



Contradictions and dilemmas in development of Hungarian food chain

Cs. ¹Sarudi, Z. ²Lakner

¹University of Kaposvár, Faculty of Animal Science, Kaposvár, H-7400 Guba Sándor u.40.

²Szent István University, Faculty of Food Science, Department of Food Economy, Budapest, H-1118 POB 52.

ABSTRACT

The globalisation and the European integration means new possibilities and threats for Hungarian agriculture and food production. The adaptation to the current processes on the world market of food and agricultural products needs the re-consideration of the development strategy of Hungarian food production. The utilisation of the Hungarian agro-ecological potential is decreasing. The production structure is rather rigid, giving only a limited possibility to the increase of value-added content of products. The strategy of product differentiation is a necessary precondition to increase the competitiveness and the price level of Hungarian products on the world market. The Hungarian experiences emphasise the importance of the human factor in the market adaptation. The concentration is a general process in agribusiness. The only possibility of the survival of small- and middle-scale economic entities in agriculture and food industry is co-operation. A specific problem is the concentration in domestic trade. The defence of interests of agricultural and food industrial enterprises should be increased by more rigorous application of the competition law.

(Keywords: channel management, competitiveness, strategy, value chain)

ÖSSZEFOGLALÁS

Ellentmondások és dilemmák a magyar élelmiszer vertikumban

¹Sarudi Cs., ²Lakner Z.

¹Kaposvári Egyetem, Állattudományi Kar, Kaposvár, 7400 Guba Sándor u.40.

²Szent István Egyetem, Élelmiszertudományi Kar, Élelmiszeripari Gazdaságtan Tanszék, Budapest, 1118 POB 52.

A globalizáció és az európai integráció egyidejűleg jelent új lehetőségeket és kihívásokat a magyar mezőgazdasági és élelmiszeripari termelés szempontjából. A világpiacon folyó folyamatokhoz történő hatékony alkalmazkodás az eddigi fejlesztési stratégia átértékelését teszi szükségessé. Ezt indokolja az is, hogy romlott a hazai agro-ökológiai potenciál kihasználtsága. A termelés szerkezete viszonylag rugalmatlan, alacsony a termékek hozzáadott érték tartalma. A magyar tapasztalatok alapján külön is kiemelendő az emberi erőforrás fontossága a változásokhoz történő alkalmazkodás folyamatában. Termékeink világpiacon versenyzőképességét hatékonyan növelheti a differenciáló stratégia alkalmazása. A világ élelmiszeripari gazdaságát a koncentráció fokozódása jellemzi. A kis – és középvállalatok túlélésének legfontosabb lehetősége a kooperáció fejlesztése. Növekvő problémát jelent a belkereskedelemben végbemenő tőkekoncentráció. Ennek érdekében a jelenleginél jobban kellene védeni az élelmiszeripari vállalatok érdekeit a versenytörvény alkalmazásával.

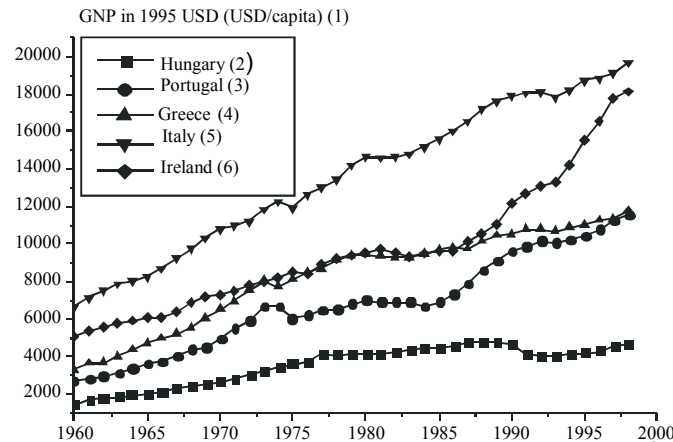
(Kulcsszavak: vertikális integráció, versenyzőképesség, stratégia, értéklánc)

INTRODUCTION

In the second half of the 20th century the relative backwardness of Hungarian economy compared to the middling developed European countries has increased (Fig. 1).

