

Apple crisis versus Karinthy' six steps

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Abstract: For many years it has been a problem for apple farmers in Szabolcs to sell their fruits at a reasonable market price. Will the Hungarian apple disappear from the market or is there a way back? The question may arise: how does Karinthy relate to the current apple crisis in Szabolcs? The answer could be found in the development of networks. Hungarian small and medium-sized agricultural entrepreneurs are in a vulnerable position due to their size. The size of the plots or farms isn't economical. This means that alone – without social support or network organization – they are not able to compete with larger agricultural firms [28]. The Hungarian people's mentality is unlike any other. While there are positive examples in the surrounding European countries, experts have met challenges to find a model that can work in the Hungarian environment. Social media is overwhelmed with voice of the outraged urban residents who blame the farmers for the situation that has arisen, and with the farmers' opinion, which are furious about the incompetent comments. The purpose of this dissertation is to find the path towards the solution: to present the characteristics of agriculture, the development of network sciences and to find the mistakes of the current situation.

Keywords: agriculture, apple crisis in Szabolcs, network, bio-farming, organic farming, competitive agriculture, technology development

1 Market environment

The European Union has grown over 12 million tons of apples in recent years, which is 1.5 to 2 million tons higher than in the period before 2010, and which the EU market can absorb. Growth was predominantly attributable to the strong development of Poland, which increased its previous 2 to 2.5 million tons production to 4-4.5 million tons, which has now become market and price-fixing in Europe [25]. Year after year, the quality decays and quantity of apple is

decreasing in Hungary as well. One consequence of this is that almost two-thirds of Hungarian apple production is industrial apple, and less fruit going to the fresh market. Plantation modernization would significantly promote the Hungarian apple market [3]. The social institutions of horizontal integration (co-operatives, sales co-operatives (TESZ), producer groups) play an outstanding role in the EU agricultural economy. Using collaborative models, the agrarian farmers build common capacities to counterbalance disadvantages and market positions in their co-operation, jointly managing inputs, capacity utilization and sales channels. [27][7][20][31][32].

2 The Hungarian Truth

Domestic agriculture, thanks to the country's favourable geographic characteristics, is a very long-lasting sector. The main agricultural products of the country - mainly cattle, wheat and wine - sold in significant quantities in the Central and Western European markets from the medieval [30]. Despite the fact that the importance of horticultural industries is not as great as the grain production with long historical past, it means the livelihood for many farmers, so we cannot ignore it. While cereal products and oil seeds are almost directly available for sale and their storage is simpler, only a limited number of vegetable and fruit products can be marketed directly, their storage duration is limited due to their perishability.

Following the survey in 2001, in 2007, 2012 and 2017, in accordance with the EU Directive, KSH (Figure 4. and Figure 5.) implemented four plant species (apple, pear, peach and apricot). During the change of regime, a large part of the fruit trees were aging and their replanting did not take place. Following the launch of EU accession, however, the number of orchards dramatically increased due to the appearance of new resistant varieties and support [30].

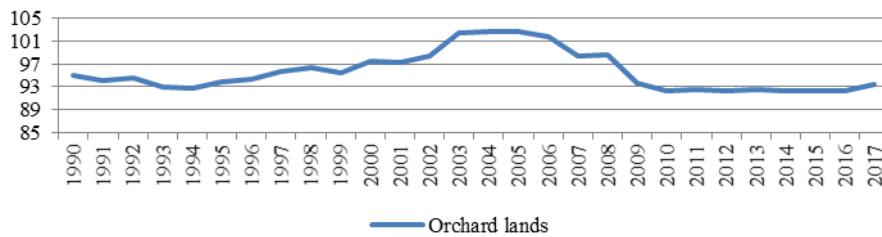


Figure 4.: Attendance orchard land 1990-2017
Source: KSH data, compiled by the author

Thanks to the EU directives, we now have adequate statistical data on how the number of orchards is distributed within the country (Figure 5). More than 75 percent of the orchards are in the Northern and Southern Plains regions, which due to the geographical circumstances can be granted [30)].

