THE EFFECT OF THE SUBSIDIZATION SYSTEM ON AGRICULTURE

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ABSTRACT

The effectiveness of the agrarian subsidies will unambiguously show a worsening tendency if the amount of the subsidy does not reach a specific volume regarding the different types of enterprises. However, concerning Hungary, it is characteristic that subsidies provided for both private farms and joint agricultural enterprises tend to be exceptionally low. Naturally, this is related to the predominantly tiny, fragmented farms that have come into existence, and where there is no potential for mass production and producing the quality expected by the market, furthermore the necessary implement utilization cannot be achieved. The existence of these circumstances can make efficiency unstable. All these are certainly related to the extent the presently functioning agriculture is able to participate in rural development in consequence of the penurious resources. It would be desirable to alter the fragmented property structure in the form of voluntary partnerships, which would create larger farm sizes, therefore fostering future profitability, and by these means producing their own resources needed for development.
Keywords: subsidy, differentiated distribution, farm sizes, sustainability, competitiveness

INTRODUCTION

Analysing and adjudging the necessity, volume, effect, and effectiveness of the subsidization system are far beyond the scope of the present study. Our aim is to draw attention, by bringing up some influential factors, to the existence of interrelations, the circumstances that must be taken into consideration regarding their effect, and indirectly the necessity of actions that should be taken.

THE CHARACTERISTICS OF THE HUNGARIAN SUBSIDIZATION SYSTEM

It is necessary to make it clear at the beginning that to interpret the term of agriculture it is practical to employ the ancient (classical) concept, which contains the processes of food production as well as the activity that alters the relationship between humans, the arable land, flora and fauna - all in all environment building. Emphasizing it is also necessary since rural development is an important element of the objectives and the subsidization system regarding the Common Agricultural Policy. Significant renewals have characterised The Common Agricultural Policy since 2009. The emphasis has been placed on the direct income subsidization of the

growers, and it has become an integral part of rural development and the agricultural policy. Making direct subsidization independent from production is a central element (SPS system) (*Cseke et al.*, 2009). The objectives of this subsidization system are market regulating role strengthening, more balanced subsidization of the growers as well as widening the potentials for rural development.

More than 56% of the agrarian and rural developmental subsidies allocated were paid as market subsidization, and approximately 30% of them served rural developmental objectives. More than 96% of direct subsidies were allocated to individual growers (*Dorgai et al.*, 2008). It is also a fact that from among the subsidized individual farms nearly half of the applicants were given small amounts of subsidy (*Tóth*, 2009). It is remarkably disadvantageous that the majority of individual farmers belong to the older than 50 age group. (Examining the different counties, farmers in Heves, Nógrád and Zala are the oldest.) Within agriculture the biggest part of the arable farming sector received subsidies.

JUSTIFICATION OF THE AGRARIAN SUBSIDIZATION

Even these few figures raise the question why subsidies are needed, since it induces a peculiar competition for obtaining the subsidies, which cannot be regarded beneficial, as they significantly determine the growers' position on the market. On the other hand, it can be articulated in economic terms that under the given price conditions the growers (especially those faming worse quality lands) can achieve socially justified, fair earnings only by obtaining incomes increased by subsidies. Specialists emphasize in their studies the non-negligible circumstances that agriculture carries out tasks beneficial for the society (fragmented labour force, the employment of unskilled social strata, care of land, keeping rural communities in existence, etc.), and for which it can justly expect financial compensation from the society.

Furthermore, it cannot be neglected that agriculture is an activity, which lives off the land and the result of this activity also alters its environment. Sustainability has also become highly appreciated and forms an integral part of the subsidization system (*Nagy*, 2008).

Consequently, the expectation of the growers can be justified regarding the compensation given to them from public finances for the extra expenses that follow from sustainability as well as from the conditions of farming that have been made more rigorous.

It is also important to underline that the significance of agriculture varies in the different counties and regions. It is well demonstrated by the gross domestic product per capita and the share of the agriculture from the gross value added (*Figure 1*).

Figure 1

Gross Domestic Product Per Capita and the Share of the Agriculture from the Gross Value Added, 2005
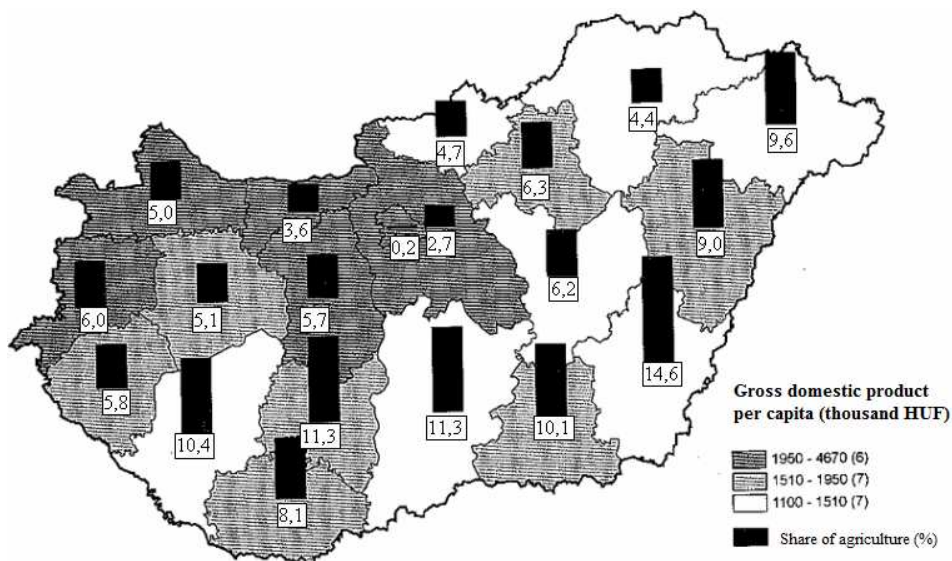
Note: Agricultural gross value added (GVA) = the joint performance of agriculture, game management, forestry and fishing.

Source: *Agricultural Studies* (2008) (In: Hung.) 6. 40. p., *National Accounts of Hungary* (2004-2005); *Hungarian Central Statistical Office* (2007)

DIFFERENTIATION OF SUBSIDIZATIONS WITHIN THE COUNTRY

We decided to describe the situation by counties, because it leads or can lead us to studying the regional differentiations, highlighting the necessity of adjudging the circumstances evolved in micro-regions.

The Hungarian Central Statistical Office has evaluated the economic and societal characteristics of micro-regions several times, including 2004 as earlier years, regarding different indices (e.g. the value of capital invested per inhabitant, the course of changing the amount of gross annual income per inhabitant, the number of operating economic organisations per a thousand inhabitants, the number of telephone lines and cars per a thousand inhabitants, etc.). The classification was made by the comparison with the country average. A researcher-made delimitation has been created in accordance with basic indices, dynamic indices and developmental level, then on this basis five region types were identified as follows: dynamically developing, developing, catching up, stagnating, and lagging behind regions.

The criteria that evaluate regions, without doubt, determined the most important fields, which contain several connections; however, the role of some of the criteria has changed considerably since then (e.g. the figure of telephone lines per a thousand inhabitants is unable to describe alone how wide-spread the infocommunication is.) The number of indices (9) classifying regions does not require an increase; nevertheless, some change would be reasonable. For example the classification does not deal with agriculture directly, although the set of indices also communicate the product of this field of the national economy indirectly. (The same can be mentioned about the traffic conditions and the development of road networks, for example.)

It is also important to emphasize that about one fifth of the population in Hungary, approximately two million people, are connected with agricultural production. In the lagging behind regions this figure can be as high as 40% (*Dorgai et al.*, 2008). In these regions working in agriculture is almost the only means to avoid a severely underprivileged status and the utmost poverty. The activity of enterprises is another factor that should be examined. The figure most often used for its evaluation is the number of enterprises per a thousand of inhabitants. Yet, this index is inappropriate for evaluating the division of businesses by the sectors of the national economy as well as by their sizes.

It is ascertainable as a fact that the proportion of agricultural enterprises compared to all businesses is within the range of only 4-6% depending on whether companies operating in Budapest are also taken into consideration or not. The presence of this enterprise group in the micro-region must also be highlighted. It is not surprising that the highest percentage of agricultural enterprises (about 15%) can be found in the 'last' member of the regional classes. In the stagnating and lagging behind regions agrarian employment (13%) is four times higher than the domestic average, which is approximately 3% (*KSH*, 2008).There is a relatively strong correlation between a lower level of regional economic development and the determining role of agricultural activity. Concomitant phenomena in these regions include the unfavourable age composition of the population, the low level of education, and the extremely moderate income level.

The biggest problem of the numerous stagnating and lagging behind micro-regions is the lack of an appropriate economic basis. Without introducing measures fostering development their ability to retain the population will deteriorate. Unemployment is increasing, the social tension is growing, and an accelerated depopulation of villages can be predicted.

Those members of the labour force who drop out of agriculture will have a much slighter chance to get other employment in the stagnating or lagging behind micro-regions, compared to those living in regions that do not fall into these categories.

EFFICIENCY CONNECTION
BETWEEN SUBSIDIES AND FARM SIZES

The efficiency of subsidization is particularly thought-provoking taking the fact into consideration that an average farm was given 976 thousand HUF subsidies in

Hungary in 2006. Whilst the average partnerships obtained 14 590 thousand HUF, individual farms received 531 thousand HUF. From the individual farmers about 114 thousand applicants (58.1% of all the individual growers) were given a small amount of subsidies (less than 210 thousand HUF) (*Dorgai et al.*, 2008).

It is important to consider that there has been a gradual societal restructurial in rural areas within the European region. The effectiveness of high-performance farm machinery as well as mass-produced food supply further strengthened the positions of large scale enterprises, and has significantly altered the structure of land ownership (*Glatz*, 2008). Changes of properties, land concentration, new ownership and land leasing forms have come into existence, and new cooperatives have been established.

With the constraints within market economy the ownership of land, the sizes of farms, along with agricultural cooperatives have been gradually altered in Western Europe. The modernisation of the former large-scale farms did not take place after the political changeover in Hungary.

The country is characterised by an agricultural business structure that is unable to succeed regarding the European competition. The appropriate producing volume, the production profile and the flexible adaptability to the market is conceivable only if farm sizes reach a certain extent. The subsidization-utilization will be or can be more efficient only after the realization of this aim and the objectives of rural policy can also be realised by then.

CONCLUSIONS

The agrarian subsidization must be regarded as a prominent element of the subsidization system. Beyond the usual business economic issues, the special environment forming characteristic of agriculture, as well as sustainability, must be taken into consideration during decision making, regarding the forms and volumes of subsidization. We regard the establishment of harmonization between the EU subsidization system and its domestic counterpart an important issue.

The unfavourable structure of land ownership is a major hindrance to rural development at present. The small, fragmented structure of agricultural land makes mass production, even quality, and efficient utilization of the means of production impossible, furthermore it also decreases the role of subsidization and its effect on successful farming. This finding is true even if there is also a favourable condition, since most part of our country is suitable for food production.

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TREND CALCULATION OF QUANTITATIVE AND QUALITATIVE FACTORS IN SUGAR BEET PRODUCTION UNTIL 2015

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ABSTRACT

Quantitative and qualitative factors applied in sugar beet production point out that all of the parameters analysed in this study (average sugar beet yield, sugar content, sugar yield, usable sugar yield and thick juice purity) show an increasing trend. Trend calculations based on linear trend method show higher yearly increase until 2015, but with lower reliabilities, compared to the moving average based trend calculations, their reliabilities are higher, but the yearly increases are lower. The calculated results show that the production value per hectare will increase in the next years, and this can be a basis for the successful and profitable beet growing in Hungary.
Keywords: sugar beet, beet production, trend calculation, sugar yield, forecast in agriculture

INTRODUCTION

Similarly to the other arable crops, the production value per hectare of the sugar beet is strongly determined by quantitative (average sugar beet yield) and qualitative (sugar content, sugar yield, usable sugar yield and thick juice purity) factors. The continuous improvement of these factors is a key question for the profitable sugar beet cultivation. This study analyses the data of the contracted farmers of Sugar Factory Kaposvár from 1995 to 2009. The main objectives of the analysis are:

- To analyze the direction and the measure of the change of quantitative and qualitative factors
- To calculate a trend for all analysed factors until 2015 to forecast the yearly increase of the factors

LITERATURE REVIEW

Nagy (2009) investigated the forecast of the quantitative and qualitative factors for different agricultural plants. He analysed country specific data between 1990 and 2006 and established that quantitative factors of most agricultural plants (wheat, maize, sunflower, potato) showed stagnation. However, some agricultural plants (sugar beet and rape seed) showed an increasing trend. Another study of *Nagy* (2008) pointed out that the uncertainty of forecasting in EU15 countries is lower than in the recently joined Eastern European countries. Many authors studied the correlation between the quantitative and qualitative factors of sugar beet production. These studies started from the 1950s. According to *Margara and Touvin* (1954) there is a strong negative

correlation between the sugar beet root yield and the sugar content. In case of high sugar beet yield the sugar content is lower. In case of higher sugar content the sugar beet yield is lower. The seed variety definition system worked out by *Lüdecke* (1953) also assumes this negative correlation. The strong negative correlation is also mentioned by *Bocz* (1992) and *Potyondi* (2002).

MATERIALS AND METHODS

Data are provided by the beet accounting system of Hungarian Sugar Ltd Sugar Factory of Kaposvár. All data are cumulated yearly. Two types of the trend analysis are carried out for all factors. First a linear trend calculation is made, but in that case the determination coefficient shows moderate reliability. To increase the reliability of the trend calculation a three-year-moving average trend calculation is also implemented. The moving average calculation smoothes out the yearly differences and the trend line is more visible. In case of moving average based trend calculation the correlation coefficient is always over 0.85 with only one exception.

RESULTS AND DISCUSSION

The analysed quantitative and qualitative factor in the period of 1995-2009 are shown in *Table 1*.

Table 1

The analysed parameters

Years	Sugar-content	Average beet yield	Sugar yield	Usable sugar yield	Thick juice purity
	%	t/ha	t/ha	t/ha	%
1995	14.88	38.03	5.66	4.65	90.97
1996	15.79	40.33	6.37	5.28	91.24
1997	16.27	36.63	5.96	5.04	92.14
1998	14.34	54.35	7.79	6.53	91.90
1999	15.02	60.14	9.03	7.74	92.99
2000	14.79	42.38	6.27	5.32	92.47
2001	15.60	53.07	8.28	7.08	92.77
2002	15.60	54.80	8.55	7.24	92.29
2003	15.30	41.66	6.37	5.38	92.21
2004	15.53	57.76	8.97	7.68	92.84
2005	15.21	66.65	10.14	8.66	92.80
2006	16.28	56.86	9.26	7.98	93.11
2007	15.17	50.01	7.59	6.44	92.45
2008	17.14	67.79	11.62	10.10	93.48
2009	16.57	54.50	9.03	7.80	93.23

Average beet yield

The most important quantitative factors used in the sugar beet production is the average beet yield per hectare. The factor shows extreme fluctuations in the analysed period. There is 85% difference between the lowest (36.6 t/ha) and the highest (67.8 t/ha) value. This difference can be explained partly with the changeable weather conditions in different years, but there are some other influencing factors like plant disease, applied technology, harvesting conditions. Despite the high yearly differences, the linear trend calculation shows an increasing trend with middle reliability. The average yearly increase until 2015 is 1.4 t/ha (*Figure 1*). Trend calculation based on moving average shows high reliability and 3.6 t/ha increase in 3 years period, which corresponds 1.2 t/ha yearly increase. Linear trend calculation shows 70 t/ha average beet yield in 2015, with 40% reliability. Moving average trend calculation shows 63 t/ha average beet yield in 2015, with 85% reliability (*Figure 2*).

Figure 1

Average beet yield linear trend

$$y = 1,4137x + 40,355$$
$$R^2 = 0,4064$$
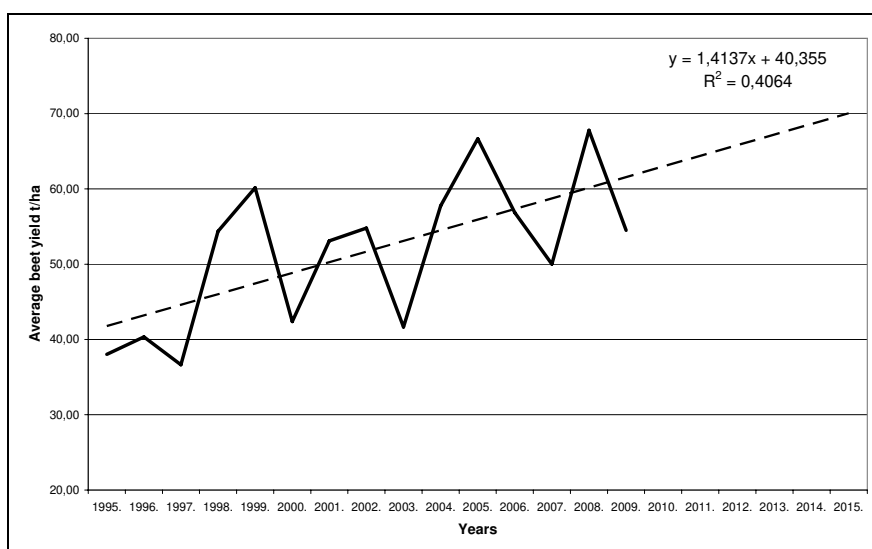
Sugar content

The most important qualitative factor of sugar beet production and also of sugar production is the sugar content in the sugar beet. Similarly to the average beet yield the values show high fluctuations in the analysed period. There is 20% difference between the lowest (14.34%) and the highest (17.14%) value, but this is much lower than the 85% in case of average beet yield. Consequently, the assumption is that the sugar content can be forecast with higher reliability. However, the analysis contradicted this assumption. The reliability of linear trend calculation is only 0.26, and the yearly increase of sugar content is 0.085% (*Figure 3*). The moving average based trend calculation does not increase the reliability considerably (0.4), and the

forecast increase of sugar content is 0.225%, which corresponds a yearly increase of 0.075% (*Figure 4*). Linear trend calculation shows 16.7% sugar content in 2015. The same factor in case of moving average trend calculation is 16.5%.
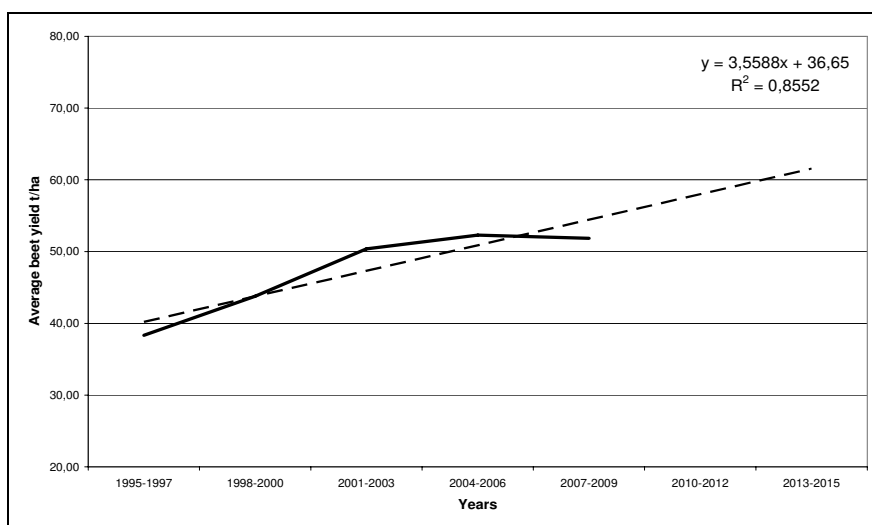
Figure 2