Fig. 1

The trajectories of development of some European countries



Source (Forrás): World Bank Statistical yearbook (*Világbank Statisztikai Évkönyv*), 2000

1. ábra: Néhány európai ország fejlődési pályái

GNP/fő az 1995-ös USD árfolyamon(1), Magyarország(2), Portugália(3), Görögország(4), Olaszország(5), Írország(6)

However Hungarian agriculture has achieved considerable results from the middle of the sixties to the second half of the eighties. These successes were based on the former market structure, and the output of Hungarian agriculture has been fallen drastically during the last decades. The European integration means new perspectives and threats for Hungarian food economy. At the same time, there are important transitions in the food chain all over the world. It is a general tendency, that the food production is changing from a branch dominated by family-based, small-scale, relatively independent farms and firms to one of larger economic entities that are more tightly aligned across the production and distribution value chain. Food trade is increasingly concentrated, more service focused and more global in ownership (*Buday-Sántha*, 2001).

There are a number of drivers of and contributors to these changes. The most important factors are:

- pressures from consumers and end-use markets,
- increasing competition from global market participants (*Szakály & Széles*, 2001),
- economies of size and scope in production and distribution,
- risk mitigation and management strategies of buyers and suppliers,
- changes in government policy (*Bánáti*, 1997),
- regulation of the agricultural industries,
- strategic positioning and market power/control strategies of individual businesses, and
- private sector R&D information and technology transfer initiatives and policies.

The development of Hungarian food economy is influenced at the same time by the general tendencies of change and by the specific conditions of Hungarian reality, mirroring the character of social and economic development, the contradictory results of privatisation and sometimes the lack of firm political will and governmental direction.

The aim of this article is to analyse some contradictions in Hungarian food chain and evaluate some possible solutions with the purpose of upgrading the competitiveness of the food economy. The current summary is an organic continuation of our former results in field of analysis of competitive position of the Hungarian food economy.

RESULTS AND DISCUSSION

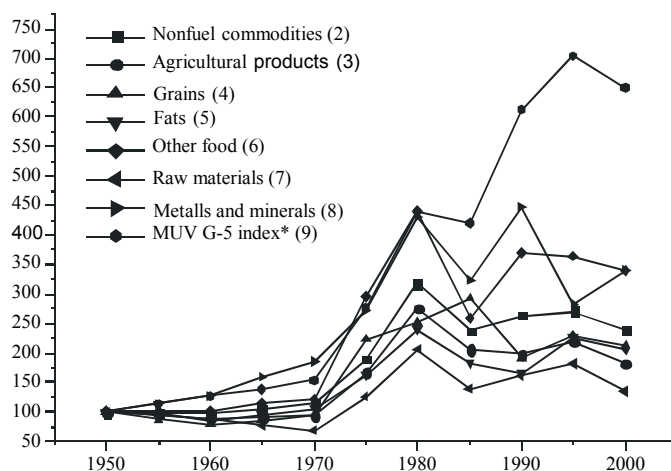
The contradiction between the supply and demand for Hungarian food products on the world market

All over the world, much of the agricultural production sector has been focusing on commodity products and these commodity products are typically produced in large volumes by numerous producers in an increasing number of geographic localities in the world. Consequently, margins in commodity production are under constant pressure because of market forces that encourage increased production when prices and margins increase even slightly (Fig. 2).

Fig. 2

The change of the export price level on the world market

Export price level in 1950=100% (1)



*Remark (Megjegyzés): MUV-5 index(9) is the manufactures unit value index for G-5 country exports to developing countries. (A legfejlettebb 5 ország fejlődő országba irányuló iparcikk – exportjának árindexe.)

Source (Forrás): World Bank Statistical yearbook (Világbank Statisztikai Évkönyv), 2000

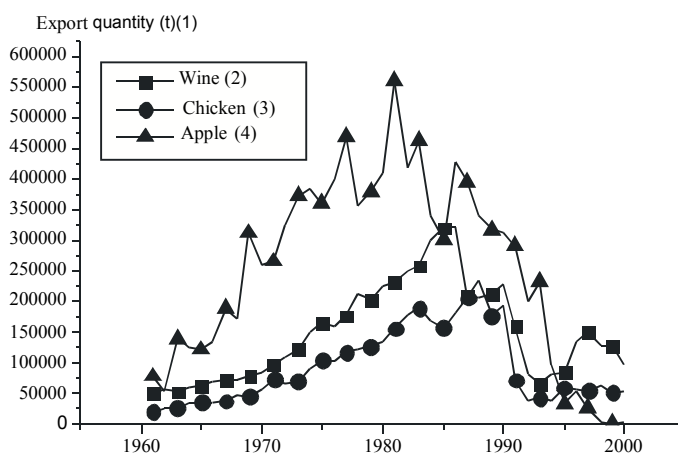
2. ábra: A világgpiaci árindexek változása