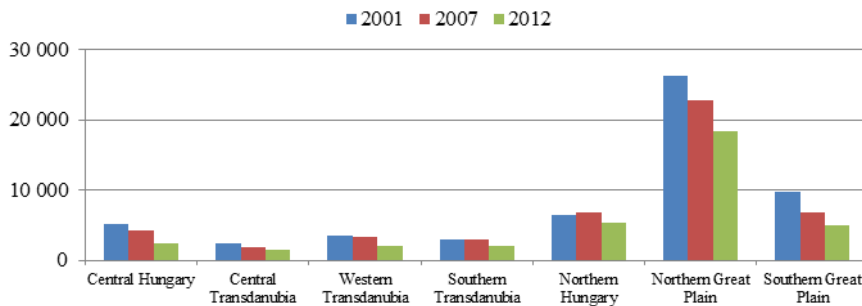


Figure 5.: Number and area fruit tree plantations by region
Source: KSH data, compiled by the author

The census of 2017 is based on many aspects of the orchards, such as organic farming, planting time, irrigation of farms, storage or refrigeration facilities, etc. Based on the database made in its compilation, it is proved by the fact that a negligible proportion of Hungarian farms chose the path of organic farming. The statistical data, on the other hand, confirm that a large number of farms are classified, which is a source of confidence. Organic farming also aggregated data from fruit species, from which data on apple plantations had been extracted (Figure 6). Classified apple plantations and organic farming show only around 10% of all farms.

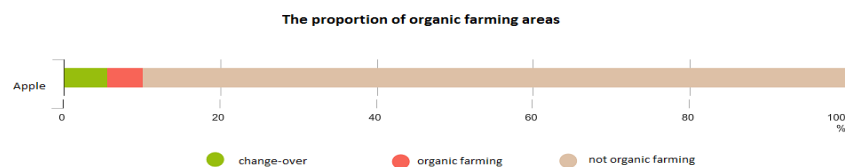


Figure 6.: The proportion of organic farming areas
Source: KSH

The development of irrigation management can be a breakthrough for farmers. Hungary's standpoint is that the spread of water-efficient and efficient technologies in Europe can ensure that sustainable development goals are met. The representatives of our country are also urging for the development of drought monitoring and drought warning systems to increase the safety of agricultural production [1].

Irrigation methods were also studied in the last year's census by species, where the data on apple plantations also had been highlighted (Figure 7.). The figure illustrates the possibilities of ensuring the irrigability of plantations. According to the census data, less the 40% of Hungarian orchards can be irrigated of which about 57% of the areas have become irrigated.

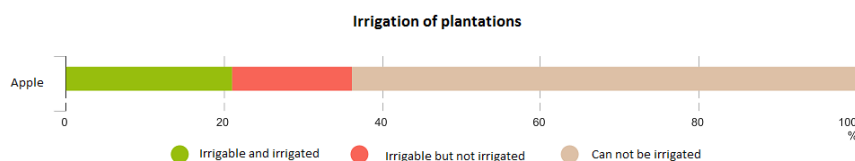


Figure 7.: Irrigation of plantations counties (apple)
Source: KSH

Based on last year's census, it can be concluded that about half of the farmers have at least secondary vocational qualifications on an average nationwide level. Based on statistical data it can be stated that a significant proportion of farmers are over the age of 60 so there is an urgent need to motivate young people in order to involve them in Hungarian agriculture. It raises questions about whether this ratio is coming from the older generation, who are soon to be leaving the sector, or young people [3]. It would also be important to give the knowledge to the younger generation, to be able to combine technology and skills to promote the development of agriculture.

In addition to the vocational qualification, there is an additional problem that the manual labor required for the harvest season has almost disappeared. The current employment situation in Hungary also severely affects the agriculture, so farmers who did not work to modernize their economy faced a serious problem this year because they had to use mechanical labor instead of manual labor for harvesting.

3. „Gold of Szabolcs”

In Hungary, in 1930, conscious apple production began. In the fifties and sixties, during state-run economy, 12.8 million apple trees were grown in the country and the production grew nearly tenfold. Due to the changes in world markets in the eighties, domestic apple production was also in trouble, but the real crisis was caused by the loss of Soviet exports, which resulted in 40% less land production. State-run farms have become private estates or abandoned lands. In Szabolcs, for example, almost everybody lived on apple production, making it clear for private producers to survive new paths should be sought. The substandard apple would be industrial or concentrate, but at the same time, due to the variety of food products, there was a need for more and more concentrate, many farmers had no interest in growing apples for domestic purpose, therefore there are many aging plantations in the country [23]. Hungarian apple production has been strongly affected for some 20 years (Figure 8). The reason for the significant backlog from Europe and the negative tendencies is that about half of the Hungarian apple plantations are untouched, with low technological and expense levels and there is only 5 thousand hectares of highly competitive plantations [3].