Average beet yield moving average trend

Figure 3
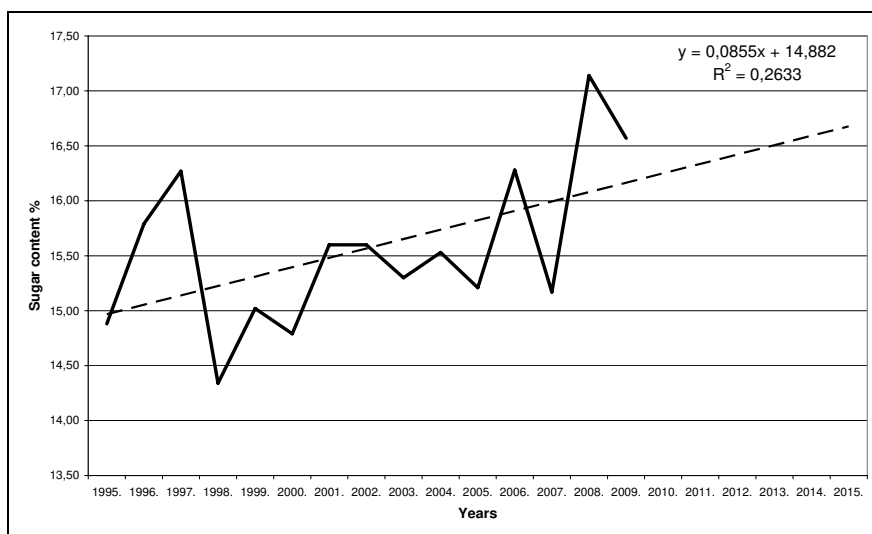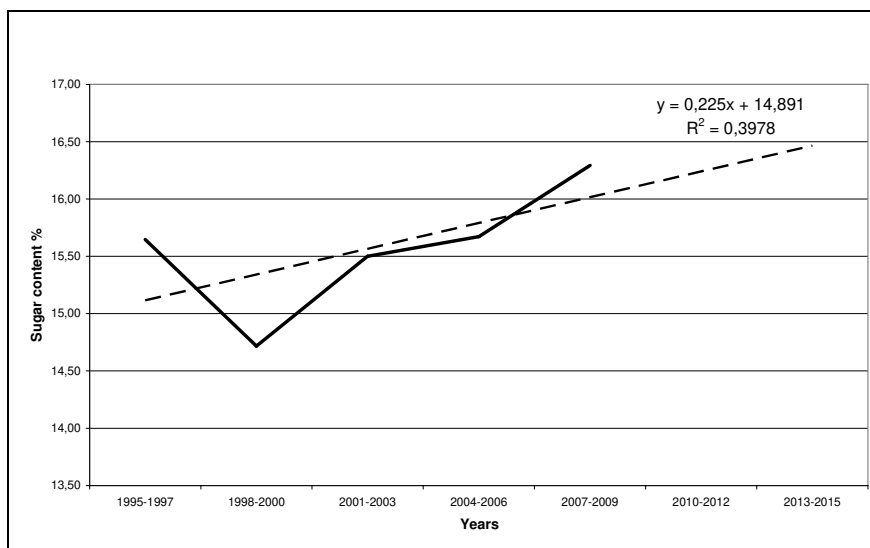
Sugar content linear trend

Figure 4

Sugar content moving average trend

Sugar yield

Sugar yield is a combined factor that includes the most important quantitative factor (average beet yield) and the most important qualitative factor (sugar content). Many professionals assume a strong negative correlation between these factors. This assumption can be suitable if we consider the data from the various years separately. E.g. in case of extreme weather conditions, drought causes low beet yield and high sugar content at the same time. However, if we analyse longer period and calculate the correlation factor, we can prove the opposite of this assumption. The correlation factor of sugar content and average beet yield is 0.25 in positive direction. The 105% difference between the highest (11.62 t/ha) and the lowest (5.66 t/ha) sugar yield also contradicts the initial assumption of negative correlation, because it is much higher compared to the differences of the initial two factors (85% and 20%). It shows that the differences do not compensate each other, but intensify the differences in both directions. Linear trend calculation of sugar yield shows an increasing tendency with middle reliability of 50% (*Figure 5*). The forecast yearly increase until 2015 is 0.27 t/ha. Trend calculation, based on moving average, shows 0.47 t/ha increase within a 3 years period, which corresponds 0.16 t/ha yearly increase. The reliability of moving average trend calculation is 88% (*Figure 6*). Linear trend calculation shows 11.5 t/ha sugar yield in 2015. The same factor in case of moving average trend calculation is 9.0 t/ha.

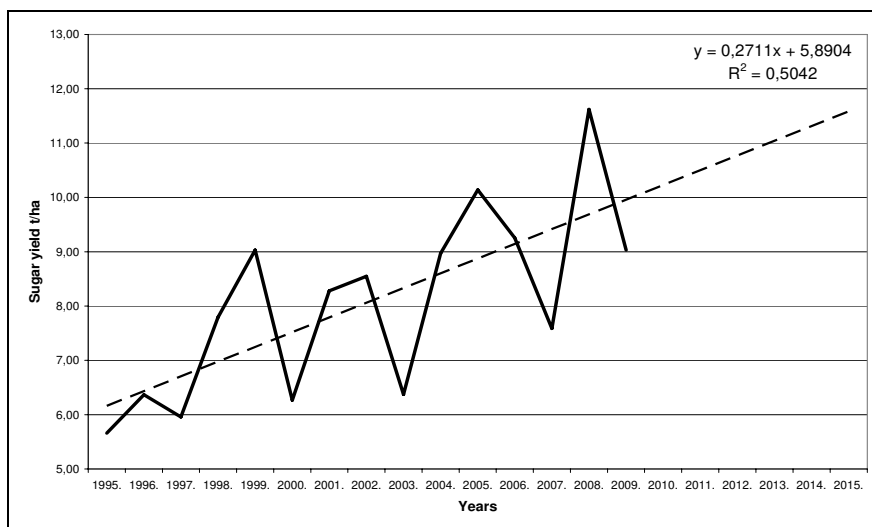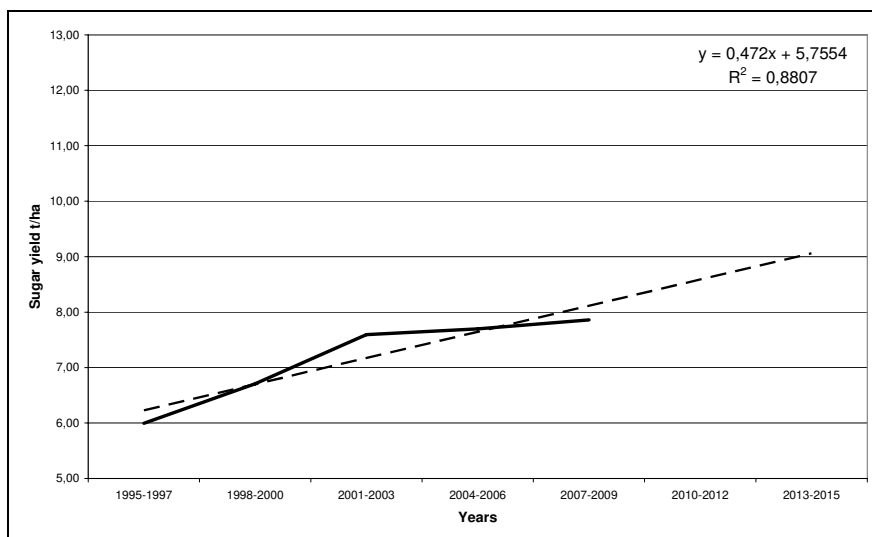**Figure 5**

Sugar yield linear trend

Figure 6

Sugar yield moving average trend

Usable sugar yield

Usable sugar yield is a factor calculated from the sugar yield and the different sugar losses during the sugar manufacturing process (molasses sugar. sugar remaining in

12

beet pulp, technical sugar losses). It is a very important factor both for the sugar beet producers and the sugar manufacturers. It shows the producible sugar quantity from 1 hectare sugar beet area. The result of the trend calculations is reliable, while producers' usable sugar yield shows similarity to the results calculated for the sugar yield. The reliability of linear trend calculation is 0.52 and the yearly increase of usable sugar yield is 0.25 t/ha (*Figure 7*). Moving average based trend calculation increases the reliability significantly to 0.89. The forecast increase is 0.44 t/ha within 3 years, which corresponds 0.15 t/ha yearly increase (*Figure 8*). Linear trend calculation shows 10.0 t/ha usable sugar yield in 2015. The same factor in case of moving average trend calculation is 7.9 t/ha.

Thick juice purity
Thick juice purity is an important factor for sugar manufacturing process. It shows the calculated proportion of non-sugar ingredients. The higher the factor is, the lower is the proportion of non sugar ingredients. The calculation of the factor is based on the potassium, sodium and alpha-amino nitrogen content in the sugar beet. The reliability of the trend calculations of thick juice purity is the highest from the five analysed factors. The coefficient in case of linear trend calculation is 0.64, in case of moving average based trend calculation is 0.95. The yearly increase of thick juice purity is 0.13% according to linear trend calculation (*Figure 9*). Moving average based trend shows 0.33% rise in 3 years period, which corresponds 0.11% yearly increase (*Figure 10*). Linear trend calculation shows 94% thick juice purity in 2015. The same factor in case of moving average trend calculation is 93.5%.
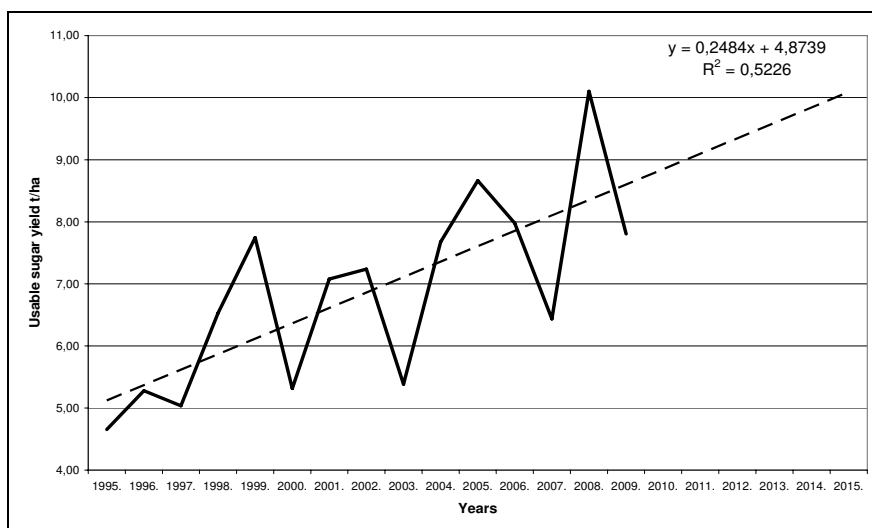
Figure 7

Usable sugar yield linear trend

$y = 0{,}2484x + 4{,}8739$
$R^2 = 0{,}5226$

Figure 8

Usable sugar yield moving average trend
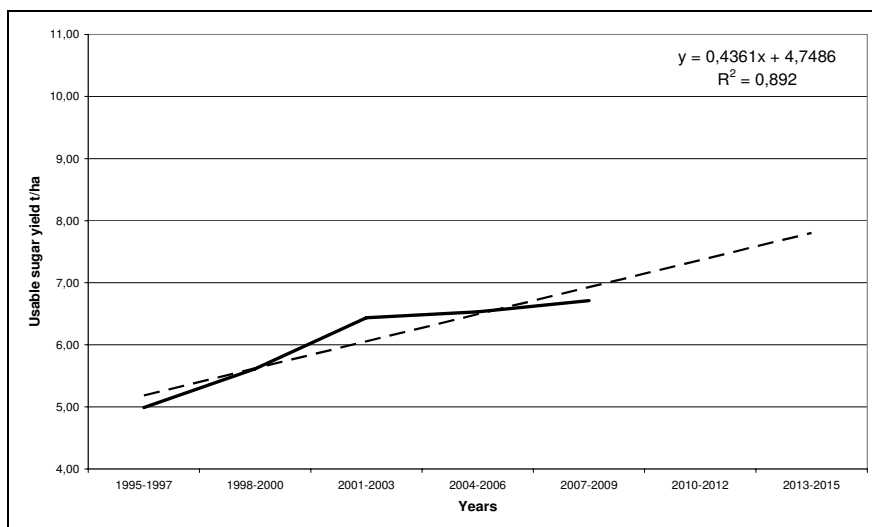
Figure 9

Thick juice purity linear trend
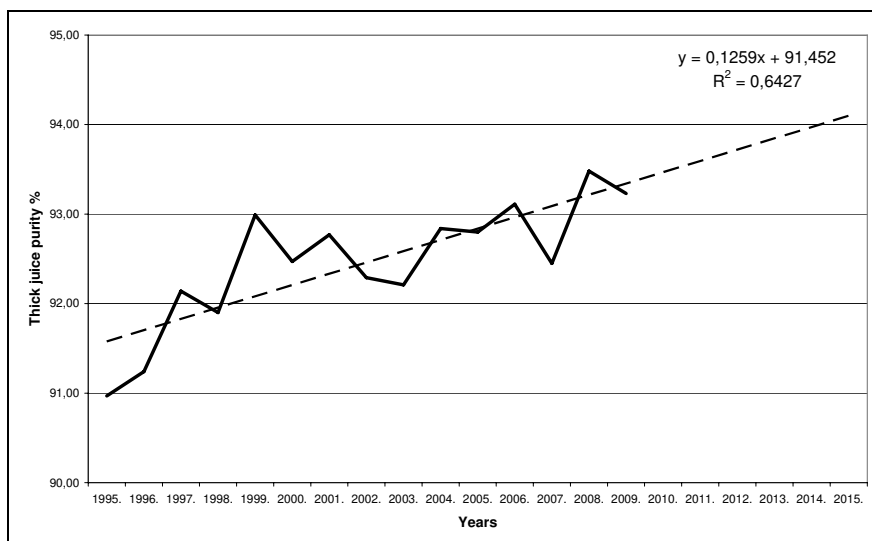
Figure 10

Thick juice purity moving average trend

$y = 0{,}328x + 91{,}166$
$R^2 = 0{,}9576$
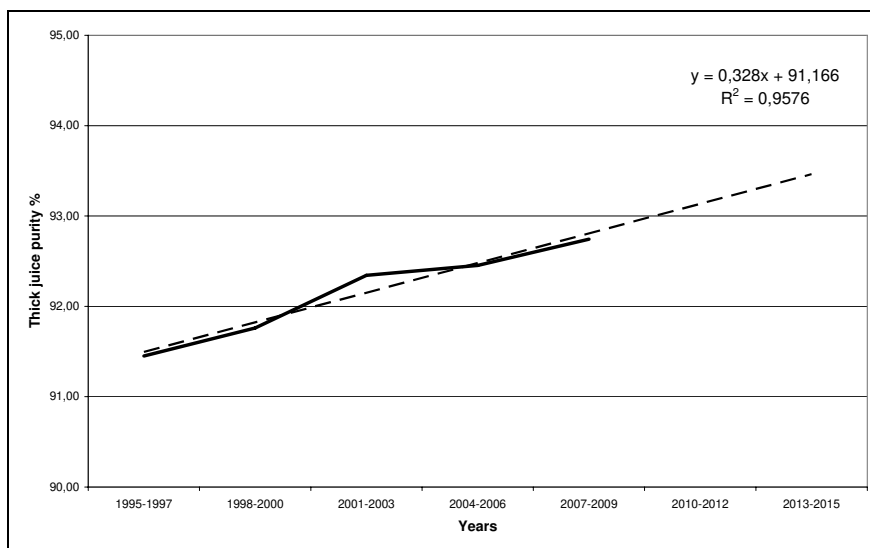
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ENVIRONMENTAL PROTECTION IN SERBIA; ENVIRONMENTAL CHALLENGES OF A WAR AND AN EXPERIENCE OF THE SUBSEQUENT CONSOLIDATION

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ABSTRACT

The main purpose of the article is to show the development of the state of Serbian environmental protection from the nineties to nowadays. In the first section, it is inevitable to start with the tragic events of the nineties, with the civil war and the subsequent NATO air strikes. In addition, an important part of this section is the discussion of the radioactive pollution caused by the airstrikes. The following section is describing the recent situation according the main environmental factors and also shortly shows the correlating factors like economy, international cooperation and regulations. In the final part, despite the large progress of the approved environmental regulations, probably the most actual and severe issues – the implementation and execution of the regulations – are discussed. It is important to see that despite all the development since the end of war until today, despite the progress in the European Union accession process and the accompanied further integration there are still several hurdles – lack of funding, lack of cross-sector planning or public awareness - to overcome in order to change the state of the Serbian environment.
Keywords: Serbia, environment protection, war, regulation

> *'Everyone shall have the right to healthy environment and the right to timely and full information about the state of environment.*
> *Everyone, especially the Republic of Serbia and autonomous provinces, shall be accountable for the protection of environment.*
> *Everyone shall be obliged to preserve and improve the environment'*
>
> (*Constitution of the Republic of Serbia*, 2006)

STATE OF ENVIRONMENTAL PROTECTION IN SERBIA

Due to the main intention of the article to present the decisive events, development and recent state of the environmental protection in the Republic of Serbia, it is inevitable to start the article with the effects of the tragic events in the nineties on the natural and man-made environment of the country and the subsequent economic implications. The almost ten years of civil war and following NATO airborne airstrikes, followed by the political and economical consolidation fundamentally determined the recent state of environmental protection policies in Serbia. Currently, in this field, despite all the positive developments, Serbia is one of the most underdeveloped countries in Europe.

The following factors and events are causing substantially larger damage to the Serbian natural habitat and general health of the public than the later discussed use of depleted uranium:

- the concentrated bombing and demolition of the Serbian industrial centers, energy sector and infrastructure;
- the militarized economy and the UN sanctions of the 90's;
- the unrealized and cancelled investments, the lack of proper maintenance and thus the utilization of inefficient obsolete and environmentally hazardous technology;
- political chaos and extreme corruption;
- lagging, inadequate and incomplete regulatory environment;
- lack of cross-sector policies and – what is even worse
- the implementation and enforcement of the regulations.

The most promising factor during the transformation of the country is the European Union Accession process according to which laws, by-laws, implementation and their execution has to be fully harmonized with the EU Acquis Communautaire.

In the following sections I would like to present shortly the main environment related events (not in their chronological order but according to the structure of the article) and their consequences in the nineties. After the past, a brief presentation of the recent state of the Serbian environment, the respective problems, regulations and potential remedies comes.