Export árszint az 1950-évi ár százalékában(1), Nem-energiahordozó alapanyagok(2), Mezőgazdasági alapanyagok(3), Gabona(4), Zsírok(5), Egyéb élelmiszerek(6), Nyersanyagok(7), Ércék és ásványok(8)

The Hungarian export increased dynamically, to the middle of eighties then it decreased sharply (Buday-Sántha, 2001). This fact makes it obvious, that on the current world market there is not enough consumer demand for mass – produced, low quality Hungarian products (Hajduné & Bánáti 2002).

Fig. 3

The rise and fall of Hungarian food and agricultural export



Source (Forrás): HCSO: Hungarian Statistical Yearbooks (*KSH Magyar statisztikai évkönyvek*), 1961-2001

3. ábra: A magyar élelmiszergazdasági export tündöklése és nyomorúsága

Export mennyiség (t)(1), Bor(2), Csirke(3), Alma(4)

The most important problems of Hungarian agricultural and food industrial export are:

- the price level of Hungarian export products, compared to prices of other exporters, is relatively low (*Tables 1 and Tables 2*),
- the export is concentrated on some Western-European countries. The market share of Hungarian products in the markets of Northern and Southern European countries, as well as in former socialist countries and in the Near East is rather low,
- due to the low level of product differentiation there is an increasing price pressure on Hungarian exporters,
- there is an increase of products with high value added in the Hungarian imports,
- the Hungarian export-import balance is continuously decreasing, especially with the EU-member states (*Fig. 4 and Fig. 5*).

Table 1**The export prices of some classic Hungarian products as a percentage of export prices of some concurrent countries (1993-1999 averages)**

Honey (1)	%	Apple (10)	%	Apricot (16)	%
Greece (2)	226	New-Zealand (11)	326	France (4)	156
Austria (3)	207	France (4)	242	Greece (2)	139
France (4)	152	Spain (12)	214	Italy (5)	125
Italy (5)	149	Italy (5)	204	Spain (12)	113
Germany (6)	133	Argentina (9)	195	Chile (14)	113
Hungary (7)	100	South-African Rep. (13)	173	South-African Rep. (13)	110
Australia (8)	77	Chile (14)	160	Argentina (9)	109
Argentina (9)	72	Hungary (15)	100	Hungary (15)	100

Source (*Forrás*): Own calculations based on foreign trade statistics of FAO. (*A FAO statisztikai adatbázisára épülő saját számítás.*)

1. táblázat: Néhány hagyományos magyar termék export árszínvonala a főbb exportőrök százalékában, az 1993-1999 évek átlaga alapján

Méz(1), Görögország(2), Ausztria(3), Franciaország(4), Olaszország(5), Német-ország(6), Magyarország(7), Ausztrália(8), Argentina(9), Alma(10), Új-Zéland(11), Spanyolország(12), Dél-Afrikai Köztársaság(13), Chile(14), Magyarország(15), Kajsziarack(16)

Table 2**The export prices of some Hungarian meat industrial products as a percentage of export prices of some concurrent countries (1993-1999 averages)**

Product (1)	Bacon (10)	Beef and veal meat (11)	Smoked and salted beef (12)	Prepared beef (13)	Game meat (14)
France (2)	150	149	498	124	321
The Netherlanden (3)	112	176	733	63	164
Italy (4)	334	102	1832	80	403
Spain (5)	241	121	661	90	260
Austria (6)	181	95	341	84	492
Belgium-Luxembourg (7)	170	154	578	246	300
Denmark (8)	112	127	398	271	166
Hungary (9)	100	100	100	100	100