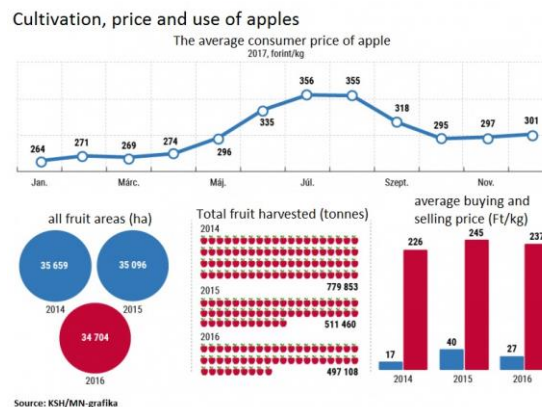


Figure 8.: Cultivation, price and use of apples

Source: KSH

A large part of the Hungarian apple plantation works with trees of 30-50 years old, with anachronistic varieties, traditional technologies, mostly without irrigation [26]. The high industrial apple production is such high only in our country (65-70%). In the EU this ratio reflects just the production of apple juice, while industrial apple is only 30%.

In the past ten years, the average price of 26 HUF / kg of the concentrate reflects the fact that it's not worth much on the market (Figure 9), but it cannot be produced even in industrial plantations at a cost of 25 to 30 forints. In the opinion of professionals, it might be the solution if farmers are to grow apple for domestic

purpose as there are 30% of them, which is suitable for producing industrial concentrate only. Primarily, the weaker plantations are the ones where the apple for concentrate grows, and there is a greater degree of crop rotation as there is no irrigation, no crop control, no professional nutrition farming and no pest control.

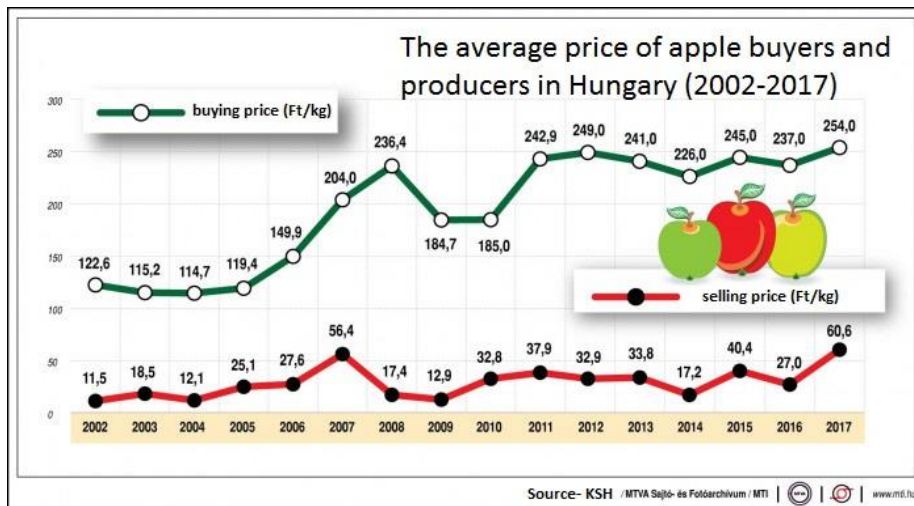


Figure 9.: The average price of apple buyers and producers in Hungary (2002-2017)
Source: KSH

4 Material and Method

On one hand, the study deals with the Hungarian and international literature on agricultural apple production, in particular the agro-specific fields, based on the current problems of agricultural producers, and analyzes statistical data and questionnaires, which may be the beginning of a solution. On the other hand, it presents the importance of networks in agriculture. It draws attention to the importance of co-operation, which can contribute to the knowledge of existing models in international practice.