The NATO Airstrike and its consequences

The NATO military action against the Federal Republic of Yugoslavia – which was strictly limited to airborne – did not only exaggerate the fall of the Milosevic regime, but also substantially deteriorated the ecological and economic potential of the country. In this section, a short presentation of the consequences of the 79 days of airstrikes and a summary and a brief evaluation of the damage will follow.

Chemical Contamination

The main target of the NATO Bombing was to paralyze the vital functions of the Serbian State and at the same time to avoid excessive civil casualties. There was a wide scale airstrike against physical establishments of the political institutions (buildings of the Milosevich Party and certain state administration), police and military outlets. In addition, several crucial infrastructural locations like bridges (Novi Sad) were completely destroyed, and the broadcasting of some TV and Radio stations (TV and radio broadcasts) was disabled by the demolition of TV towers like Fruska Gora near Novi Sad and Avala in Belgrade (where the reconstruction was completed only in 2009). With the above strategy, they wanted to cut off the distribution of information and to substantially make the movements of the Serbian military and supplies difficult. An additional goal was to disable everyday life and to motivate the inhabitants of Serbia to either overthrow the Milosevich regime or to force them at least to cooperate peacefully and constructively with International

Institutions and Forces. Despite all the great plans and announcements to minimize non-military related damage, the list of industrial targets was also substantial and the consequent ecological and human cost, were extremely high.

The main targets of the Serbian Economy were:

- agricultural centers and chemical fertilizer plants;
- fuel, oil and chemical industrial plants;
- electric power-plants
- metallurgical plants;
- pharmaceutical plants;
- food processing plant and several storages;
- and other types of plants, for instance machine manufacturing, battery and plastic processing plants, tobacco factories and even commercial and office centers were included on the list to be bombed.

Radioactive Pollution

Before further discussion, it has to be emphasized that the environmental damage and health problems caused by the use of depleted uranium as a result of the military action against Serbia – were proven to be negligible compared to other much more serious problems.

As it was mentioned earlier, in an article about the state of environment in the Serbian Republic, it is imperative to discuss about the use of depleted uranium and its real ecological and human health related consequences. The employment of depleted uranium in the artillery was confirmed and in addition (in 2001) a detailed list of locations was supplied by the NATO (*UNEP*, 2002).

In nature, two different kinds of uranium isotopes can be found: the 235 *mass-number* and 238 *mass-number*. For nuclear power-plants the 235 isotope is used for the enrichment of uranium. The by-product of the enrichment process is the so-called depleted uranium. The radioactivity of the depleted uranium is approximately 40 percent less than that of the natural uranium and the half-life is around 4.5 billion years. Due to industrial enrichment processes and the wide use of nuclear energy on a global scale, disposable depleted uranium sources are plenty and cheap. Given the large density of the uranium, the artillery with uranium head penetrates deeper into the armor of the target than a regular bullet. The use of depleted uranium for military purposes is a globally widespread phenomenon (*WHO*, 2010; *www.wikipedia.org*, 2010).

After the conclusion of military actions in Serbia, the issue was raised by the Milosevic propaganda and it became not only a scientific debate, but also a media created hype. Both the use of depleted uranium and its consequence on the human health and on the natural habitat have become one of the hottest topics at that time. Just as an example, in Hungary just after the finish of the NATO Campaign, the topic became popular and exaggerated by the media. Many articles concluded that the so-called Balkan-syndrome (in a relatively short time a large number of peacekeeping – SFOR – soldiers became sick with Leukemia) was caused by the depleted uranium (*origo.hu*, 2001).

Depleted uranium basically damages its environment in two ways: as heavy-metal and as radioactive material. According to independent experts employed by the UN, the Balkan or previously the Gulf-syndrome among other factors is more attributable to the first factor (*UNEP*, 2002).

To evaluate the environmental damage caused by the depleted uranium, the UN has formed a Balkan Task Force and the group examined the posterior radiation in all the major areas affected by the NATO airstrikes (in Serbia, Montenegro and Kosovo). The international task force (also including Russian scientists) did not find any serious aftermath and the hazard was rated as minimal. The Balkan Task Force has examined all areas twice with a few years difference and they are also planning further evaluations (*UNEP*, 2002).

EXAMPLES OF WHAT TO BOMB?

Panchevo: around 1.7 million people were affected by the direct consequences of the airstrike, due to the relative proximity of Belgrade and even more because of the fact that industrial zones were/are right on the bank of the Danube. The chemical industry and oil refinery of the city was one of the largest single industrial complex of ex-Yugoslavia and that is why it was one of the first targets of the NATO strategy. Basically, every industrial construction in Panchevo was ruined to the ground. Even today, there are not exact and correct statistics about the quantity of oil, oil derivatives, auxiliary materials and chemicals which contaminated the air, the Danube, underground water reserves and soil. According to estimates, approximately 80 000 tonnes of oil products burned and 5000 more tonnes of oil product leaked into the soil and sewer system (*UNEP*, 2004).

Kragujevac: the airstrikes affected around 175 000 people and the city used to be the center of car, weapon and munitions manufacturing in Yugoslavia. At this hotspot, the bombing of the Zasatava complex led to high concentration of polychlorinated biphenyls and dioxins (approximately 2500 tonnes of PCB oil leaked from the damaged transformers) in the territory of the factory and also in the Lepenica River (*UNEP*, 2004).

Novi-Sad: is the center of Vojvodina with approximately 300 000 inhabitants and also one of the main service and logistical center of the economy. It was one of the main targets of the NATO bombings, due to its gate role (as the main distribution center) in the economic life of Serbia and also due to the bridges on the Danube. Furthermore, the storage facilities and pipelines of the local oil refinery were seriously damaged and approximately 70 000 tonnes of oil products burned and spilled into the soil and groundwater (*UNEP*, 2004).

Belgrade: the full population of the city (around 1.7 Million people) was affected by the consequences of the airstrikes, not just due to its role as the capital of Serbia and as such the administrative, military and cultural center of the country, but as mentioned before also by its proximity to Panchevo. The main military, police and Milosevich Party buildings, the TV tower and TV center (and the be-famed Chinese embassy) were completely destroyed.

In addition, to the previously mentioned major targets, there were several other seriously damaged industrial centers. Among them, Bor – the main mining and smelting complex and Nis – apart from Panchevo the city was the center of energy and chemical industry of ex-Yugoslavia.

PRESENT

Since the turn of the millennium, the Serbian economy not only consolidated from a military driven economy, but despite the lost possibilities in the nineties' global prosperity and also all the post-war and post-sanction political problems, it became one of the dynamically growing economies of Europe. Although the present global economic crisis has slowed down the economic recovery and probably due to the large exposure to Greek banks, the economic growth might lose some momentum. However, given the low starting point, further large falls in the productivity and GDP are unlikely. Furthermore, it is in the best interest of European Union itself to support an economically sound and politically stable Serbia.

Figure 1

**Changes in the Serbian GDP per capita since 1990
(at current prices – US dollars)**
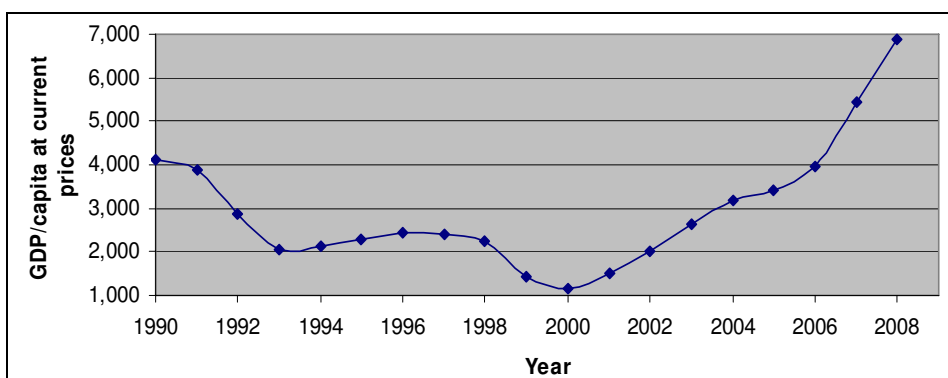
Source: *UNdata*, 2010

In the nineties, with the existence of the military driven economy the GDP took a free fall. Just for comparison, in 2000 the GDP per capita (1161 USD) was approximately four times less the same 1989 data (4100 USD) (*UNdata*, 2010). In 2006, the same statistics (3979 USD) were again four times higher than in 2000, however, still did not reach the 1989 value. 2007 was the first year again, when the GDP per capita number (5456 USD) was larger than in 1989. In 2005, 2006 and 2007 the annual growth of GDP was around 5-7%. In the recent years, the main driver of the economic growth has been service sector with especially large contribution from the logistic and passenger transportation (in the second quarter of 2006 their performance was almost 27 percent higher than in the same period of

2005) services. The industrial production is also successfully reviving after the great shock of the 90s and its growth reached 5% in 2006 (*UNdata*, 2010).

In ex-Yugoslavia, the heavy industry and machine manufacturing were mainly concentrated in the Serbian Republic, thus now still these are the dominant sectors in the economy. As basically all the segments of the heavy industry are represented in the present territory of Serbia, the level and extent of environmental problems are large and varied. Despite all the development and revival of the Serbian industry it is still in a very immature phase in relation to modern technologies, and what is even more problematic the usage of old, obsolete and inefficient equipment and methods creates serious hazards. Due to these technologies the environmental damage is substantially more serious than what would be implied by the size of the Serbian industry.

Air and Lead

The greatest air pollutant is the energy and chemical industry, the heating plants, waste sites and construction industry. These have the highest emission not only due to the fact that they are usually the most polluting sectors in any economy, but also because their operations are very far from any contemporary industrial standards. The derivatives and by-products of the productions are not processed at all, but simply burnt without any cleaning and then driven into the air without filtering. The major pollution arises from the use of low quality lignite in power plants (around 62% of the electricity is produced by the use of lignite) In most of industrial zones, which can be called as environmental 'hot-spots' (not surprisingly, many of them are identical with the industrial areas bombed by the NATO, for example: Panchevo, Kragujevac, Nis) the air and water pollution is many times higher than the threshold limits. The production of electricity and heating is done in old power-plants with the usage of low quality lignite. The loss during distribution is enormous and due to the lack of individual meters at the consumers, neither the plants, nor the retail customers are interested in efficient usage. Based on estimates recently only 75 percent of all produced energy has reached the final consumers. Wit the introduction of different incentives, separate consumption meters, and more energy efficient equipments and appliances final consumption could be decreased by as much as 50 percent. The use of renewable energy in the whole energy industry was less than 7 percent in 2006 (*National Environment Strategy*, 2006).

Another serious emission problem is caused by the passenger transportation and logistic sector, as generally both the freight and passenger vehicles are obsolete with high and inefficient fuel consumption. In line with the quickly increasing number of vehicles (approximately 2.3 million registered road vehicles in 2004) pollution is continuously growing. In this sector the main problem is the use of leaded petrol, which is still the most popular type of fuel. At present, there all still no plans to ban its distribution, or not even to introduce a special excise tax to modify consumer behavior. It is simply the cheapest source of fuel (*National Environment Strategy*, 2006).

It is estimated that the total annual damage due to air pollution and greenhouse effects in Serbia amounts to 447.2 – 1 370.1 million Euros, which is equal to 1.8-5.5% of GDP (*National Environment Strategy*, 2006).

Soil, Water and some Waste

In agriculture the major cultivation method is still intensive and it is exploiting the soil. Due to the high proportion of land in private ownership (around 85 percent), the quality of soil is further decreased by inappropriate methods and chemicals for pest control. It is especially problematic in the Vojvodina region, as it contains the most fertile agricultural land (83.5% of its area is in agricultural use). An additional problem is the high level of erosion of soil, as around 80 percent of the agricultural areas are affected by either wind or water caused problems. This section would not give a full picture without mentioning the emissions caused by the low quality industrial processes and traffic related emissions, as the land around industrial cities and major roads is deeply contaminated by various pollutants (*National Environment Strategy*, 2006).

The country possesses sufficient quantities of water resources to meet its needs. Water management, however, stayed as immature/underdeveloped as it was 20 years ago, just like in any other areas, there were no new investments, appropriate maintenance and basically no rehabilitation. One of the main specific reasons of deterioration of fresh water quality is the lack of environmentally sound infrastructure – no satisfactory waste management and storage, water supply and sewage system management. Approximately, 90 percent of industrial wastewater is discharged unfiltered. The quality of water suffers especially from eutrophication caused by nutrients and organic pollutants, (caused by unfiltered sewage and discharged agricultural substances) and along large cities. In the nineties, the use of fertilizers sharply dropped and the level of eutrophication decreased substantially, but since then it has been increasing again mainly due to a rise in livestock. Furthermore, it seems that probably the area of water management suffers most from the lack of regulations and delays compared to the international regulations and best practices due to the relatively high cost. It is important to mention that the low quality of water is also the result of the negligent behaviour of the neighbours, as only 8 percent of the water sources originate in Serbia. The quality of water for human consumption is generally low (*National Environment Strategy*, 2006).

One of the factors which contributes to both the already low quality water sources and soil is the inadequate waste management. Approximately only 60-70 percent of municipalities are collecting solid waste in their territory (mainly in urban areas) and even the hazardous waste is collected and dumped together with household waste. In rural areas the most important way of waste management is burning (*National Environment Strategy*, 2006).

Regulatory environment

In 2004, Serbia adopted the following laws, which comply with the respective EU directives: Law on Environmental Impact Assessment, Law on Strategic Environmental Assessment and Law on Integrated Pollution Prevention and Control. The main importance of these laws is that they allow public participation and access to information (*UNDP*, 2009).

The time period since 2006 can be characterized as a continuous election campaign, which completely disqualified any issues (including environmental

matters) among politicians and lawmakers apart from daily political survival. In 2006, after the separation of Montenegro, the new Serbian Constitution had to be quickly completed and approved, in January of 2007 parliamentary elections were held (resulting in a fragile majority) and in 2008 on the presidential election Boris Tadic, pro-European and a democratic politician was elected. In February 2008, Kosovo announced its independence and completed its separation from Serbia. In May 2008, early parliamentary and municipal elections were held, after which with the lead of the Boris Tadic Democratic Party, and despite the participation of the post-Milosevich party in the coalition, a pro-European and stable cabinet was formed. The main goal of the cabinet is to prepare Serbia for the EU accession (the first great achievement was to reach the abolishment of Visa requirement for Serbian citizens into the Schengen countries), and to conduct an open and multilateral communication and cooperation with the EU member countries to improve the external evaluation of Serbia. The EU accession process and the cooperative behaviour were giving place for high hopes in the area of environmental protection regulations, administration, implementation and execution as well. The accession itself requires the harmonization of all Serbian laws and by-laws including the environmental ones too.

In 2005 Serbia and the EU started negotiations on the Stabilization and Association Agreement, which regulates its relationship with the EU and the main questions of the integration. In 2006 the negotiations were suspended, as the International Criminal Tribunal for the Former Yugoslavia (the Hague Tribunal is responsible for war crimes committed in the territory of the former Yugoslavia), found Serbia as non-compliant. In April 2008, the agreement was finally ratified by the EU and Serbia (*Official Gazette of Republic of Serbia*, 2008). However, for the full implementation of the agreement, the EU is expecting the approval of the Dutch government, which requires the full cooperation of Serbia with the Haag human rights court. In July 2008 Serbia arrested and extradited Radovan Karadzsizs, who was charged with crime against humanity and genocide. The capture of Ratko Mladic, the last big name fugitive, did not occur yet and probably Serbia also expects further political commitments from the EU before fully complying with the Haag court.

Despite political battles, until recently Serbia has ratified several of the following multilateral and international environmental treaties, for instance: Kyoto Protocol (*Official Gazeta of Republic of Serbia*, 2007); The Framework Convention on the Protection and Sustainable Development of the Carpathians; Convention on the Conservation of European Wildlife and Natural Habitats; Convention on Migratory Species; Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction (*National Environmental Strategy*, 2006).

The most important regulations about the environment have been completed and they were enacted by the Serbian parliament, as the 'Green Package', in 2009. These laws are the following: Act on Waste Management, Act on Ionizing Radiation Protection and Nuclear Safety; Act on Non-Ionizing Radiation Protection; Amendments in the Act on Environmental Protection; Act on

Chemicals, Act on Air Protection; Act on Packaging and Packaging Waste; Act on the Ratification of the Rotterdam Convention on the Prior Informed Consent Procedures for Certain Hazardous Chemicals and Pesticides in International Trade; Act on Biocides, Act on Ratification of Conventions and Trans-boundary Effects of Industrial Accidents; Act on the Protection and Improvement of Green Areas; Act on Protection and Sustainable use of Fish Fund, the Act on Noise Protection (*Official Gazeta of Republic of Serbia*, 2009). All the listed acts or their amendments are done in accordance with the harmonization requirements of the EU accession. In addition, law on Access to Public Information, which was approved in June of 2004, was also absolutely vital for the further development of the Serbian environmental regulatory framework (*UNDP*, 2009). The authorities are continuously working on a completely new proposal according to international standards and on the harmonization of the existing regulations according to the EU requirements.

The administration of the regulations

Responsibilities of the Ministry of Environmental Protection:

- Preparation of strategic documents, plans and programmes,
- Estimation of groundwater reserves and preparation of standards for geological maps,
- Protection from ionizing and non-ionizing radiation, chemical substances, waste and hazardous substances in production, transport, storage and disposal,
- Transboundary pollution of air and water,
- Control of transboundary waste movements and transboundary movements of protected flora and fauna,
- Climate change and protection of the ozone layer,
- Environmental protection measures in the process of spatial planning and construction,
- Early warning system against accidents,
- International cooperation in environmental matters and nature protection,
- Protection from noise and vibration,
- Preparation of programmes for basic geological investigations aimed at sustainable use of natural resources and underground water,
- Nature conservation and identification of potential natural areas of significance for preservation of nature,
- Permitting relevant to the import, export and transit of waste and vulnerable wild flora and fauna, ozone-depleting substances, chemicals and radioactive materials,
- Environmental and sustainable-development-related inspection (*UN*, 2007).

Despite all the positive changes in the regulatory environment and the establishment of a Ministry fully dedicated to Environmental issues with real European concepts and agenda, and despite all the good intentions of the politicians, regulators and civil organizations, there are serious obstacles to make the accepted laws, by-laws enforceable and executable. There are several reasons of the weak enforcement of the

environmental protection legislation: weak monitoring system, the lack of certain environmental standards and generally low awareness of and compliance with the Acts. In addition, the fines and charges are not sufficiently high to change behaviors.

However, the main reasons of the low enforceability of the legislation are, that in Serbia independently of the political situation and ad-hoc power deals, all planning and execution happens within the given sector and only little horizontal integration and cooperation exist. In addition, the Ministry of Environment Protection itself is not responsible for each environment related area. For example, in case of water quality management, apart from the MEP, the Ministry of Agriculture, Forestry and Water Management is also a responsible institution. Typical examples of non-harmonized cross-sector policies are the environment protection related issues as these areas usually have no centralized normative governance. For example: although the number of environmental assessments is increasing every year, the Strategic Environmental Assessment act (despite that it was enacted in 2004) is still not fully implemented as the Ministry of Environmental Protection has no capacity to carry them out. In addition, the inter-ministerial consultation process is limited to formal governmental comments procedure (*UNDP*, 2009). Furthermore, there is no real cooperation between central administration and municipal level.