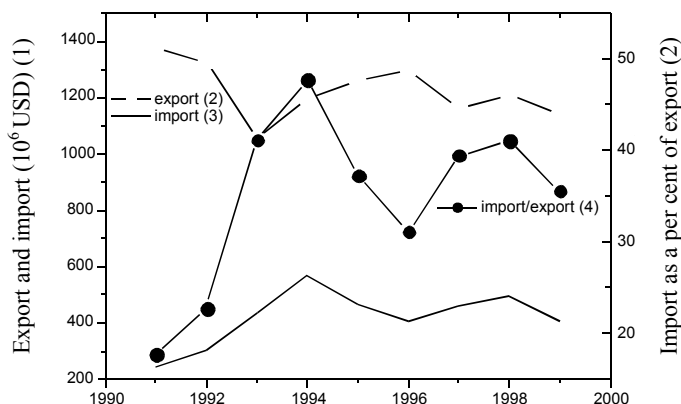
Source (*Forrás*): Own calculations based on foreign trade statistics of FAO. (*A FAO statisztikai adatbázisára épülő saját számítás.*)

2. táblázat: Néhány magyarországi húsipari termék export árszínvonala a főbb exportőrök százalékában, az 1993-1999 évek átlaga alapján

Termék(1), Franciaország(2), Hollandia(3), Olaszország(4), Spanyolország(5), Ausztria(6), Belgium és Luxemburg(7), Dánia(8), Magyarország(9), Bacon(10), Marha-és borjúhús(11), Füstölt, sózott marhahús(12), Marhahús-készítmény(13), Vadhús(14)

Fig. 4

The agricultural export-import balance in the foreign trade between EU and Hungary



Source (Forrás): Udovecz, 2001

4. ábra: Magyarország és az EU agrárkülkereskedelme

Export és import (milliárd USD)(1), Export(2), Import(3), Export/import arány(4), Import az export százalékában(5)

One of the most important possibilities of product –development in food industry is the increasing share of differentiated products. The transformation of food industrial production from commodity to differentiated product industries is driven by the consumers’ desire for highly differentiated food products; their demands for food safety and ability to the origin of the product; from continuous advances in technology; and from the need to minimise the total costs of production, processing, and distribution. Food systems will attempt to differentiate themselves and their products by science and/or through marketing. Ways to differentiate through science include exclusive technology in processing systems; and superior food safety integrity. Differentiation will occur not only in terms of the attributes of the product, but also in terms of process. Agricultural raw materials will be different because they are grown in different ways (for example free-range poultry) as well as their nutritional value or chemical composition. Much of the production sector has focused on commodity products in the past and these commodity products.

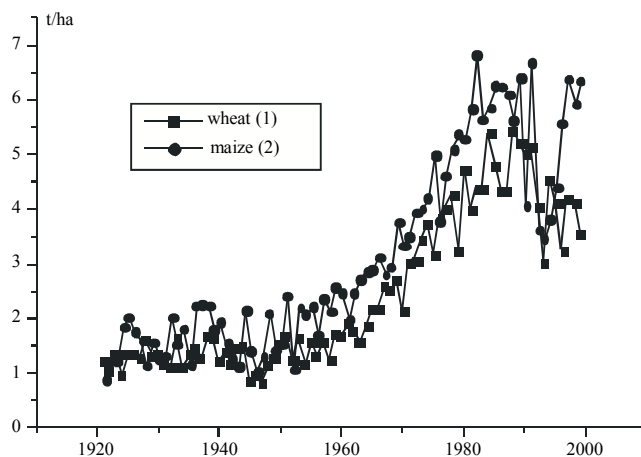
In the food business, value consists of many ingredients from nutrition, health, and safety, to entertainment, convenience, satiety, and status.

The contradiction between the agro-ecological potential and its utilisation

From the late sixties till the middle of the eighties, based on stable export possibilities into the socialist countries, on considerable state subsidies and on the safe position the domestic - market, the agriculture and food industry rapidly developed, net food export on a per capita basis was among the highest in the world (Szabó, 1998). By the middle of the eighties it became obvious: the former way of development, characterised by the lock of real owners and competition, the low efficiency of resource utilisation, and the quantity- oriented production had achieved its maximum development (Fig. 5 and Fig. 6).