There are also serious problems at the municipalities in this respect, as they are lacking a sufficient number of staff, adequate personnel and equipment and appropriate inspection bodies. Another problem is that as municipalities are trying to manage all the public services solely in their authority and there is not a central normative to aggregate these funds and plans into one nationwide effort, hence the targets and funds are fragmented, they are not reaching a threshold level to refinance them economically either by the central government, or by the EU organizations. Even if municipalities are able to find funding, the investment, maintenance lasts only until the complete utilization of the given funds and usually no renewal or extension of the refinancing is requested (*REC*, 2007).

Weak monitoring also largely contributes to the low level of enforceability of the regulations. National and local statistics are incomplete and inaccurate and they are based on outdated questionnaires. The relationships with the Eurostat are at an elementary level (also due to the rapid dissolution of the former Yugoslavia to its member states). The above is still true, although since the establishment of the *Environment Protection Agency* (2003) – the main priority of which was to establish an information system, assessment and reporting - statistical databases and coordination have been improving. One of the major difficulties in setting up a generally reliable statistical monitoring and database is again the lack of cross-sector coordination and undefined responsibilities and procedures. Another problem is the issue of public disclosure of the statistics, as there is a large time gap between data collection and dissemination. Generally speaking international relationships and cooperation in the field of Environmental Protection are unsatisfactory but emerging as a future priority (*UN*, 2007).

The lack of not executing and complying with the regulations can be easily detected during the regular everyday activates in Serbia. Basically all rivers of Serbia

are severely polluted and the pollution is continuously increasing. The quality of air in the big industrial cities (the ones listed earlier) is disastrous and is further deteriorating. These factors are obviously putting an enormous strain on the already insufficient and underfunded healthcare system, and contribute to the underutilization of the Serbian economy. Not to mention that to change the situation huge and ever growing efforts and financing are needed. In 2007, the Ministry of Environmental Protection has adopted an Action Plan about the most polluted areas (Panchevo, Bor and Smederevo) in Serbia.

The Integrated Pollution Prevention and Control System, which as mentioned before has adopted the related norms of the Community Acquis in full extent into the Serbian Legal Framework, was enacted in 2004 and since then most of the by-laws have already been approved. However, the limits and thresholds of allowed emission of different industrial sectors are under approval and implementation has slowly started. An example for this are two plants (Nikola Tesla and Kostolac) where electro filters have been set up according to the domestic and EU legislative, which resulted in a decrease of the emission (80% Nikola Tesla and 54% Kostolac) compared to 2003 (*National Report*, 2008). In addition, there seems to be an insufficient specific technical knowledge of employees participating in the IPPC. By the full implementation of the system, authorities could avoid the burden of ad-hoc individual cases and the control of the polluters could be done at a systematic level. By the use of the integrated system the emphasis from post monitoring and control would move to prevention and to previous control of approval of licenses. Probably it would increase the general trust toward authorities and it would substantially decrease corruption. It is not a topic of this article, but the fight against corruption, due to its wide spread presence at all levels of the administrative and judicial system is vital for the change and ultimate success.

In 2006, Serbia spent 0.2 percent of the GDP (around EUR 44 Mio) on Environmental Protection (NES) and the related industrial data is absolutely unknown. In addition, no public information is available on the distribution of the expenditures to the most important environmental sectors (*UN*, 2007). In the new EU countries the annual environment related expenditures are around 1.5-2.5 percent. There were no available public data on the amounts distributed by the central budget among environmental sectors and obviously no information on their proportions. According to estimates municipalities are distributing maximum one percent of their budget on this purpose. The National Investment Plan, which was announced in 2006, has proposed 1.2 percent of the full amount (approximately EUR 20 Mio) for such environmental related purposes for the full 5' years length of the program (*UN*, 2007). The biggest proportion of the proposal goes to waste, wastewater and clean water management. Given the extent of the pollution, the lack of monitoring, controlling and enforcing functions, the above mentioned amounts can be labeled as insignificant ones. Furthermore, it is also doubtful if the available funds are spent on the most serious environmental issues. In addition, the price paid by the final consumers, despite an increase in the energy prices lately, is still highly subsidized and does not motivate the use of energy efficiently (*REC*, 2007).

An estimate on the expense of environmental damage shows that environmental degradation costs the national economy from 4.4 percent (conservative scenario) to

13.1 percent (maximum scenario) of GDP (2005) annually. The highest loss is incurred by air pollution (53 percent of total costs), followed by water pollution (22 percent) and waste management (11 percent) (*REC*, 2007).

In order to enforce cross-sector planning and implementation – based on the already approved acts – a number of vital strategic documents have to be adopted, for example: National Environmental Strategy; National Program of Environmental Protection; Environmental Quality Standards and Emission Standards; Handling of Hazardous Waste; Environmental monitoring and information systems and an integral cadastre of polluters; Environmental Labeling; National Strategy of Sustainable Utilization of Natural Resources and Goods; Import and Export of Ozone-depleting Substances; Import and Export, Transit of Waste; and finally Economic Instruments to amend behaviors (*UN*, 2007).

SUMMARY

Due to the originally stated goal to briefly present the environmentally important events and development in Serbia in the last 20 years, many important related areas were not even touched upon (for instance: biodiversity, noise protection, apart from depleted uranium, ionizing and non-ionizing radiation or risk management, correlation of poverty and environmental issues). However, the discussed issues gave a general overview of all the difficulties and shows the size of the job to renovate and hopefully to maintain the quality of the Ecology of Serbia.
Despite all the odds that a nation can face after a civil war and during the consequent political and economic consolidation, there are great and continuous improvements in the field of Environmental Protection in Serbia.

- Serbia has enacted several Environment related laws, several new laws are in completion phase and further new regulations are planned and under development now. All the new laws, policies and their implementation are fully harmonized with the respective European Union Regulations.
- As the international organizations have recognized the elementary level of Serbian Environmental Protection (apart from requiring only strict fulfillment of indicators and guidelines) to enhance the development and to put a pressure on the central government, they also set up several funds and NGOs. The focus of these organizations is that generally, they are not doing their lobbying activity based on the un-enforceable environmental regulations, but rather on the law on access to public information and on health care and health protection related regulations. Here it is important to mention that until recently regional international cooperation has contributed to the largest extent to the development of the Serbian environmental protection (*UN*, 2007).
- There are initiatives to increase the general awareness in Serbia. The significance of environmental education is to increase the interest and understanding of environmental issues of the public. The quality of the natural and man-made environment cannot be greatly improved without the active participation of the whole society.

Without doubt, despite all the efforts of the country and all the progress reached till now, the European Union has a huge responsibility and it is vital self-interest to contribute to the development of the Environmental issues in Serbia.

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STATISTICAL AND 'GREEN' EVALUATION OF AGRICULTURAL EFFICIENCY IN DENMARK AND HUNGARY

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ABSTRACT

The present study will examine the possible ways of measuring the performance of agriculture by simple methodology, then by using statistical analysis and the ways of integrating sustainability indicators in measuring the performance of agriculture will be attempted. I am examining the appropriate ways of calculating the output of the sector including the damage caused by and the benefits of agricultural production. I present the almost 40 year old history of how to integrate the environmental components in the calculation of the GDP, then attempts will be made to investigate some environmental indicators that could be applied in the comparison of the efficiency of the Danish and Hungarian agricultural sector.

Keywords: green national accounts, sustainability indicators, efficiency, agriculture

INTRODUCTION

This interim study deals with sustainable agriculture in Denmark and Hungary and with the efficiency of the agricultural sector. Three steps of a recent research process are discussed in this present paper, in which some of the results were developed together with co-authors. The first step was to compare the potential ways of comparing the performance of agriculture, in the second step the methodology applied was justified and in the third step, the need of involving environmental indicators was discussed.

The involvement of the new indicators - especially the ones that express environmental pressure is vital because – as Stiglitz puts it – the attempt to revitalize the world economy, together with answers to be given on global climate crises, raises the question whether the traditional statistical metrics could give a proper indication of further action. In other words, the per capita GDP figure as a development indicator is questionable, since social and environmental concerns do not appear in it. The maintenance of competitiveness, together with EU expectations, require to meet the principle of sustainability.

Environmental pressure and pollution as a consequence of agricultural activity has become an economic issue and significantly affects the sector's performance.

MATERIALS AND METHODS

Modelling the performance of the agricultural sector

In our recent researches we were investigating the potential methods for modeling the performance of the agricultural sector of Denmark and Hungary. Our first goal was to create a model without applying complex mathematical production functions.

Contrary to our expectations, and to our greatest surprise, we found that Hungary proved to be slightly more efficient. Because of the results we received we are convinced that the application of a new methodology is necessary since our findings are different from what was expected. While trying to find the possible explanations for the findings, we came to the conclusion that the hardly justifiable results can be due to the inadequacy in the applied methodology. Our aim is to assess the applicability of our methodology, and either to justify or to reject our results by using statistical methods. The more sophisticated method that was used is a linear regression analysis.

Comparative analysis of efficiency

Following a careful study of the scientific literature on measuring efficiency, and based on Mundlak's study, we designed a model with which we endeavoured to measure efficiency.

Considering the results of Rao and Acemoglu, much attention was paid to the role of the growth-enhancing institutions, since we are convinced that the institutions have a major impact on production, on the incentive system and consequently on profitability and growth. The efficiency of the two countries was compared with the help of a six category metric system in which a time series of 20 years was taken into account.

Time series for the period between 1990 and 2007 were compiled for each of these factors, and then the averages for the period were compared (Danish data divided by Hungarian data). The weighed average of the ratios of the six main groups was compared with the gross output figures. Five different weights were applied and it was concluded that the most realistic version is described if the weight of the institutional and cultural determinants are 50%.

Factors used for measuring the efficiency of Danish and Hungarian agriculture

The *output* was calculated by the sectoral output expressed as gross output at constant prices (Eurostat data). The factors that have influence on performance are the following:

1. *Inputs to agriculture*: Four groups of inputs were applied:
   a. *land* - arable land and utilized agricultural area, croplands and pasture in hectares (Eurostat)
   b. *capital* - machinery, equipment (tractors, harvesting machinery, milking machine), animal stock (Eurostat)
   c. *labour force* - only active workers employed in agriculture, the number of hours worked (AWU) (Eurostat)
   d. *quantity of chemicals used* - fertilizers and 5 pesticides (organic phosphates, herbicides, insecticides, fungicides and bactericides), the volume of mineral oils (FAO).

2. *Technological* indicators that represent the level of technological development in a given country
   a. *R & D expenditure* - total expenditure on R&D as percentage of GDP (OECD, Eurostat and Danmarks Grundforskningsfond data).
   b. *agricultural yields* – wheat yields, milk pre cow production, number of piglets per sow, eggs per laying hens (FAO, CSO, Dansk Landbrugsr adgivning Landscentret data)
   c. *animal density* – number of animals per area, head/km², FAO and Eurostat

3. *Cultural* factors: According to *Weber, Fukuyama, and Mundlak*, efficiency is determined by the quality of human capital and the behavioral patterns.
   a. *religion* - the proportion of Protestants. Since we accepted Weber's view on protestant ethics, in our calculation we applied the *proportion of protestants* among all the religious population (CIA World Factbook), furthermore, based on the data of the World Value Survey we included data on *being religious* the number of people going to church once a week, or the number of people who are atheists, agnostic, non-believers, based on the 2005 Zuckerman reports.
   b. *education* **-** only graduates from tertiary education (Agriculture, forestry and fishery) as the percentage of all graduates and the number of years spent in higher education (Eurostat)

4. *Infrastructure*: Mundlak examined the effects of quantifiable assets that have a positive impact on productivity such as transport and communication infrastructure, health care, research and development or consultancy systems. In our study three branches of infrastructure were examined:
   a. *transport infrastructure* - OECD and Eurostat figures, motorway density and density of railway lines
   b. *communication network* **-** the proportion of households with home Internet access and phone subscriptions per 100 inhabitants, the duration of calls, Internet accessibility of households and companies (Eurostat and OECD)
   c. *health infrastructure* **-** health expenditure as% of GDP measured in purchasing power parity per capita, life expectancy at birth, (WHO, OECD and Eurostat)

5. *Institutions***:** According to *Acemoglu, Johnson and Robinson* (2001) in countries where the institutions are better, IP protection is stronger and policy distorts competition to a lesser extent. The value of physical and human capital is higher and their use is more effective. That is, the physical, legal and regulatory framework has a positive impact on economic development. The influence of institutions was measured by the Freedom House political rights and civil liberty scores in Mundlak et al. The model was expanded and the following factors were involved:
   a. *civil liberties and political rights* (Freedom House – scores of freedom of assembly and association law, functioning of the legal system and the government)
   b. the *confidence in institutions* (parliament, judiciary, church, armed forces, police, social security, health care, civil services) European Values Survey and World Values Survey
   c. mutual *trust* (*Halman*, The European Values Study).

6. *The physical environment* can not be ignored, as agricultural production is highly dependent on the natural environment, so we took the following factors into account:
   a. number of *sunshine hours*
   b. *water resources* – measured by the annual amount of precipitation (Statistical Yearbook 2009, KSH, Encyclopedia Britannica), and the amount of available freshwater (Eurostat).
   c. *temperature* - running mean temperatures

A short summary of what we found in our recent studies is the following: Although agricultural output in Denmark is only one and a half times more than output in Hungary, Denmark applies 1.6 times more input which determines the output level. In an earlier paper we discussed the factors that can be attributed to the Hungarian advantage (for further details see *Beke and Forgács*, 2009a).

Statistical methods for justifying the results
As it was mentioned earlier, because of the hardly justifiable results of the study a more sophisticated statistical analysis was necessary.

The dependant variable (Y) is the output of the sector which is influenced by the independent variables $(X_1 \ldots X_m)$. Only 5 of the determinant factors were studied because for institutions no time series were available. Correlation calculations were used to assess the relationship between the determinant factors and the output by applying correction calculations. Calculations were possible for 3 factors (inputs, infrastructure and technology). For the other factors (institutions, culture) the relationship with the output is not proved, and for the physical environment sufficient amount of data could not be collected.

1. Input :
   a. land use (UAA 1000ha),
   b. machinery (tractors, harvesting and milking machines together).
2. Technology - R & D expenditure - total expenditure on R&D as percentage of GDP.
3. Cultural factors – education: school expectancy (years in education).
4. Infrastructure length of motorways (km).
5. Physical Environment – number of sunshine hours (own compilations).

The results of the calculations for the 5 determinant factors and the output of the sector are depicted in *Table 1*.

As it can be seen, the relationship with technology (R & D expenditure) is strong both in Hungary in Denmark. The relationship with school expectancy is strong in Denmark, while in Hungary a weak negative relationship can be seen.

In conclusion, the methodology needs further development in justifying the adequacy of the model, since not enough data were available.

Table 1

Results of correlation calculations

	DK	HU
1. Input		
a. Land	-3.291	0.450
b. Machinery	0.057	0.010
2. Technology	410.108	2907.095
3. Cultural factors	556.535	-83.751
4. Infrastructure	-1.035	4.2211
5. Physical environment	- 0.691	-0.762

Involvement of green indicators

In the third stage of the study environmental indicators were involved and an additional group of determinant factors war integrated into the model. I was searching how the requirement for sustainability could be integrated in the measurement of the performance of agriculture. That is, how the currently measured output of the sector could be corrected by the damage caused or the benefits to natural resources.

My research was put into a new context because of the findings of a recent article, in which Stiglitz explained that it is time to modify our views on economic growth and the wealth of a nation (*Stiglitz*, 2009). At present, the per capita GDP figures are considered the most accurate way of measuring economic welfare, even though we are faced with a number of new phenomena which have a significant impact on our perception of well being. However, these phenomena are not part of the traditional macro-statistical accounts and are not reflected in the GDP measures. Stiglitz refers to three important areas of consideration such as:

a) *climate change,* which is the consequence of pollution (it distorts the GDP measures because the current methodology does not take the degradation of the environment, of natural resources and of nature's assets into account)

b) *negative social phenomena,* like the increasing income inequalities. If GDP is expressed in per capita figures, then, according to Stiglitz, we might have false ideas about the general welfare of the citizens of a given country. In a country with an even distribution of income for example, the per capita national income, as the mean, can show a realistic picture of an individual's income, but with an uneven distribution, when the majority of the wealth is concentrated in the hands of a minority, a great number of people may live below the average income level.

c) the *growing share of the government sector*, e.g. in education, health, infrastructure, (the problem is the value of output. It distorts GDP figures because their output is measured simply by the input values)

In his article published more than three decades ago, Weitzman argued that the net domestic product is considered a good measure of wealth, while prosperity is the

discounted value of future consumption, so human and natural capital should be included in capital stock (*Weitzman*, 1976).

According to Bartelmus and van Tongeren an early indicator of the trends and limits of sustainable economic growth may be the replacement of GDP by EDP (Ecological Domestic Product) or the extension of the scope of key variables in the dynamic growth models (*Bartelmus and van Tongeren*, 1994).

The potential indicators that can be used in the assessment of the performance of the sector are classified into two broad groups:

a. Agriculture *increases the value of the environmental stock* (natural wealth): for example, it keeps the soil in good condition, preserves the genetic resources of plants and livestock, preserves biodiversity, and does not pollute the environment (air, water, soil) by generating waste while providing employment and a livelihood for the rural population. The present study does not deal with the benefits of agricultural activity; it only deals with the destructive impacts on the environment and to the quality of life.

b. Efforts should be made to minimize undesirable impacts on the environment, so in this group I suggest indicators that quantify the *negative impacts* of agricultural activities.

In modern agriculture, and in particular in the developed countries, the attention is focused on the external effects. This is because, on the one hand, the environmental pressure (soil, water, air pollution), the consequence of intensive production, can be measured and on the other hand, social tensions (rising unemployment, deepening of income disparities) deepened as a consequence of the slowdown in economic growth rates and in particular because of the crisis of these days. The changing structure of the economy is manifested in the growth rate of the service sector, and in this expanding tertiary sector rural areas have to find their place by the diversification of rural activities, such as by the development of tourism or maintaining traditional rural activities and maintaining the landscapes.

As Stiglitz puts it – the attempts to revitalise the world economy and to tackle climate change raise the question whether the traditional statistical indicators (development indicators) provide an appropriate signal for acting, since social and environmental factors are excluded (*Stiglitz*, 2009). Competitive economic activities and the expectations of the EU require an agricultural activity which complies with the principle of sustainability. The environmental impact of agricultural activities, the levels of pollution and the environmental taxes, compensations and subsidies (to internalize the externalities) became an economic issue, which affects economic performance and is quantifiable.

Ball et al. (2004) highlighted the important role of integrating environmental damage (especially water pollution) and the beneficial effects resulting from agricultural activities in performance evaluation, namely in the calculation of productivity indices.

Based on the results of the first part of this study, through the example of Denmark and Hungary, I would like to introduce some of the environmental indicators that could be integrated into the measurement of the performance of

agriculture. I examine what negative impacts agriculture has on the environment, and its effects on growth.

Environmental indicators
By taking into account the methodology developed by *Ball et al.* (2004) I will depict the application of a number of indicators that express negative environmental impacts, which I believe represent the environmental damage caused by the agricultural sector and may significantly affect the sector's output.

Nitrogen balance
The gross nitrogen balance indicator accounts for all inputs and outputs on the soil surface, and includes all residual emissions of nitrogen from agriculture into soil, water and air. Due to the intensive animal production and higher productivity the application of inorganic nitrogen and phosphate fertilizers increased significantly. Because of the growing number of animal stocks the amount of additional nitrogen from manure is increasing. In the European Union the total amount of diffuse nitrogen - that is, 8.9 million tons of nitrogen from inorganic nitrogen fertilizers and 7.6 million tonnes of nitrogen from manure – was approximately 16.5 tons in 2003, almost 18 million tonnes in 1999 and 17.4 million tonnes in 1995. The nitrogen from agricultural sources is a gross indicator of the nutrient/nitrogen balance. The potential surplus of nutrients is calculated by the balance between nitrogen and phosphorus added to the agricultural system and nitrogen and phosphorus removed from the system per hectare of agricultural land. Nitrogen balance is calculated as the difference between the nitrogen intake (the principle inputs include volumes of nutrients as inorganic fertiliser, livestock manure, nitrogen fixation by crops and atmospheric deposition per hectare) and nitrogen output (the principle outputs include volumes of nutrients taken out by harvested crops and grass/fodder (*EEA Report*, 2007). In Europe the volume of nitrogen input is significantly higher than the volume of the output.

Water contamination
An important factor in environmental pressure is the deterioration of water quality resulting from agricultural production. The reasons for water contamination are the excessive use of organic fertilizers, mainly nitrogen leaching to groundwater and surface waters, the salinisation process, sediments from erosion leaching into surface waters, as well as livestock manure and the leaching of heavy metals in sewage sludge then to groundwater (*Czachesz and Fehér*, 2004). The sources of water pollution (rivers, lakes, seas, and groundwater) are sewage, industrial activities, and in particular agricultural activities. The direct damage from such pollution is a limited option for recovery of contaminated water or a significant increase in costs related to water pollution. Indirect damage resulting from water quality deterioration is the degradation of the natural environment, health hazards destruction of marine life, losses of fisheries, a reduction in recreation and sports facilities and lower quality products. The quality of water can be measured either directly by chemical analysis of water samples or indirectly by the level of the

emission of pollutants (fertilizers, pesticides) (*EEA Report*, 2007). Israeli researchers have developed a new method in which a laser beam illuminates the algae in the water, then the researchers record the sound waves which reveal the type and extent of contamination.

Water abstraction
The amount of water used for agricultural purposes greatly affects the environment. The main areas of agricultural water use are irrigation, fish farming and animal husbandry. Irrigation and fish farming can be handled together, mainly because in Hungary they represent the greatest demand for the abstraction of surface waters. Agricultural irrigation and fisheries are the main sources of water abstraction.

Air pollution
Besides industry and transport, agriculture is the third largest pollutant. To measure air pollution the amount of greenhouse gas emissions was used.

Waste generated by agriculture
This includes the amount of manure from livestock, liquid manure, dead animals, vegetable waste, fishing and hunting. Waste can cause contamination indirectly e.g. air, water, soil contamination, can cause a stink or can evoke unpleasant aesthetic or visual effects.

RESULTS AND DISCUSSION

Slightly modifying the model, the distortive factors (religion) were disregarded and the calculations were based on figures for only one year. An additional factor is animal density and to demonstrate the importance of environmental protection a 10% weight was applied.

Efficiency is calculated by the ratio of the values for Denmark and Hungary (DK/HU) for the year 2006. When no data were available for both countries for 2006 then figures for 2004 were applied in the calculation.

The results can be seen in *Table 2*: in 2006 the sector was more efficient (1.03) in Denmark. In comparison with data excluding environmental pressure figures, efficiency was 1.07. The difference is not significant therefore, as a conclusion it can be stated that the involvement of the consequences of environmental pressure into the comparison of the efficiency of agriculture is not justified in this study. The results might not be surprising given that both countries, although Denmark is a high income country and Hungary is a middle income country, are members of OECD, and both of them are EU member states, which means similar regulatory framework.

The concept of an environmentally adjusted measure of the performance of agriculture is a current issue since agricultural activities contribute to environmental degradation and have diverse environmental impacts which threaten to undermine the sustainability of agriculture.

Table 2

Factors including environmental pressure in measuring the efficiency of the agricultural sector in Denmark and Hungary

Factors	DK/HU
Education	0.35
Infrastructure	2.05
Technology	2.16
Institutions	1.2
Inputs	0.73
Physical environment	0.89
Environmental pressure	1.57
Weighed average of factors	1.33
Output	1.37
Efficiency	1.03

This paper is concerned with the question of whether comparison of Danish and Hungarian agriculture can be compared with the use of the determinant factors applied, then statistical analysis was used to justify the appropriateness of the methodology, then integrating environmental indicators in the inputs to agriculture was attempted.

Based on the results of this study environmental components incorporated into the measurement of the performance of the agricultural sector do not alter the results that were received without applying the environmental indicators. Environment-related input-output analysis is vital if the general welfare of a nation is assessed and if environmental degradation is highlighted.

CONCLUSIONS

Today, GDP per capita measures continue to be the main indicator for economic welfare and progress. The current system of national accounts neglects environmental resources unless they can be expressed in monetary terms or are marketable. Many of the "services" of nature (such as the work of wind, water) is free of charge, consequently are not reflected in GDP measures. If the nation exploits its natural resources then it is included in the national income figures because they mean income and output. However, the degradation or destruction of natural resources is not counted in the national accounts.

There are currently no comprehensive environmental indicators which could be used *alongside* GDP. The ecological footprint can not be fully applied, therefore, the European Commission seeks to introduce the pilot version of the environmental load index in 2010. This indicator will reflect the environmental damage caused within the EU, and will include the major environmental policy issues, namely climate change, energy use, biodiversity, air pollution, health impacts, water use,

water contamination, waste generation and the use of natural resources and will provide information to policy-makers.

ACKNOWLEDGEMENTS

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Economic calculation of
alternate energy resources in households

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ABSTRACT

In these days the importance of alternate energy resources is growing. There are more and more technologies available of size and at price suitable for households. In our paper the possibilities of solar energy, wind power, geothermal energy and biogas energy use are shown. In the study the instruments are chosen from the market and the installation costs and the produced power are calculated. On the basis of these, various economic calculations are made regarding the returns of the investment, for example: net present value, rate of return, payback period. The result shows that biogas is the one economic investment of them in this economic environment.
Keywords: Alternate Energy Resources, Households, Economical Calculation

INTRODUCTION

Nowadays the importance of alternate energy resources is growing. There are more and more technologies available of size and at price suitable for households. The use of fossil fuels should be reduced because of global warming. Large amounts of money are spent on research concerning the use of alternative energy. There are many new environment friendly technologies available for household use. In this article the economic calculation of different alternative energy resources was analyzed, which can be used in the households is studied.

MATERIALS AND METHODS

Such alternative energy generating equipment was chosen that may be implemented at 'household size'. The investment costs and possible savings were calculated on the basis of online available data or estimations. The investment "is realized" in a family house of 100 m², where 'originally' the hot water for central heating is supplied by gas furnace and the gas boilers provide hot water storage. A five-member family live in the house.

Simplifications were used, since we aim to compare various alternative energy sources and not to specify the economic indicators of a certain project. The yields were calculated at today's prices, the amount of annual energy savings was taken into consideration, and the projection's duration was 20 years. We calculated with the central bank rate in the investment. The calculations did not consider any proposals to be awarded.

Electricity fee: 41.24 HUF/kWh, the electricity charges for the night: 24.76 HUF/kWh, natural gas price of 3.19 HUF/MJ, or 109.13 HUF/m³.

Net present value, payback period and internal rate of return calculations (*Chikán*, 2008) were performed with the data using Excel spreadsheet.

RESULTS AND DISCUSSION

First of all the parameters of different 'green' technologies were defined, these parameters are fitting to the house size.

Solar Collector
The solar collector is used for hot water production by fully utilizing the existing system. The investment is 3×2 m² surface of solar collector and an additional 250 liters of hot water tanks and pipe work, the installation price is 637 000 HUF, the annual savings are 41 382 HUF.

Solar Panel
The solar panels can produce electricity, which is stored in batteries. A piece of 1.6m² surface 220 Watt monocrystalline solar panel can save 440 kWh of electricity in case of 2000 hours sunshine per year. The investment will be 300 000 HUF, which represents 18 145 HUF annual savings.

Windmill
A windmill is chosen (voltage: 12 V, power: 400 W, average intensity current: 8.33 Amper) for current production which can be installed homemade. This is able to provide electricity for 13.5 hours per day, so we can save 492.6 kWh of energy in a year. The investment will be 250 000 HUF, which represents 20 312 HUF annual savings.

Biogas Reactor
There is currently no equipment available for domestic biogas production in the Hungarian market. A young Hungarian inventor's invention won first prize in the '2006 Future of young entrepreneurs' competition. The inventor did not disclose details of the device information, what these data are used.

The biogas production and power generation equipment costs 1.2 to 1.5 million HUF. This is able to produce – given 40 kg of organic material plus 100 liters of water per day – approximately 30 m³ of biogas, which can be used for heating directly. The gas can be converted into electricity by a generator connected to the gas engine, while the cooling water is used for heating. In the calculations, natural gas used for heating is replaced, thus the technique saves annually 346 080 HUF. The 100 liters of water is ensured by the water use of the family (sewage), and even some organic waste also contributes to the operation. The saving from the used organic materials (corn silage) – calculated at a price of 10 HUF/kg – is 146 000 HUF.

Ground Source Heat Pump
The installation of heat pumps in existing buildings is quite expensive. In this example a ground source heat pump system is used to replace the gas heating system, at the same time by keeping the radiators. The estimated investment costs 3 million HUF. The cost of annual heat pumps for heating is 270 254 HUF, which replaces the gas cost of 346 080 HUF, so the annual saving is 75 826 HUF.

Economical Calculations
We can see the results of the calculations in *Table 1*. The three indicators gave similar results. The investment was economical only in one case, in which the net present value

is positive, the internal rate is higher than central bank rate, and the payback period is the shortest.

According to the net present value and internal rate the biogas is the only economically viable investment with parameters taken into account for counting. Unfortunately, this system cannot currently be available. It is also possible that when the product gets onto market other costs will be incurred.

Table 1

The results of the economic calculations

	Net Present Value (HUF)	Time of Return (year)	Internal Rate of Return
Solar Collector	-248 700	9.35	6.5%
Solar Panel	-127 945	9.80	6.1%
Windmill	-64 843	8.01	7.7%
Biogas Reactor	240 348	5.52	10.4%
Heat Pump	-2 129 491	16.41	1.6%

The windmill and the solar investment mean loss at today's prices, but the two combined cost of 550 000 HUF is more affordable to a household and does not involve a significant reconstruction of the building. Further on, a small increase in energy prices can also economize on the investment.

The price of solar collectors and a major construction of the building is not reasonable to use only for hot water production, however, it is likely that the installation of it for the existing floor heating is worth it.

The heat pump system installation causing the greatest reconstruction is the most expensive and the savings achieved at current prices are not enough. The indicators are better in case of floor- and wall heating systems requiring lower temperature water. The support system should encourage the installation of the new buildings.

CONCLUSIONS, RECOMMENDATIONS

It is welcome that environmentally friendly technology solutions are already available, which are affordable to households. Unfortunately, they themselves are not economical. Further applications to encourage the preferential credits for alternative energy are necessary to increase the number of households using alternative energy sources. Although in case of a single household the saving is not great, but 'many a little makes a mickle'.

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STORE BRAND PRODUCTS ON THE MARKET OF HEALTH PROTECTIVE FOODS

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ABSTRACT

In Hungary the first store brand – alias private label – products appeared on the shelves of shops in 1995. In 2011 we cannot find any chains of stores without their own private label products in their line of goods. Private label distribution shows higher and higher proportion rates in the product range of national food chain stores. In the strong economic competition, it is not easy for chains of stores. Experience shows that it is more and more difficult to find such a product which successfully expands private label product lines. One of the most important options for progression is innovation, namely to develop brand products.
Keywords: food trade, private label, brand label, innovation

LITERATURE REVIEW

We could observe two major trends in food trade during the past years: one shows the increase of private label product rate and the other one shows an increasing number of health protective and organic foods in shops. There is also another significant trend on the market of traditional and provincial (local) foods, and on functional and organic food markets. According to *Oberholtzer* (2009) the share of store brand private label organic products had risen from 2% (2003) to 17.4% by 2008. In the case of milk, this ratio has doubled from 12% to 27%. The authors state that the quality of store brand products has improved significantly since the 1970-80's. Based on the reports of *Progressive Grocer* (2007) all sales of private label (in each category) have reached $46.5 billion. The market of organic products has risen even faster than the market of private label products. The study mentioned above reports that in the USA bio-product sales went up from $3.6 billion to $21.1 billion between 1997 and 2008.

According to surveys made in 2008, 69% of the American adult consumers have bought organic products 'at least occasionally' and 19% of them have bought these products on a weekly basis. With reference to the organic food study of Hinter International Group, the market of organic products tripled at a global level between 1997 and 2007 with the biggest influences in Europe (54%) and North-America (43%). Based on the studies of *Sahota* (2009), the organic food sales account for as much as 4% of the total food sales volume in several European countries.

Changes in customer preferences raise the question of whether traditional foods can satisfy the new consumer demands. Due to the more and more competitive environment food retailers are able to and motivated to respond quickly to the changing consumer preferences. According to *Weaver and Moon* (2010) those innovation possibilities must be taken into consideration, which can generate such health protective private label goods that are not part of brand product lines. The report throws light on the fact that as a consequence of globalisation, market evolvement and informational advantages, the retailers are in a bargain position and can react to consumer demands quickly.

According to the survey of the Private Label Manufacturers Association (*PLMA*, 2010) the market of private label products is $88 billion annually in the USA. Over half of the customers in the USA buy store branded products. Based on the data of *Groznik and Heese* (2009) the market share of private label products is 16% in the USA and 30% in Europe. In the studies of *Avinash and Pindich* (1994), and *Zozaya-Gorostiva* (2003) it is said that for retailers the best opportunities lie in the timing of private label products, although they believed that customers were not likely to acknowledge and appreciate the functional features of trade brand products. *Weaver and Moon* (2010) assume that consumers can be divided into at least two major segments which are:

1. the segment of traditional buyers,
2. the segment of health conscious and experimentalist buyers.

The innovation possibilities for health care private label products and the buyers' reception are two very difficult areas for a store network to estimate. The retailer has to assess the future demands and has to decide whether to launch a product under a private label or not. If the answer is yes, the timing of launch must be decided for the private label product which might substitute a brand label product of similar quality and price position. In the writers' opinion food store chains often put such own private label products on the market which possess such health claims/messages that are not represented by the brand product. In these cases the private label represents for a higher quality or at least the same quality as the similar manufacturer brand name. However, this situation is quite contradictory to former statements of literature. According to *Choi and Conghlan* (2006) manufacturer brand products are of higher quality than private label goods, or customers are brand-loyal.

PRIVATE LABEL VS. BRAND LABEL

Based on literature we can distinguish two copyright brands: the 'manufacturer brand' (brand label, national brand) and the 'store brand' (own brand, own label, private label).

Store brands are such products which can be purchased only in a certain chain of stores. The most important features of brands are summarised in *Table 1*.

Before presenting the current situation of private label products it is worth knowing the stages of development (*Table 2*).

Table 1

Features of brand label and private label

Features	Brand label	Private label
Risk of possession and failure	Is the supplier's	Is the distributor's and/or the retailer's
Uniqueness	High	Low*
Brand identity	Narrow and always consistent	Expanded and consistent
R+D driving force	High	Low
Time limit	Long term/maintainable	Depends on retailer
Customer ads	High	Low
Distribution	Widely available	Available only in own stores
Price profile	High	Low/medium*
Customer loyalty	High	High only to the chain
Customer/seller relationship	Traditional selling	Common aims
Customer/seller coordination	Medium	High

*Except for 4th generation premium and innovative niche private labels.

Source: Based on *Ezrachi and Bernitz*, 2009; *de Jong*, 2007

Table 2

Stages of private label product development

Features	First generation 'economic'	Second generation 'characterless'	Third generation 'me too'	Fourth generation 'unique'
Brand	'No name'	'Quasi brand'	Umbrella brand	Segmented brand
Products	Basic food	Large volume	Many categories	Image maker goods
Technology	Basic technology with low limits	Behind market leader (brand 'B' type)	Nearer to market leader (to brand 'A')	Innovative
Quality/image	Lower than brand product	Medium but not really noticeable	The same, trade quality guarantee	Good/better than leader brand. Trade image aura.
Customer motivation	Price	Price	Good value for price	Better than other products
Manufacturer	National, mostly not own brand specialized	National, partly own brand specialized	National, mostly own brand specialized	International, largely own brand specialized

Source: Based on *Sattler*, 1998; *Bruhn*, 1997

THE EFFECTS OF STORE BRAND PRODUCTS ON PRODUCT INNOVATION

Defined by *Iványi and Hoffer* (2010) 'Product innovation is such a service or product development with launch which is new or mostly renewed in terms of product features and its usage. It involves technical descriptions of development, product components and materials, the built-in software, the user-friendly features or other functional characteristics.'

Drucker (2003) derives sources of innovation from seven fields:

- unexpected events,
- lack of harmony,
- needs of processes,
- changes in market and industry,
- demographic changes,
- changes in mentality,
- appearance of new knowledge and its utilisation.

The connection between store brands and innovation is sometimes addressed with positive, sometimes with negative criticism in certain literature.

Viewed as negative effects if:

- The spread of store brands limits the innovation processes of manufacturers. According to *Olbrich et al.* (2005) and *Sexton et al.* (2002) in this case manufacturers can ignore innovation in research and development.
- New innovative brand products are copied faster and better than before – there is no time to recover the costs of innovation.

Viewed as positive effects if:

- Real, non-copied product innovation can be realised by retailers based on direct customer feedback (*Chunling et al.*, 2008; *Maurer*, 2006).
- It can speed up innovation processes at well-capitalised food-industrial companies (*Competition Commision*, 2007).

For manufacturers and retailers there might be innovation ideas in the following things: the unhealthy lifestyle of the Hungarian population, improper eating habits, aging society and the need for sustainable development (*Szakály*, 2010). The quality of food and the product range may influence significantly the customers' quality of life, health and eating habits.

Based on the innovation strategy plan of the *Hungarian National Food-Technology Platform* (2009) the R+D innovation efforts should focus on the following areas:

- innovations to facilitate health conscious diet,
- innovations to provide more convenience and pleasure to consumers,
- innovations to protect features of traditional foods,
- innovations of processing technologies and related technologies,
- innovations to satisfy Hungarian consumers' taste,
- innovations of methods to increase effectiveness and reduce losses.