Fig. 5

The yield of wheat and maize in Hungary



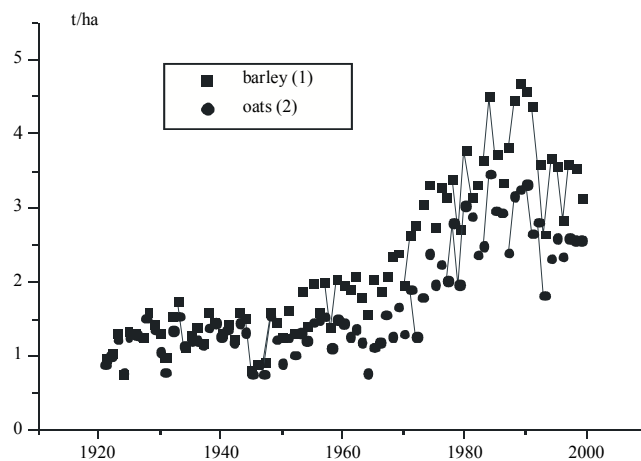
Source (Forrás): HCSO, Agricultural yearbooks (KSH Mezőgazdasági statisztikai évkönyvek), 1920-2000

5. ábra: A búza és a kukorica termésátlagának változása Magyarországon

Búza(1), Kukorica(2)

Fig. 6

The yield of wheat and maize in Hungary



Source (Forrás): HCSO, Agricultural yearbooks (KSH Mezőgazdasági statisztikai évkönyvek), 1920-2000

6. ábra: Az árpa és a zab termésátlagának változása Magyarországon

Árpa(1), Zab(2)

In the late seventies a special workgroup was organised to determine the agro-ecological potential of Hungarian agriculture. In the work of this group practically the best specialists had taken part from every important branch of Hungarian agriculture. The group published its research results in *Láng et al.* (1983). The predicted values were determined on a conservative way: the specialists did not take into consideration any possible drastic, unexpected change in the biological base or technology of agricultural production. It is very interesting to compare the forecasted and the realised values. Analysing the forecasted and actual values of yields of two main products of Hungarian agriculture it is obvious, that there is a considerable difference between the possibilities and reality. The wheat production is below the pessimistic anticipated value (*Table 3*).

Table 3

The possibilities and the reality: the yield of wheat and maize production in Hungary

Product (1)	Pessimistic (4)	Real (average) (5)	Optimistic (6)	Fact (1996-1999 average) (7)
Wheat (2)	4.3	5.1	5.8	4.0
Maize (3)	4.7	6.2	7.2	6.2

Source (*Forrás*): *Láng et al.*, 1983; HCSO Statistical Yearbook (*KSH Statisztikai évkönyvek*), 1999

3. táblázat: A lehetőségek és a valóság a búza és a kukorica termésátlagának változásában Magyarországon

Termék(1), Búza(2), Kukorica(3), Pesszimista(4), Realista (átlagos)(5), Optimista(6), Tény (1996-1999 átlag)(7)

Table 4

The forecasted and actual yields of various agricultural products (t/ha)

Product (1)	Forecasted value in 1982 for 2000 (13)	1997	1998	1999	Average (14)
Sugar beet (2)	42.2	37.86	41.96	43.54	41.1
Potato (3)	28	16.28	18.85	18.39	17.8
Sunflower (4)	3.2	1.22	1.68	1.52	1.5
Green Pepper (5)	20	10.61	12.13	14.21	12.3
Red pepper (6)	10	7.55	8.91	6.28	7.6
Tomato (7)	40	14.39	22.28	22.02	19.6
Greenpeas (8)	4.5	3.77	4.37	3.89	4.0
French beans (9)	8.5	5.45	5.58	5.65	5.6
Carrot (10)	47.5	17.6	17.94	18.62	18.1
Parsley (11)	16	10.63	11.28	11.2	11.0
Sweet corn (12)	15	11.37	11.78	14.58	12.6

Source (*Forrás*): Own calculations, based on (*saját számítás*) *Láng et al.*, 1983; HCSO Statistical Yearbook (*KSH Statisztikai évkönyv*), 1999