A major element of the strategy is to encourage efforts for promoting the purchase of nationally produced, healthy foods. Unfortunately, the economic recession of the past years has hindered innovation processes. Between 2003 and 2007 the volume of production has decreased by 8.4%, the domestic sales by 14.4% and the number of employees by 17%. Due to recession, Hungarian consumers have become considerably price sensitive.

Countless questions arise in the customer during shopping, but first of all the question of *where* and *how much*. In the strict sense of the word, healthy food is really hard to find in a little local shop. We can obtain this type of food mainly—beside hypermarkets—at specialized shops, organic food stores or drug shops.

Nowadays, almost all of the food chain stores sell store brand products which cost 20-30% less than similar category products. The favourable price and the prevalence of the chains of stores make it possible for the customers to purchase those foods which meet the requirements of up-to-date and health conscious mentality. In 2008 a Hungarian food chain of stores saw an opportunity to widen its store brand product range with functional food products.

EXPERIENCE IN THE DISTRIBUTION OF HEALTH PROTECTIVE STORE BRAND PRODUCTS

The Hungarian Coop food chain of stores has been selling store brand products for almost ten years. The chain has been producing its store brand products under its own name and now there are 800 of these products. This number has been increasing year by year dynamically, though it can be felt that it is becoming more and more difficult to find such a product category which is worth being launched under the store name.

In 2008 Coop also saw an opportunity to widen its store brand product range with functional food products, so experimentally it released 14 new store brand products.

Not just the quality and the higher intrinsic value of the products were emphasized, but the packaging and the obvious information too. The highlighted, vital features of the nourishment were easy to read with the help of pictograms to inform the customers. The main graphic design is characterised by naturalness and high quality product photos.

In the stores leaflets were distributed to draw customers' attention to the highlighted features of the products and their effects on health:

- Source of dietary fibre
- With wholemeal grain
- Gluten free
- Source of protein
- Free of flavour enhancer

The products were well received by the customers, which can be supported by the turnover figures, the sales after an initial period have reached over HUF 20 million per month.

Figure 1

Turnover figures of Coop *Good for Me!* products
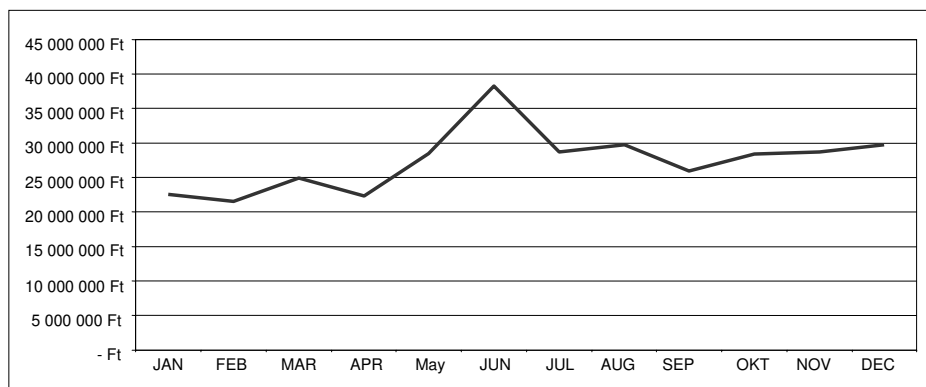
Source: *Coop inner data*, 2008

There is a peak in the yearly figures in June (*Figure 1*). The reason for this was an intensive marketing campaign which included for example, flyers, discount price and use of media. The turnover data in the graph show a continuous increase.

CONCLUSIONS

On the basis of sales experience the following aspects were important beside product quality:

- Preparedness of staff: shop assistants must be able to answer the customers' questions because there is no trust in the brand without this step.
- The intrinsic value and flavour of the product: 'healthy' food must be not only of excellent quality, but tasty too, otherwise there will not be a second purchase of the product.
- Product recommendation: it is important from the shop assistants too, but more important from opinion leaders or from friends, colleagues.

To sum up what has been said, we can state that by distributing health protective store brand products the chains of stores make it possible for customers to have an easy access to basic food products, which are beneficial for their health at a favourable price.

It is highly important to inform the customers and to display useful information on the product packaging, which is easy to understand for the layman too.

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CONSUMERS' JUDGEMENT ON SUPPLY ASSOCIATIONS – WITH SPECIAL REGARD TO CBA

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ABSTRACT

Important changes happened in the trade of Hungary during the 90's. Numerous international chainstores of solid capital appeared in Hungary establishing modern trade establishments and shopping centres with big basic area.The process of concentration is becoming stronger nowadays. Stores are concentrated in the hands of fewer and fewer companies, at the same time the number of stores is decreasing, as well as their basic area is increasing. Moreover, a decreasing number of stores perform an increasing part of turnover (Seres, 2005). Supply associations – especially CBA – take an important place among food retail trade stores in Hungary. This is proved by the prominent second place of CBA among the biggest chain stores. CBA is an organisation with strong consumer-orientation. It selects its suppliers consciously taking into consideration, on the one hand, prices and the possibility of good bargain, on the other hand, preferring quality and brand. The ratio of the two product-segments is formed according to the consumers' expectations.
Keywords: supply associations, retail, CBA, consumer preferences

INTRODUCTION

At the beginning of the 90s – due to privatisation – garage shops, small retail units operated as family ventures offering a decent profit for the owners were mushrooming. However, multinational small companies retail companies appeared a few years later. Due to their stronger bargain position against suppliers they purchased products at very favourable conditions, which, combined with efficient operation manifested in lower retail prices.

The market competition that became livelier meant a too big challenge for a big part of the independent retail companies. They faced rearranged customer habits and a decreasing profit.

Wholesaler enterprises realized that by organizing retailers into groups both their own and the retailers' competitiveness can be improved and in this way they became the engines for the development of supply associations. Nowadays 3 supply associations operate in Hungary: CBA, COOP and REÁL. Wholesalers' acumen is supported by that, based on turnover data, these associations take a prominent place in the order of retail chains distributing food products and chemical products. In the course of my research my aim is to survey the consumer judgement on these retail chainstores with a special emphasis on CBA.

MATERIALS AND METHODS

During my primary research from among the different quantitative methods the questioning by questionnaries was chosen. The aim of the investigation was to map the consumption and shopping habits of the consumers in the Southern-Transdanubian Region. The most important benefits of the research were the quantification of the data, structured data collection and a great number, representative sample (*Clifton et al.*, 1992; *Malhotra*, 2001).

The consumer survey with questionnaires was made in the third quarter of 2008. 500 people were chosen from the population of the region in the course of the sampling. Their number was determined according to the satisfactory size of the sub-groups formed according to different background variables. It was a primary aim to ensure representativity in the course of selecting people into the sample.

The quota was chosen on the basis of the 2001 census data of KSH (Central Statistical Office) according to resident population living in county towns and villages of the region, and according to gender, age and educational level. In order to gain a reliable sample, layered random sampling was applied in the selection of the respondents. The processing of data collected during the survey was made by using mathematical-statistical programs. The data – which were coded previously – were processed by using SPSS for Windows 9.0 and Microsoft Excel softwares

RESULTS AND DISCUSSION

I was interested in the consumers' opinions during the in-hall tests about how consumers judge the position of the food retail sector with special regard to supply associations. The survey investigated in details the consumption frequency, the most frequently visited store-types, the point of views influencing food selection, the prices and the frequency of impulse-shopping.

According to the consumers' opinions, Hungarian purchasers visit food retail stores still at great frequency. This is related to the fact that six in ten Hungarian consumers visit one of these store-types 3-4 times a week (classical consumer habit). However, it is also obvious that a consumer layer developed for which big shopping once a week is an optimal solution. This may be in connection with lack of time, the increasing importance of comfortable purchase or the demand to spend free time more beneficially.

In the next step it was examined how often respondents visit each store-type. This is demonstrated in *Table 1*.

Analysing the attendance of each store type it can be found that supply associations are in the second place behind hypermarkets. This shows that the role of the small shop unifying associations has a crucial importance in the provision of the rural population.

The second important index-number beside the attendance of store types is the so-called 'basket-value'. This is demonstrated in *Table 2*.

Table 1

The most frequently visited types of retail trade stores among respondents (n=942)[1]

Store-type	Division	
	Head	**%**
Hypermarket	240	48.0
Supply association	198	39.6
Discount	157	31.4
Supermarket	144	28.8
Independent small shop	91	18.0
Specialist shop	79	15.8
Other	33	6.6

[1]Respondents could mark more than one answer

Table 2

Division of purchases in each store type according to 'basket-value' value categories

Amount spent on purchases in different categories, HUF	Division of basket-value in each store type %					
	Hyper-market	**Super-market**	**Discount**	**Supply associa-tion**	**Indepen-dent small shop**	**Specialist shop**
0-1.000	0.3	2.3	1,5	13,4	30,3	1,9
1.001-2.000	21	14.4	4,9	26,7	34,8	20,9
2.001-4.000	1,5	24.7	25,7	29,6	15,7	36,1
4.001-6.000	15.	20.5	20,4	12,1	11,2	20,9
6.001-10.000	36.4	24.2	24,3	12,6	5,1	11,4
10.001-15.000	13.3	7.4	14,6	1,2	0,0	2,5
15.001-20.000	11.2	3.3	6,3	0,8	0,6	3,8
20.001-30.000	6,7	1.4	1,5	0,8	1,1	0,6
30.001-50.000	2,4	1.4	1,0	1,2	0,0	1,9
50.001-80.000	0,6	0.5	0,0	1,6	1,1	0,0
80.001-	0,3	0.0	0,0	0,0	0,0	0,0

Supply associations – among them CBA – belong to the store types with low basket-value and high attendance. This is due, on the one hand, to the great number of stores and, on the other hand, to the small basic area. Almost one third (29.6%) of customers do their shopping in supply associations for between 2001–4000 HUF, and 26.7% of them for between 1001–2000 HUF. The total rate of the two categories is 56.3%. The results of the table reveal an important relation: there

is a close connection between the basic area of the store and the average basket-value. This means that the larger the basic area of the store is the greater volume is purchased there.

The shopping frequency of each food industrial product category differs depending on the character of the product. The annual shopping frequency of each category is presented in *Table 3*.

Table 3

Annual shopping frequency of several kinds of food categories (n=498)

Food category	Annual shopping frequency, day
Bakery products	252.5
Milk and dairy products	172.2
Vegetables and fruits	140.4
Carcase meat	131.2
Processed meat products	102.4
Non-alcoholic drinks	89.5
Sweet industrial products	82.6
Milling industrial products	57.8
Alcoholic drinks	43.1
Deep-frozen products	39.9

From among the daily consumer products the so-called 'fresh products' get into the customers' baskets every day. These are the following: milk and dairy products, bakery products and carcase meat. On the contrary to them processed meat products, some kinds of vegetables and fruits and certain dairy products are purchased only once or twice a week. Deep-frozen products, sweet industrial goods and non-alcoholic drinks are bought even more rarely (once or twice a month). Freshness and durability of the products determine the purchasing amount and the frequency of shopping, and these features can be connected to sales in shops: customers buy a larger quantity from durable consumer goods in case of sales (advanced shopping), while in case of fresh products they buy an amount that can be consumed on 2 or 3 occassions (e.g. consumer milk, cold cuts). This is reinforced by the survey made by *Huszka* (2008), in which he generally stated that people living under better financial circumstances consume products processed at a higher level more frequently. However, 45% of the respondents involved into the survey think that they would buy their favourite branded products even if their price was increased. These products are probably the ones processed at a higher level (*Huszka*, 2008).

These product categories were examined according to the place of shopping in the next part of the research. Supply associations have a safe position in those product categories that represent daily shopping. According to this, consumers buy processed meat products (23.5%), bakery products (31.0%), sweet industrial products (25.0%) as well as milk and dairy products (28.3%) in big proportion through these distributional channels. Moreover, these shops take a favourable

position after the two leading store types (hyper- and supermarket) in the market of alcoholic (17.9%) and non-alcoholic drinks.

Features influencing food choice were also analysed in the research. Each point of view's effect on shopping was measured on an one-to-five scale, where one means the category of 'does not influence me at all'and five means the category of 'particularly influences me' The results of these are summarized in *Table 4*.

Table 4

The order of factors influencing food choice according to respondents (n=498)

Influential factor	Statistical indicator	
	Average	Standard deviation
Product's freshness	4.50	0.887
Clean, tidy shop	4.16	1.008
Product's price	4.16	1.024
Everything can be bought in one place	4.00	1.081
Favourable opening hours	3.97	1.132
Product's healthiness	3.91	1.070
Product is easily available	3.77	1.134
Kind, polite service	3.77	1.457
Product's appearance, aesthetic quality	3.68	1.039
Frequency of sales	3.65	1.149
Universal usability	3.30	1.038
Product's brand	3.18	1.121
Product's novelty	2.84	1.132

Looking over the results of the table, it can be seen that the most important influential factor is the product's freshness during shopping for food. Since the strength of supply associations and among them of CBA is usually selling fresh goods, that is why the tendency of consumer behaviour exactly coincides with the tendency of the main strategic direction.

Another factor determining the tendency of a shop's turnover is the share of the so-called impulse-shoppings. This is demonstrated in *Table 5*.

Smaller shops are under a handicap as opposed to larger ones in this field. This is because the larger basic area and the wider product-assortment lead to increased impulse-shopping, while people prefer to do their pre-planned shopping in smaller stores. This is why CBA made a good decision when it increased the size of its new shops. CBA is able to increase the share of impulse-shoppings in the way of entering the super- and hypermarket segment, which can reach in this was 50% of the customer purchases in these kinds of stores.

The strategies of CBA can particularly depend on the price sensitiveness of the consumers. As 70% of the respondents stated food prices are very high, which limits, on the one hand, the purchased amount and, on the other hand, the share of

impulse-shoppings. In spite of this it can be asserted that CBA should not only try to serve the price sensitive consumer layer, but regarding the future it should also plan the group of branded premium products because of the increasing number of quality sensitive consumers.

Table 5

Impulsiveness of the examined food product categories (n=498)

Product category	Statistical indicator	
	Average	Standard deviation
Sweet industrial products	2.48	0.871
Vegetables and fruits	2.48	0.950
Bakery products	2.29	1.018
Processed meat products	2.26	0.823
Dairy products	2.17	0.995
Deep-frozen products	2.00	0.765
Non-alcoholic drinks	1.97	0.811
Milling industrial products	1.91	0.824
Carcase meat	1.90	0.866
Alcoholic drinks	1.85	0.903

There is also a competition between some supply associations for winning the consumers. Analysing the position of supply associations those stores were investigated that were visited by the consumers during the last year. The result are presented in *Table 6*.

Table 6

Supply associations visited by the respondents during the last year (n=727)*

Supply associations	Division of answers	
	Head	%
CBA	374	74.8
COOP	262	52.4
REÁL	70	14.0
HONI-KER	21	4.2

*Respondents could mark more than one answer

CBA is in a very good position in this field. 75% of the respondents said that they had visited a CBA store in the last year and with this CBA came first among this type of associations. Based on the consumers' opinions, it is also obvious that the only important competitor of CBA is the COOP chain store, the attendance of which is 52%. The judgement of the stores' image is also an important factor besides the attendance of stores. The image-profile of the associations is summarized in *Table 7*.

Table 7

**The judgement of some image factors in case of each supply association
(CBA: n=374; COOP: n=262; REÁL: n=70; HONI-KER: n=21)**

Image factor	CBA		COOP		REÁL		HONI-KER	
	Average	SD	Average	SD	Average	SD	Average	SD
Salespeople's clothes are clean	3.98	0.872	3.81	0.934	3.90	0.861	4.23	0.6
Clean, tidy shop	3.89	0.957	3.52	1.076	3.75	0.829	3.57	0.8
Shelves are clean	3.84	0.846	3.54	0.922	3.80	0.832	3.42	0.8
Products are priced easily identifiably and clearly	3.78	0.932	3.48	1.059	3.66	0.852	2.80	1.0
Polite service	3.73	1.019	3.51	1.078	3.56	0.999	4.09	0.4
The shop is well arranged	3.73	0.864	3.51	0.936	3.84	0.795	4.23	5.9
Fresh products are available	3.70	0.872	3.38	0.947	3.75	0.848	3.85	0.4
Good quality goods	3.65	0.858	3.16	0.889	3.63	0.893	3.38	0.7
Hungarian products	3.64	0.788	3.41	0.845	3.47	0.779	3.33	0.7
Salespeople give the asked amount precisely	3.62	0.934	3.41	0.980	3.56	0.999	3.95	0.7
Salespeople thanked for the purchase	3.55	1.080	3.19	1.194	3.69	1.014	4.42	0.5
Salespeople cared for the customer immediately	3.31	1.101	2.99	1.122	3.24	0.984	4.23	0.4
Favourable prices	3.26	0.896	2.99	1.051	3.53	0.985	2.90	0.8
Everything can be bought in one place	3.23	1.018	2.86	1.018	4.18	5.276	2.80	0.8
Foreign products	3.05	0.863	2.94	0.838	3.20	0.800	3.19	0.9

SD: Standard deviation

According to the results the image of CBA is connected mainly to the elements of tidiness. According to the respondents the salespeople's clothes do not leave much to be desired, the shops are well arranged, the shelves are clean and always refilled. Further strengths of CBA are that the products are easy to find, they are of good quality and fresh. It is also a favourable result for CBA that COOP – as a direct competitor – underachieved in case of most image factors. The respondents emphasised from the statements regarding CBA stores the factors connected to the staff working in the stores in the first place. This refers to that the customers are

very satisfied with the level of the service, with the salespeople's politeness, in one word, with the development of the personal contacts. Since in this field CBA had a benefit compared to COOP in the competition between supply associations, this is why the consumers' judgement can be regarded a very favourable phenomenon. Probably this difference causes CBA's more than 50% attendance advantage over the closest competitor.

CONCLUSIONS AND PROPOSALS

It can be seen well from the results of the in-hall test that supply associations play an important role in the Hungarian food-retail sector as a result of the union of shops. CBA stands out of supply associations because this is the most frequently visited such kind of a store. The basket-value of shoppings in these types of stores is characteristically lower, but the frequency of attendance is usually higher. Since there is a close connection between the basket-value and the size of stores, this is why CBA has chosen a good strategy when it decided to increase the size of stores by establishing supermarkets, because the basket-value can be increased in this way, and because of the remaining small shops the high frequency of attendance does not fall. It was found during the examination of the product categories that supply associations can improve their position by increasing the variety of daily consumer goods.

CBA stands out of its competitors with its tidiness, with the fact that its shops are well arranged and with its fresh products. Considering most image factors, CBA performs better than its main competitor, COOP. However, it is important to pay attention to the stores of REÁL, because – although its customer basis is not so large – it is an ambitious company and it has received better grades during the examination of image factors in case of several factors than CBA.

SUMMARY

In my article I wanted to give a detailed review about the consumer habits, about the shops and about the consumers' opinion about the service in food retail shops in the Southern-Transdanubian Region.

Supply associations – especially CBA – take a particularly strong place among food-retail stores in Hungary. This is proved by the illustrious position of CBA among the largest stores. However, it also came to light from the results of the survey that CBA is listed among the first fifty chain stores in Europe. In spite of their favourable position, supply associations, and among them CBA, have to struggle hard to keep their position in the future. Super- and hypermarkets which possess an important part of the population's all food consumption, create a strong competition. Moreover, there is a case for the supply associations that this type of shops are present almost uniquely in smaller settlements.