4. táblázat: Néhány termék prognosztizált és tényleges termésátlaga

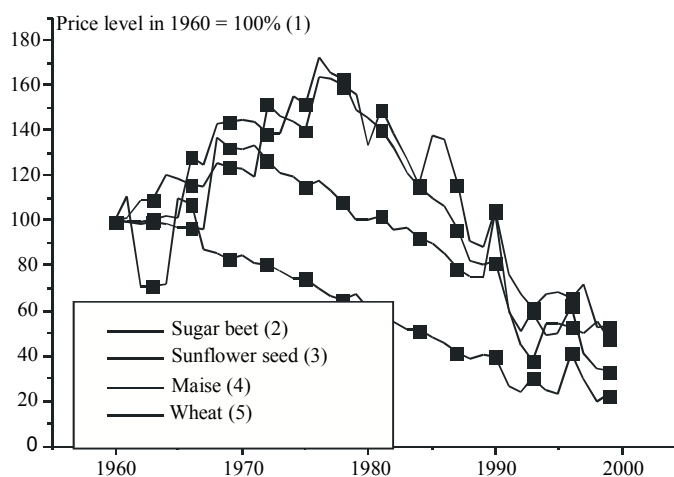
Termék(1), Cukorrépa(2), Burgonya(3), Napraforgó(4), Zöldpaprika(5), Piros paprika(6), Paradicsom(7), Zöldborsó(8), Zöldbab(9), Sárgarépa(10), Petrezselyem(11), Csemegekukorica(12), 1982-es előrejelzés 2000-re(13), Átlag(14)

In the case of other agricultural products the differences between predicted and achieved values are even more obvious (Table 4). This fact emphasises, that the possibilities of agricultural production are much better, than the actual yields of agriculture. Of course, with such low yield levels of agricultural production it is impossible to achieve any significant in the increase the profitability of production. These low levels of production do not give any possibility for profitability (Borszéki, 2001).

The possibilities for structural change are narrowed by the constantly decreasing producer prices. So a vicious circle is created (Fig. 7).

Fig. 7

The real price level of some agricultural products



Source (Forrás): own calculations, based on HCSO Agricultural yearbooks (KSH Statisztikai évkönyvek alapján végzett saját számítás), 1960-2000

7. ábra: Néhány mezőgazdasági termék real-ára

Real árszínvonal 1960=100%(1), Cukorrépa(2), Napraforgó(3), Kukorica(4), Búza(5)

Contradiction between the structure of Hungarian food production and the structural development of food industry in the European Union

Most firms in Hungarian food industry are relatively small, with those employing fewer than 11 workers accounting for 85.5 per cent of all food industrial firms in 1999 but only a small share of the total employment (Tables 5, 6, 7). At the other extreme 108 firms each employing 300 or more and constituting 1.2% of all firms accounted for 53% of the total employment. Although the details vary, the general picture remains much the same when size is measured in terms of turnover instead of employment.

The concentration of food industry creates new contradictions, too. Shifts in plant size suggest economies of scale in food industry, and scale economies and the resultant shift to large plants can account for part of the increase in concentration. If larger food industrial plants realise lower costs, then increasing food industrial concentration may lead to lower food prices for consumers but the practical evidences do not prove this

theory. The enormous food industrial plants sometimes impose significant new social costs on rural communities in the form of sharp changes in community social structures and increased educational and social service commitments to service plant work forces. The increase of the size of plants increases the distances of raw material transportation, too. It often happens, that the same firms are the leaders in each industry and in related businesses (such as in sugar beet processing and in vegetable oil industry) too. Increasingly, agricultural producers deal with a small set of very large food processors in marketing of different products. In concentrated markets of agricultural raw materials with only a few buyers, the food processors may be able to use contracts as a tool of price discrimination, thereby exploiting the potential market power created by concentration. Concentrated buyers may be able to manipulate thin cash market prices, which frequently form the basis for contract settlements (this was the case in meat section of Hungarian stock exchange). In short, contracts may combine with buyer concentration to allow buyers to exploit market power (*Lehota, 1995*).

Table 5

The size-structure of Hungarian food industry

Turnover (1000 US) (1)	Distribution of turnover (%) (2)	Distribution of number of enterprises (%) (3)
<400	3.17	77.3
400.1-2000	6.7	12.84
2000.1-4000	6.67	3.04
4000.1-12000	12.81	0.88
12000.1-24000	12.05	1.18
24000.1-40000	17.87	0.93
>40000	40.73	3.83

Source (*Forrás*): Association of Hungarian Food Processors (*Élelmiszer-feldolgozók Országos Szövetsége*), 2000

5. táblázat: A magyar élelmiszeripar méretség szerkezete

Árbevétel(1), Részarány az árbevételből(2), Részarány a vállalatok számából(3)

Table 6

The structure of Hungarian food industry by of employment

Number of employes (1)	Number of enterprises (2)	Distribution of number of enterprises (%) (3)
<11	7438	85.5
11-20	468	5.3
21-50	395	4.6
51-300	287	3.4
>300	108	1.2
sum (4)	8696	100

Source (*Forrás*): See Table 5. (*Lásd 5. táblázat*)

6. táblázat: A magyar élelmiszeripar vállalati szerkezete a foglalkoztatottak száma alapján

Foglalkoztatottak száma(1), Vállalatok száma(2), Vállalatok megoszlása(3), Összeg(4)

Table 7

The size structure of food industry in the EU and in Hungary

Number of employed (1)	Distribution of number of enterprises (%) in EU (2)	Distribution of number of enterprises (%) in Hungary (3)
<20	92.4	90.8
20-99	6	7
>100	1.7	2.2

Source (Forrás): See Table 5. (Lásd 5. táblázat)

7. táblázat: Magyarország és az EU élelmiszeriparának méretség szerkezete

Foglalkoztatottak száma(1), A vállalatok számának megoszlása az EU-ban(2), A vállalatok számának megoszlása Magyarországon(3)

The only possibility of survival for these small –scale enterprises is the specialisation and the concentration of supply. Successfully supplying a market segment over the long run requires sufficient capacities, sophisticated supply chain management and distributive systems as well as fighting off competition that intensifies in proportion of the attractiveness of the segment. For example some Hungarian wine growers bottled high –quality, premium –category wines, but the volume of their production did not achieve the minimum for the regular supplying of trade organisations (Udovecz, 2001).

Rapidly growing market segments have attracted fierce competition. When Pharmavit Rt. – a middle scale Hungarian food industrial firm - developed a specific instant product in the 1990s, the a big American Pharmaceutical company responded by buying out the firm and proliferated the imitations of the original products. In the end the original product gained only a small market share.

A specific way of niche product creation is to define products by geographic origin and/or production practices and seek to subdivide markets through restricted entry. These programs may provide market information as a public good that individual producers would be unable to provide. In Western - Europe these interventions are quite specifically justified as a means of protecting classes of producers and products from an unfettered marketplace.

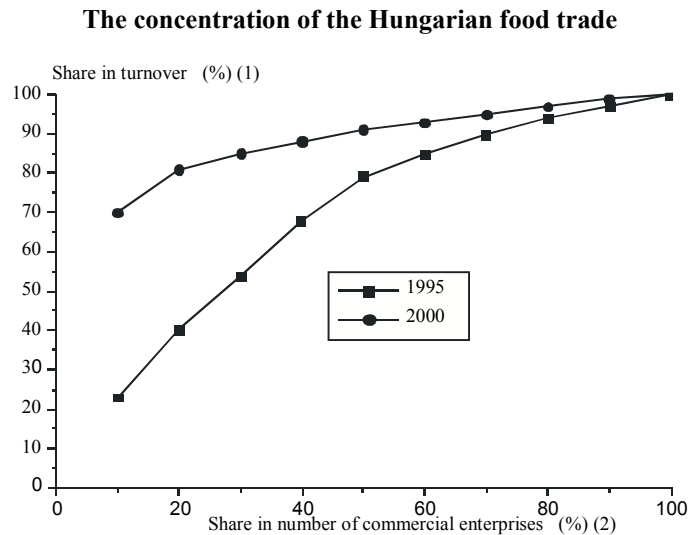
The contradiction between the spheres of the food production and the domestic trade

The Hungarian food industry is concentrating intensively (Fig. 8).

The multinational enterprises and the Hungarian retail chains form larger buying groups. The buying power of these groups is impressive, with 70% of Hungarian food sales now accounted for by these eight integrated buying groups. Shippers who are not equipped to sell to these very large buyers must focus their efforts on the remaining more fragmented portion of the food system, both retail and other. By purchasing more volume, retailers hope to lower the per-unit cost of goods by negotiating lower prices. In return, retailers may develop partnerships with preferred suppliers, concentrating volumes with these firms, potentially benefiting suppliers with more predictable firm level demand. When demand and supply are more closely coordinated buyers and sellers can work together to stimulate sales, and achieve more consistent volumes and quality. On the other hand, as price takers in a low margin business many shippers feel that they have little ability to absorb lower prices, reporting that volume discounts are not cost-

justified for commodity-based fresh produce shippers (as opposed to shippers of value-added produce like packaged salads).