The survival and the lasting increase of CBA is also promoted by the effort that its shops of bigger solid capital (with larger basic-grounds) support the survival (increase) of the less profitable ones. Based on the results it is obvious that CBA

follows in its strategy the so-called 'aimed at two segments' strategy to cover the market. CBA practically covers all the settlement-type (size) categories by keeping the smaller shops and by increasing the number of the stores with a larger basic area. This is a strategy with which chainstores with a big basic area are unable to compete.

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MARKET SEGMENTATION OF TOKAJ WINES

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ABSTRACT

A deliberate market segmentation on the Hungarian wine market appeared not more than a decade ago. Due to an enormous competition, a conscious segmentation of the market for Tokaj wines is essential. In spite of these difficulties on the market it is very rarely seen that producers are using global marketing tools consciously. My aim is to do the consumer market segmentation of Tokaj wines, and to set up consumer clusters. The spread of questionnaires was preceeded by arbitrary sampling. I began with a filtring initial question (do you drink wine?) and the first question of the questionnaire came after the answer YES. Following this, the number of samples was 472 persons. Similarly to the general model of food consumers, 4 classic types of consumer behaviour can be discovered on the market of consumers of Tokaj wines. From the results of the research we can conclude that the general behaviour of food consumers and the characters of the segments of wine consumers' behaviour correspond to the types of Tokaj wine consumers selected by us. Based on this we can state that the characteristics of the basic types of general food consumers' behaviour consequently appear in narrower groups as well. This, in the meantime, confirms the correctness of our methodology and can confirm our results.
Keywords: market segmentation, consumer behaviour, market of Tokaj wines

INTRODUCTION

A deliberate market segmentation on the Hungarian wine market appeared no more than a decade ago. Facing an enormous competition, a conscious on segmentation on the market of Tokaj wines is essential. The relative loss in the importance of sweet wines means further difficulties for sales and production. In spite of these difficulties on the market it is very rarely seen that producers are using global marketing tools consciously. The reasons for this can be found in the lack of the neccessary knowledge and practical experience. The recognition of deficiencies is made even more difficult by the lack of innovative approach from the winemakers' side, and the fact that the professional enviroment is not able to assist appropriately either.

Marketing experts usually approach an analysis built on scientific basis with a great deal of scepticism or opportunism, questioning the usefulness of research work. They are asking for results that can be measured at once, while for several years there have been almost no steps forward in delivering a unified system of tools.

Wines like Tokaj wine specialities have to be handled with accentuated care. It is also very important to take into consideration that the domestic market still has a determining role, and this is why reliable market research and analyses discovering market requirements are needed (*Szakál*, 2002).

My aim is to do the consumer market segmentation of Tokaj wines, and to set up consumer clusters.

MATERIALS AND METHODS

The most important requirement when using targeted marketing tools is that we should know exactly who we want to deliver the message to, ie. who the target person/persons are. The consumer market has to be divided into smaller parts, based on different attributes. The groups of the market showing distinctive demand characters are called segments, the method aiming to know the market, and dividing it into homogenous parts is called segmentation (*Bauer and Berács*, 1999).

The wine market needs differenciated marketing work in the interest of short and long term profitability. For the complete understanding of the needs, preferences, attitudes and purchasing behaviour of wine consumers, market segments have to be defined precisely (*Tzimitra-Kalogianni et al.*, 1999).

If the motivation of the consumers in their decisions of purchase is understood, we will be able to create a much more realistic model, with the help of which our strategic decisons regarding price definition, package, distribution and promotion can be much more efficient (*Lockshin et al.*, 2003).

The consumers are trying to decrease all risks of purchase. Due to the differences in wines, and the variations in consumer preferences, all the four purchasing decision positions can be discovered in case of wine purchase:

- Simple purchase decisions are made in the category of drinkable wines by the group of customers of such wines.
- For those who like diversity, the category of pleasant wines, including wines of lower alcohol contents, even flavoured, coloured wines can be an option.
- Wines that require consideration can be called good wines. Consumers in this category endeavour to decrease purchase risks.
- Consumer behaviour targeting the decrease of discordance can be found in case of wines meant for 'professionals' or connoisseurs. In this case the recognised risk is bigger for a wider scale than the marked value of the product (*Papp and Komáromi*, 2002).

The spread of questionnaires was preceeded by arbitrary sampling. I began with a filtring initial question (do you drink wine?) and the first question of the questionnaire came after the answer of YES. Following this, the number of samples was 472 persons. I did the questionning on my own. During the research I did the statistical analyses by MS Excel and SPSS 13 softwares.

Our purpose was to create the clusters of tokaj wine drinkers. Creating clusters means to make homogen clusters from our data base. We used a two-step cluster because we had nominal and metrical data. The two-step cluster offers the ideal number of clusters. They were 2 different clusters.

According to our previous research, it is not objectionable because it can not clarify the market perfectly. We specified 4 different clusters.

RESULTS AND DISCUSSION

48% of the samples were female, 52% were male. 22% were between the ages of 18-30 years, 48% between the ages of 31-45 years, 17% between the ages of 46-60 years and 13% at the age above 60 years.

The majority of the samples had higher education (65%), 34% had intermiediate education and only 1% had basic education. The majority of the respondents are employed (70%), 14% are retired, 3% are students and unemployed, 10% are private enterpreneurs.

Figure 1 shows the results of the question: *'When did you last drink wine?'* three quarters of the respondents said 'last week', from which we can take the conclusion that people regularly have wines on their table. Taking into consideration that due to social expectations, people when asked about alcohol consumption usually admit lower figures, this regularity is especially interesting.

The proportion of answers to the question: *'What type of package do you prefer when drinking wine?'* is as follows: 89% chose bottled wines, only 2% said PET bottles, 9% chose wine by the glass and none of them mentioned bulk wine.

Figure 2 shows the latest spendings of consumers, according to which more than half of the consumers spend 1000-3000 HUF on a bottle of wine. 30% choose wines under 1000 HUF, so 84% regard the price of HUF 3000 as a limen during purchases.

Figure 3 shows that 56% of the samples *drank Tokaj wine* more than a month ago, or even farther than that. Compared with the first question it can be stated that though ¾ of those asked drink wine every week, or even more often, but in the majority of occasions they choose other than Tokaj wines. Only 15% said that they drank Tokaj wine less than a week ago.

Figure 4 shows when did the respondents last buy Tokaj wines. Almost 70% bought Tokaj wines more than a month ago, or even farther. This answer probably shows that Tokaj wine is regarded as the wine for special occasions, celebrations, and the higher price category also has a role in this.
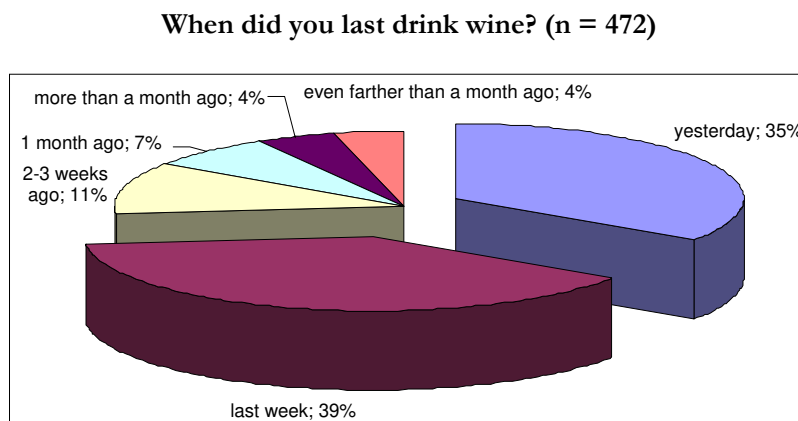
Figure 1

When did you last drink wine? (n = 472)

Figure 2

How much did you spend on wine during your last purchase? (n = 472)

7.000Ft-9.000Ft; 1%
above 10.000Ft; 2%
4.000Ft - 6.000Ft; 13%
below1000 Ft; 30%
1.000Ft - 3.000Ft; 54%
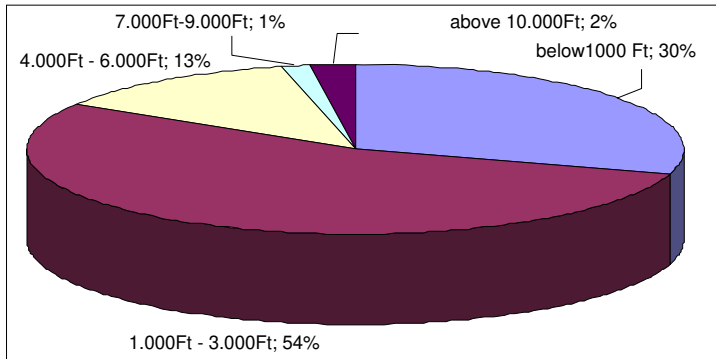
Figure 3

When did you last drink Tokaj wine? (n = 472)

even farther than one month ago; 27%
yesterday; 3%
last week; 12%
2-3 weeks ago; 13%
1month ago; 16%
more than 1 month ago; 29%
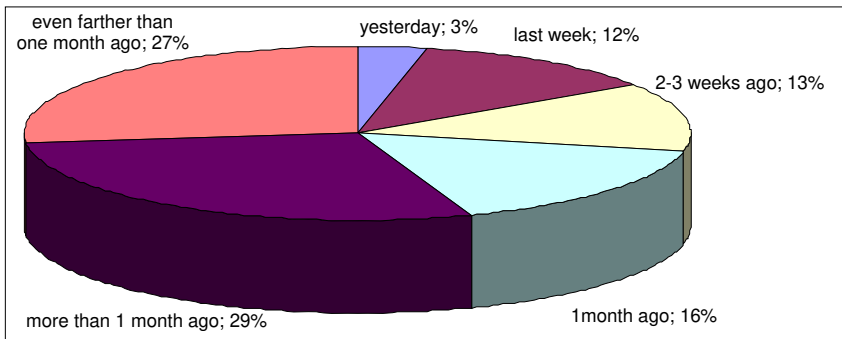
Figure 4

When did you last buy Tokaj wine? (n = 472)

even farther than one month ago; 36%
yesterday; 2%
last week; 6%
2-3 weeks ago; 10%
1 month ago; 13%
more than 1 month ago; 33%
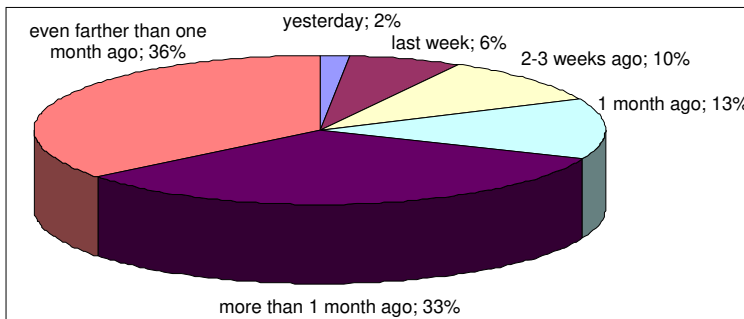
According to *Figure 5* Tokaj wine is drunk by respondents most often on special occasions and at celebrations. 39% of them answered this to the question: *'When and on what occasion do you drink Tokaj wine?'* The answers: at home, with guests and at home for joy are mentioned in the first place by the majority, with the proportion of 15%-15%. The same of these three answers are mentioned in the second place, all of them are around 20%. Based on the processed data we can state that people do not drink Tokaj wines in pubs and bars almost at all.

The proportion of sexes regarding wine tastings and wine tours is almost the same, but men prefer to buy wines directly from the cellars, compared to women. In restaurants and cafés mostly women drink Tokaj wines. Men drink Tokaj wines mostly at home for joy, and they form the majority of those who buy these wines for collections.

Figure 5

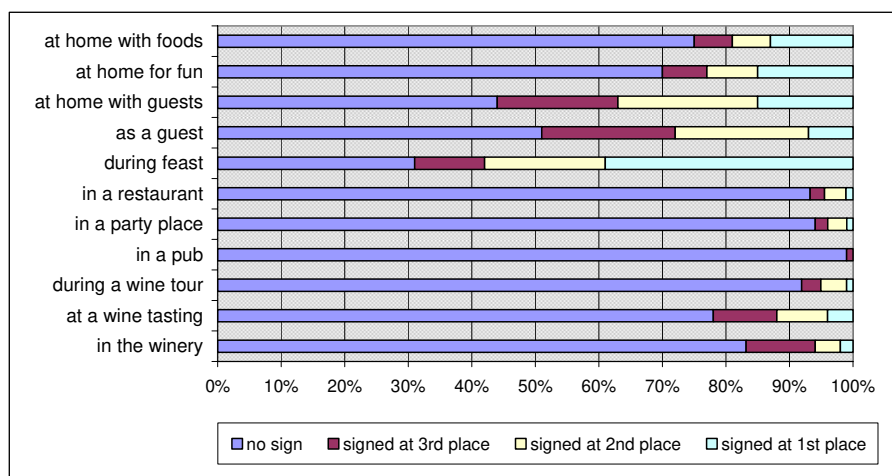**When / on what occassions do you drink Tokaj wines?**

Figure 6 shows the answers for the question: *'On what purpose do you usually buy Tokaj wines?'* It can be seen that 44% of those asked mentioned own consumption in the first place, which shows similarity with the answers on previous questions, i.e. people drink Tokaj wines mainly on special occasions, celebrations. The second most frequent answer was the purchase when visiting friends and when welcoming guests, 31%-22%. In my opinion here we can see the aspect of Tokaj wine that shows value and quality, a tool for self-expression accepted as a wine of higher value. It can be stated that the collection of Tokaj wines is not widespread in Hungary, yet.

Examining the proportion of sex it can be stated that it is mainly men that buy these wines for own consumption.

The majority of the respondents mostly and usually *buy Tokaj wines* on the same *place* where they do their *everyday shopping*. On *Figure 7* 43% mentione this. The proportion of purchasing in supermarkets is high, mentioned by 39% and takes the

second place. In case they cannot buy Tokaj wines on the premises of everyday shopping, the next possible place is the place where big volume shopping is made, ie. at supermarkets. A bit more people buy them in wine shops than directly from the producer. A tendency can be seen that buying Tokaj wines mostly takes place on the premises of everyday shopping and in supermarkets, which may be explained with the challenges of accelerated life.

Figure 6

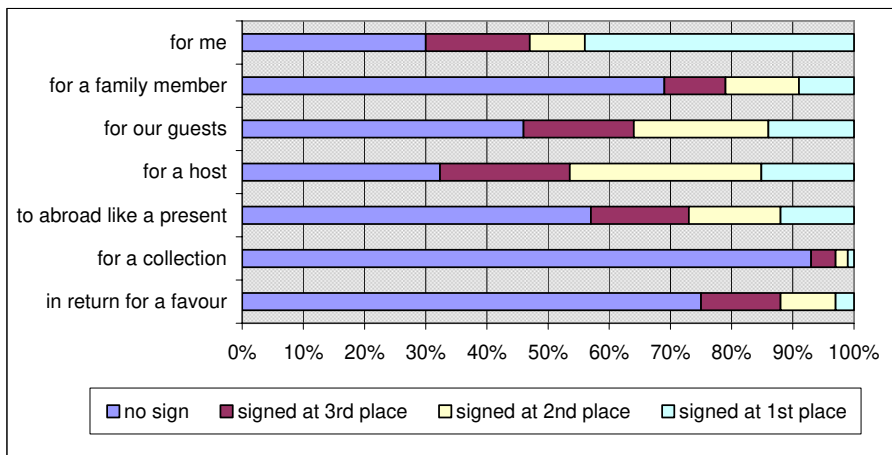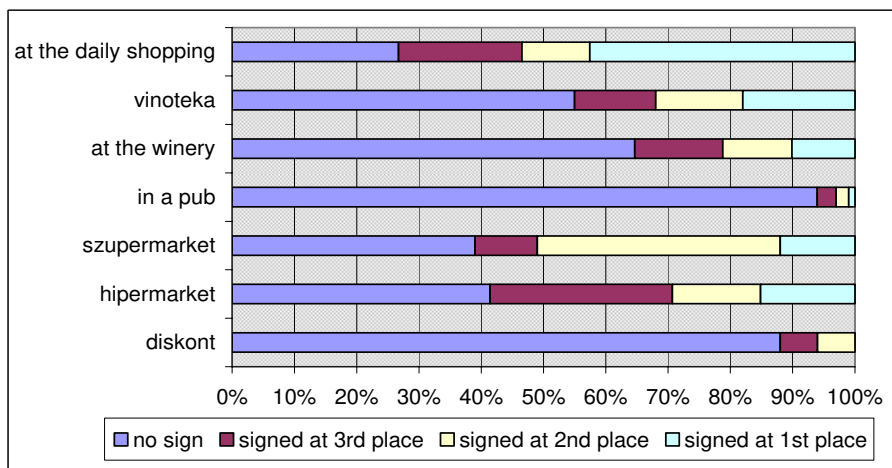### On what purpose do you usually buy Tokaj wines?

Figure 7

Where do you buy Tokaj wines?

According to *Figure 8* consumers largely differentiate regarding the *winemaker* when selecting the *factors influencing purchases*. 28% of them think the winemaker is a less important factor, while for 32% the producing person is the most important factor influencing their purchase. 28% do not think this way.

Figure 8

How important role does the winemaker have in your decision when buying Tokaj wines?
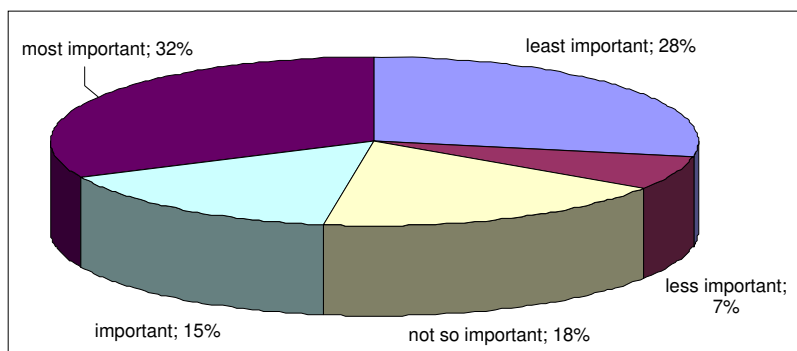
Figure 9 shows that the opinions of consumers regarding *vintage year*, as a *factor influencing purchases* are quite different, since almost all answers were marked in the same proportion, but they incline to evaluate it as important. We should mention here that this result most probably reflects the opinion of wine experts saying that vintage year characters should be taken into consideration.