Fig. 8



Source (Forrás): Nielsen, 2001

8. ábra: A magyar élelmiszerkereskedelem koncentrációja

Részarány a forgalomból (%) (1), A kereskedelmi vállalatok részaránya (%) (2)

Retailers also expect reduced marketing and selling costs as a result of relationships with preferred suppliers. Suppliers and distributors are being asked to help retailers with the design and provision of category management, effective design of promotions, promotional allowances, and special packaging. To make this type of marketing support function effectively retailers should share sales data with suppliers in order to better evaluate promotions, seasonal effects, price responses, and other characteristics of consumer demand.

Although the economic effects of the recent mergers in field of food products have not yet been determined, many producers fear that competition will further erode. Producers will increasingly face fewer but larger buyers as consolidated food retailers reduce the number of buying offices and combine orders into larger volumes.

The best possibility for the increasing of the efficiency of producers is the joining of their efforts to improve their bargaining position as well as (especially in the case of small- or middle scale horticultural producers) the utilisation of alternative ways of product selling, e.g. by the utilisation of local markets, without any middleman. The scientific foundation, the financial and material resources are in most cases not enough to change the way of thinking of producers into the direction of exploitation of new markets and distribution channels. It is one thing to disseminate the latest results in framework of local workshops to entrepreneurs, and another thing to put these pieces of knowledge into practice. For example there is a considerable difference between the

producer prices and retail prices of vegetables. We have made some interviews with horticultural producers, why they do not utilise this gap, why they sell their product to traders, instead of selling themselves their products. The stereotype answer was: "I just don't like trading and bargaining with all those people." This was a case of the producers who had a highly attractive market opportunity fallen into their his laps and they turned away from it.

ACKNOWLEDGEMENT

This research has been supported by OTKA T 037583 and NKFP - 2001 - 4/032 OM 00154/2001 research projects.

REFERENCES

- Bánáti D. (1997). Az EU élelmiszerszabályozása. (The regulation of food-quality in EU.) FM Integrációs füzetek, 13. 1-12.
- Borszéki É. (2001). Capital and income transverses in agro-economy. Szent István Univ. Gödöllő, Vision – 2000, SzIE 3-1 Gödöllő, 4 –25.
- Buday-Sántha A. (2001). Agárpolitika-vidékpolitika. (Agrarpolicy-rural policy.). Dialóg campus, Pécs 1-459.
- ÉFOSZ: Egyéni adatszolgáltatás, Budapest, Specific data supply, Budapest.
- FAO (2002). Agrostat electronic database, Rome.
- Hajdu I.-né, Bánáti D. (2002). Élelmiszerjog SZIE, Budapest, 1-210.
- Hungarian Central Statistical Office 1899-2000 Statistical yearbooks, Budapest.
- Láng I., Csete L., Harnos ZS. (1983). The agro-ecologic potential of Hungarian agriculture on millennium (in Hungarian) Mezőgazdasági Kiadó, Budapest, 1- 266.
- Lehota J. (1995). Marketing channel relations in the milk sector, 41st EAAE Seminar, Gödöllő, 147-151.
- Nielsen Co. (2001). The concentration of Hungarian trade, Budapest ,120.
- Szabó G. (1998). Élelmiszer-gazdaság (Food – economy) PATE ÁTK Kaposvár, 1- 210.
- Szakály Z., Széles Gy. (2000). Problems of animal production in Hungary, Seoul National Univ., 128-136.
- The World Bank 2001, World Development Indicators 2001, Washington D.C.
- Udovecz G. (2001). The Hungarian agricultural export. (in: The Hungarian agro-economy and the possibilities of development-in Hungarian.) ed.: Papócsi L., Takács L., VE publishing house, 98-120.

Levelezési cím (*corresponding author*):

Sarudi Csaba

Kaposvári Egyetem, Állattudományi Kar
7401 Kaposvár, Pf. 16.

*University of Kaposvár, Faculty of Animal Sciences
H-7401 Kaposvár, P.O.Box 16.*

Tel.: 36-82-314-155, Fax: 36-82-320-175
e-mail: szekeres@mail.atk.u-kaposvar.hu