Figure 9

How important factor is the vintage year when buying Tokaj wines?
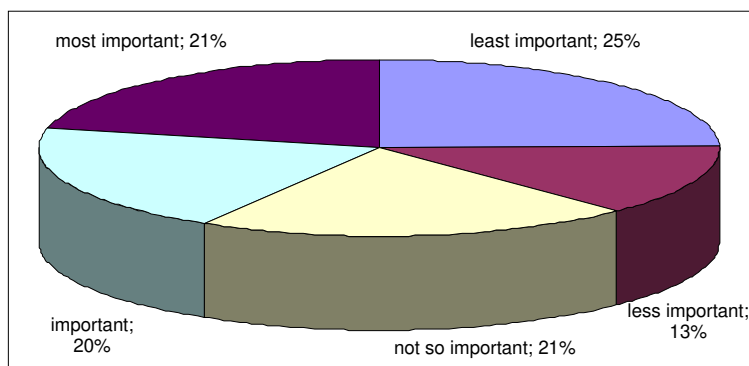
The decision of consumers is highly influenced by the *price*, as shown on *Figure 10*. 91% of those asked think that price is a quite or even more important factor when

deciding about buying Tokaj *wines*. This means that the majority of the customers are 'price- sensitive' in respect of wines.

Figure 10

How important is price for you when buying Tokaj wines?
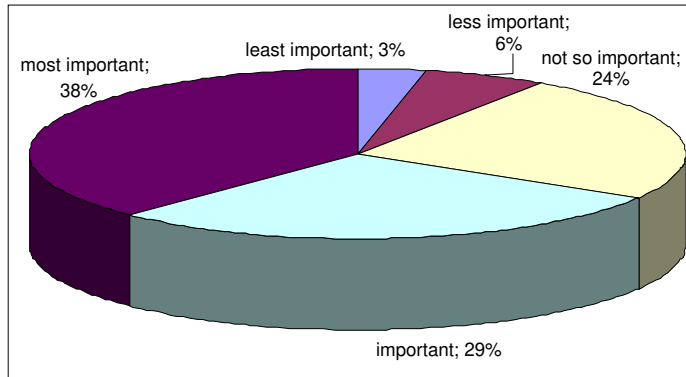
According to *Figure 11* 51% of the respondents think that the *product design* is not, or a less imporant factor when choosing Tokaj wines from the shelves , though 10% take this as one of the most important factors. The proportion of women is higher in this respect than that of men.

Figure 11

How important is the product design for you when buying Tokaj wines?
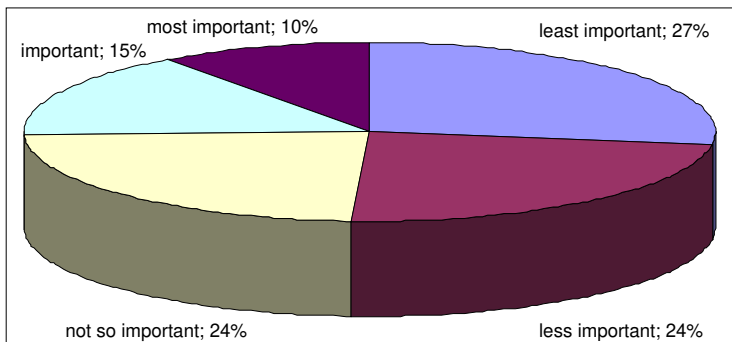
On *Figure 12* it can be seen that more than half of the respondents consider *friends' suggestion* as the most important factor when *buying Tokaj wines*. It is especiallly true in case of women, where this proportion is even higher. According to earlier researches Hungarian wine consumers have less knowledge of the wine market. This explains the fact that the comments of an opinion leader may count a lot when deciding. 23% does not take their friends' suggestions into account when deciding about purchase.

Figure 12

How important is your friends' suggestions when buying Tokaj wines?
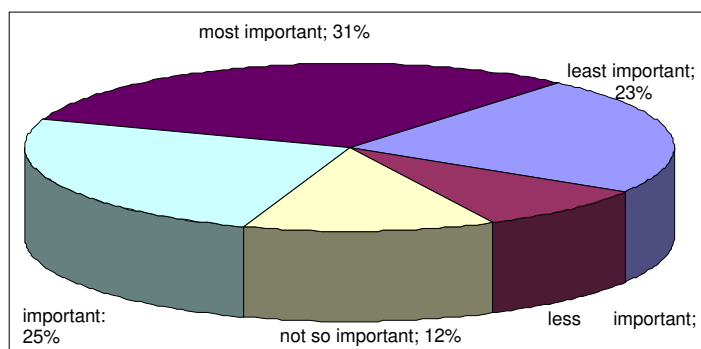
Figure 13 shows that for the consumers of Tokaj wines the suggestions of wine magazines are less important. 53% of the respondents think it is the least important factor when choosing a wine.

Figure 13

How important are the suggestions of wine magazines for you when buying Tokaj wines?
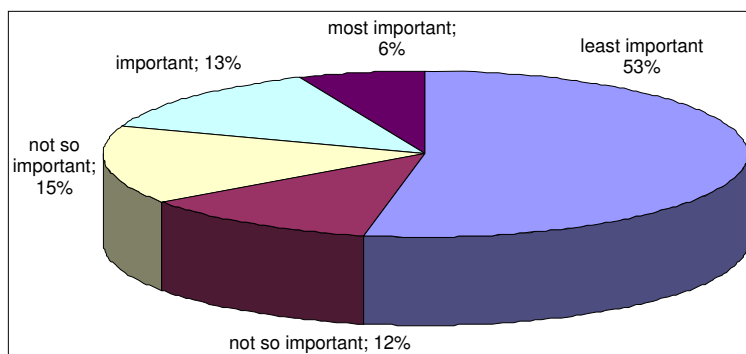
Figure 14 shows that *indication of awards at wine competitions* influences the choice of wine to be bought to a higher extend than opinions published in wine magazines. Here only 40% of the respondents have indicated this as the least important category.

Figure 15 shows that for 39% of the customers the *labels of products* are important, or they are one of the most important factors. 24% of them think it is not important at all. The difference is quite big. Women pay more attention to information indicated on labels than men.

According to *Figure 16* 41% indicated *price promotions* as an important or very important factors when deciding about *purchasing*, 67% indicated price. The proportion of those considering price promotions as not so important is extremely high: 30%.

Figure 14

How important is the indication of awards from wine competitions for you when buying Tokaj wines?
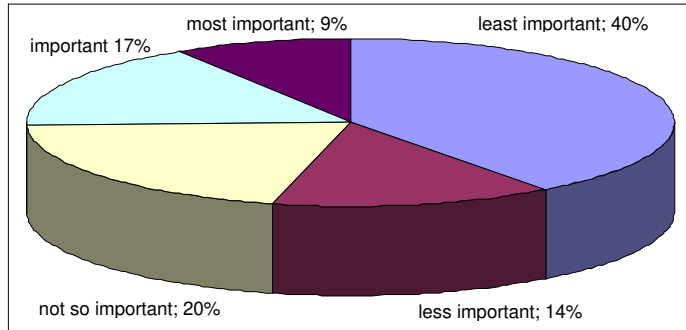
Figure 15

How important is the information indicated on labels for you when buying Tokaj wines?
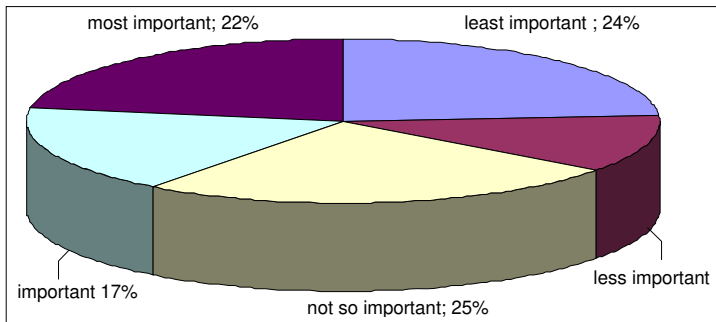
Figure 16

How important is price promotion for you when buying Tokaj wines?
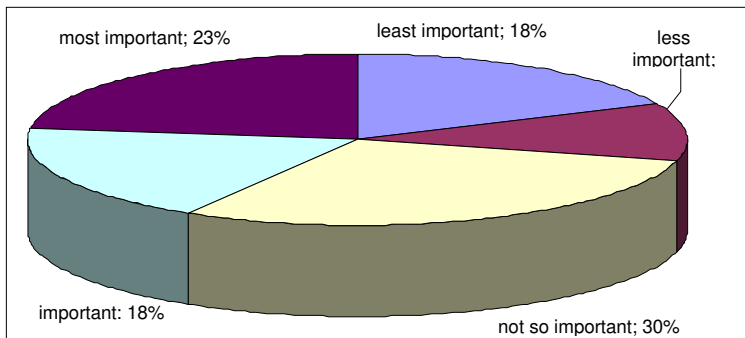
Consumer clusters of Tokaj wines
The clusters were created on the basis of behaviour and social-demographic factors of the research. Classic consumer behaviour groups can be discovered in them.

The Hungarian yuppie
21% of all samples is given by the category that I call the Hungarian yuppie (*Figure 17*). 90% of this cluster comes from the age group of 18-45 years, which age group is very much preferred by advertising experts. The proportion of sexes is equal. They mostly have higher education, 2/3 of them is an employee. In the meantime the porportion of private enterpreneurs is the biggest in the cluster.

Figure 17

The segment of Hungarian yuppies
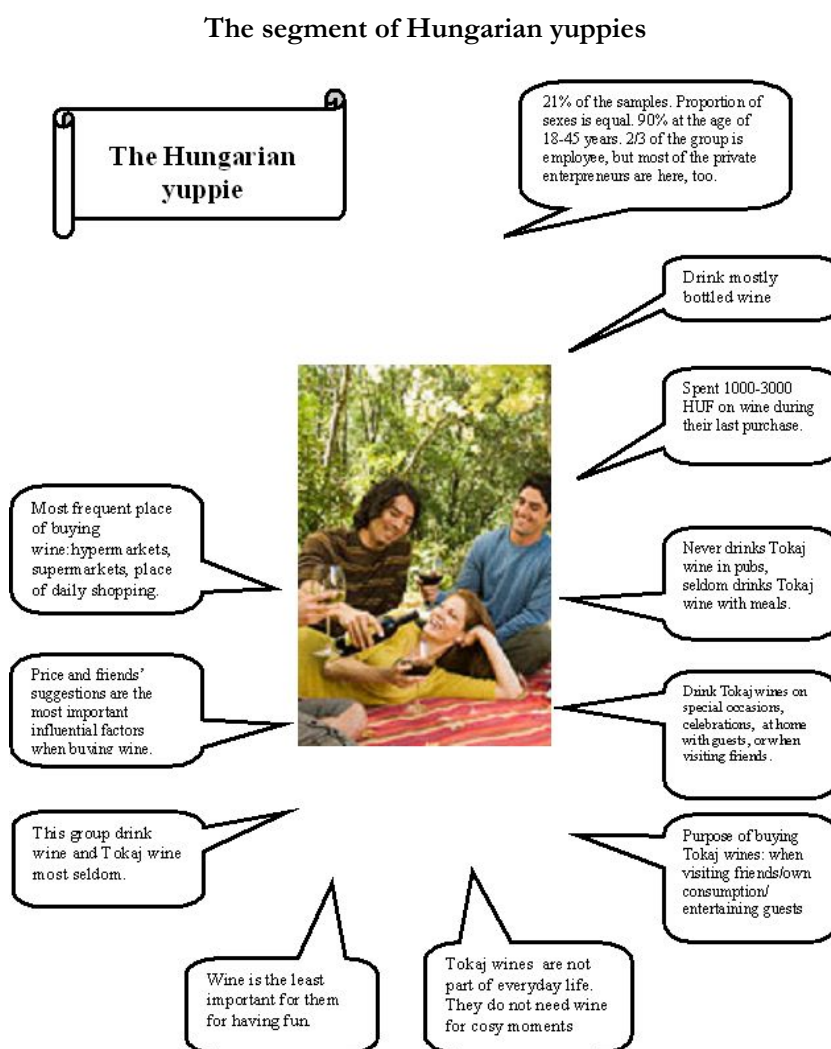
They mainly drink bottled wines, but this is the group that drink wine and Tokaj wine the least frequently. They hardly drink Tokaj wine with meal. The main occasions for drinking Tokaj wines are: celebrations, special occasions (at home with guests), when visiting friends.

If they buy Tokaj wines, they mainly do it on the following purposes: when visiting friends/for own consumption/entertaining guests. They mostly buy Tokaj wines in hyper,- and supermarkets, and on the premises of their daily shopping, and they are mostly influenced by the price and their friends' suggestions.

They spent 1000-3000 HUF on wine last time. They never drink Tokaj wine in pubs. Tokaj wine is not the part of their everyday life, they do not need wine for cosy moments. This group needs wine for having fun the least.

Striving to get in line

20% of all samples is given by the category that I call those striving to get in line (*Figure 18*). This group is mainly formed by men of different age groups. There are pensioners and employees in the group, 2/3 of them have higher education.

They mainly drink bottled wine and spent 1000-3000 HUF last time when bought wine.

They drank wine 'last week', but drank Tokaj wine 1 month ago. This correponds with the fact that they buy Tokaj wine once a monthon average. The winemaker, the vintage year and the price are important factors for them when buying wines. They mostly buy Tokaj wines on the premises of their everyday shopping, in super,- and hypermarkets, mainly for own consumption, but also when visiting friends or entertaining guests.

Representatives of this group drink Tokaj wines in pubs, with meals and for fun most frequently.

The most important occasions for consumption are celebrations/at home for fun/at home with meals.

Drinking wine is a ceremony for them. Tokaj wine is the queen of alcoholic drinks. Wine and cosy moments belong together.

The sophisticated artists of life

30% of the respondents form the category of sophisticated artists of life (*Figure 19*). They mostly have higher eduction, all of them are in the age group of 18-45 years, mostly employees. There are 30% more women in the sample group than men.

They only drink bottled wines. The latest occasion on drinking wine was 'last week'. They buy (every month) and drink (less than 1 month ago) Tokaj wines most frequently. Important factors when buying wines are their friends' suggestion, winemaker and the price. It is this group where friends' suggestions, suggestions of wine magazines, awards at wine competitions and labels are the most important factors.

According to their own judgement they can navigate themselves among wines, they are interested in information regarding winemaking. They know what wine regions and wine varietals are there in Hungary. They know what wine matches to

different occasions. They attend wine tastings, visit cellars, go on wine tours most frequently.

Figure 18

The segment of those striving to get in line

Most typical place of buying Tokaj wines are wine shops/hypermarkets/directly from cellars. They buy in wine shops, directly from cellars and discount stores the most frequently. They buy in supermarkets the least frequently. The purpose of buying Tokaj wines are for own consumption/when visiting friends/for entertaining guests, but they buy with the purpose of collection and in exchange for services most frequently as well.

They drink Tokaj wines mostly at home with guests/on special occasions/at home for fun.

Figure 19

The segment of the sophisticated artist of life

The sophisticated artist of life

30% of the samples. All of them are at the age of 18-45 years. 30% more women. Mostly employees, and mostly have higher education.

Drink only bottled wines.

They buy most frequently in wine shops, directly from the cellars, discount stores. They buy wine most rarely in supermarkets.

Most frequent place of buying Tokaj wines: wine shop, hypermarkets, cellars.

Most important influencing factors when buying wines: friends' suggestion, winemaker, price. It is this group where the most important factors are: friends' suggestion, labels, wine magazines, awards at wine competition.

They buy Tokaj wines one a month en average.

The latest occasion for drinking wine was "last week". They drink Tokaj wines most frequently. (less than 1 month ago)

They go to wine tastigs, visit cellars, go on wine tours most frequently.

Occasions of drinking Tokaj wines: at home with guests/special occasions/at home for fun.

Aim of buying Tokaj wines: own consumption/ when visiting friends / entertaining guests.

They can navigate themselves among wines. Interested in information on wines.

They know the wine regions and wine varietals of Hungary. They know what wine matches the different occasions.

The price sensitive simple average consumer

The price sensitive simple average consumer constitutes 29% of the samples (*Figure 20*). The rate of sexes is close to equal. 2/3 of them are above the age of 46, 2/3 of them are employees, they mostly have intermediate education.

They mostly drink bottled wines, but here we can find most of those drinking wine by the glass. They drank wine 'last week', but they drink and buy Tokaj wines the least frequently (the average is between 1 month and more than 1 month). This cluster spent the least amount on wine during their last purchase.

The purpose of buying Tokaj wines are when visiting friends/own consumption/ entertaining guests. They never buy for collection, and hardly for other members of the family. They take it most frequently abroad as a gift.

Figure 20

The segment of price sensitive simple average consumer

The price sensitive, simple average consumer

29% of the samples. Proportion of sexes is close to equal. 2/3 of the cluster above the age of 46 years. 2/3 of the cluster are employees, having mainly intermediate education.

They mainly drinks bottled wines., but here is the biggest proportion of drinkers by the glass.

Latest occasion for drinking wine was" last week". They drink /buy Tokaj wines most seldom.

They almost never goes to wine tastigs, cellar visits, wine tours. They drink Tokaj wine for the fun least frequently.

Occasions of drinking Tokaj wines:special occasions/ when visiting friends/at home with guests/They have marked the special occasions, and visiting friends most frequently as an occasion for drinking Tokaj

Aim of buying Tokaj wines: when visiting friends/ own consupmtion/ entertaining guests.

The most typical place of buying Tokaj wines: place of daily shopping, supermarket, discount stores. They never buy in wine bars, wine shops, seldom buy from cellars.

The most important factors when buying wines are: prices, promotional prices, They do not care about vintage years, suggestion of magazines, or wine

They never buy for collections, rarely for other members of the family. They buy it as a gift for abroad most frequently.

They think least that drinking Tokaj wines need special ceremony.

They do not know what wine matches to different occasions. They do not know the Hungarian wines and wine regions.

They like flavours that they got accustomed to. They cannot navigate themselves among wines. They have not interested in information on wines-

Price and price promotions are important for them when purchasing, these are the most important factors for them. They do not care about vintage years, suggestion of magazines, or awards from wine competitions. The most typical places of purchase

for them are: premises of daily shopping/supermarkets. They never buy wine in discount stores and wine bars, hardly ever in wine shops or directly from the cellar.
The most frequent occasions for them to drink Tokaj wines are: special occasions, celebrations/when visiting friends/at home with quests.

They almost never attend winetastings, hardly go to wine cellars,or on wine tours. They drink for fun the least. Within the total of samples they marked special occasions and gift when visiting friends the most frequently.

They like tastes that they got accustomed to. They cannot navigate themselves among wines. They are not interested in information regarding winemaking. They do not know what wine matches to what occasion. They do not know Hungarian wine regions and wine varietals. They think the least that drinking Tokaj wines needs a ceremony.

CONCLUSIONS

Similarly to the general model of food consumers 4 classic types of consumer behaviour can be discovered on the market of consumers of Tokaj wines. From the results of the research we can conclude that the general behaviour of food consumers and the characters of segments of wine consumers' behaviour correspond to the types of Tokaj wine consumers selected by us. Based on this we can state that the characteristics of the basic types of general food consumers' behaviour consequently appear in narrower groups as well. This, in the meantime confirms the correctness of our methodology and can confirm our results.

The gaps between the opinion of producers and consumers in judging the Tokaj wine market can be recognised and proven. Strategic development steps can be drawn up unambiguously on this basis.

We intend to evaluate the questions of the above mentioned gap analyses in our following publication.

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