5 Networking theories

One of the most important scientific topics of the beginning of the 21st century is the network, which is based on the same organizational principle. It is extremely interesting that at the beginning at the 20th century, a Hungarian writer had a great influence on the development of mathematical theories. The six-step distance

theory suggests that anybody on earth can connect with anyone through a chain of acquaintances. The theory is found in Frigyes Karinthy's 1929 Chain links, with five steps. The idea began with the conception of Karinthy. He thought there was enough connection to make the circle of acquaintances of all mankind [10].

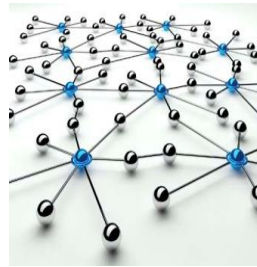


Figure 10. Illustration of networks
Source: www.fokusz.info

Laszlo Albert Barabasi and Reka Albert, a research fellow founded the theory of scale-independent network in 1999, which, despite the publication of several independent researchers joined the subject and contributed to the generalization of the theory. Researching the worldwide web has come to the conclusion that, from cells to complex societies, all networks are based on a similar structure-organization principle [4].

Studies on new economic configurations report that the network of companies and their partners is a condition for rural innovation [12]. Increasing globalization, strong multinationalization of food processing and trade, investments, technology and knowledge transfer the network increase in agricultural production [13]. Collective resources, such as the use of infrastructure, greatly benefit the development of economic networks [14]. Businesses can reduce their costs in transactions with geographically close partners and in the field of labour management. The development of local networks efficiently promotes knowledge transfer, innovation and learning process.

The cluster-based economic structure is a general feature of the industry's key business, which is able to produce and sell exportable products outside the region. This industry relies on networks of related business partners in the implementation of production, the vertical structure and processes of the industry are supported and served by the economic infrastructure and the environment [20]. The structure and characteristics of agrarian clusters and the results of competitiveness can fundamentally differ from the national characteristics, the concentration or function of certain participants. Theoretical standardization is somewhere between industry clusters and regional clusters depending on the structure of the cluster and the nature of the activities. Agricultural production may be closer to the conceptual framework of the regional cluster due to its attachment to geographical conditions (e.g. land or other agricultural inputs) [15][17].

6 Network in agriculture

Competitive and sustainable agriculture can be achieved if the innovation is greater than the current one, if we have the skills to do so and the sector is upgraded by investments. Most Hungarian farmers are not able to pay for technology, but this is even less of a problem than having the knowledge to adopt new technologies in their farming. Furthermore, a major problem is that over the next ten years a large number of elderly farmers expected to exit the sector, while agriculture is not attractive to the young and educated workforce due to low income and prestige [30].

Following the apple crisis of 2018, a great number of experts expressed their opinion. According to experts, the development of a modern apple plantation involves a great risk: 15-25 years of payback and 14-15 million forints per hectare. With a cold storage and sorting wrapper this would cost another HUF 10 million, the irrigation would increase the costs by approximately 1 million forints per hectare. The Polish have also resolved this in co-operative form. However, in Hungary the co-operative law is changed every few years, so nothing can be planned for a long term. In the experts' opinion, the solution could be if farmers had at their own fruit processing industry, so they could influence the prices. With this solution, however, the problem is that domestic prices are moved by the international market. In addition, a Hungarian subsidiary of a multinational company owns 65 per cent of processing industry capacity that can be processed on average 500-550 thousand tons of apples per year. The average cost of processing is estimated to reach 1 million Euros, but a significant part of the 25-26 thousand hectares of domestic apple production is found in one of the most disadvantaged regions in Szabolcs-Szatmar-Bereg County. In Poland, farmers in 4-5 villages cooperated and built fruit processing factories, cold storages and at least 20 hectares of plantations. The average yield of Hungarian apple trees in the last three years was 15.6 tons per hectare, while in Poland it reached 34.6 tons per hectare. However, upgrading and higher ratio of apples for domestic use would be a source of new problems as domestic consumption did not exceed 200-250 thousand tons per year, despite all marketing efforts. If the manufacturing capacity did not follow the expansion of production, farmers would come off badly, as there is not much chance for increasing apple exports next to Poland [26].

You have to look at what the majority is doing, so all EU Member States with advanced apple production. Italy, Germany, Austria and the Netherlands produce apples for domestic use, and only 20-30% of the apples will become industrial. These are by-products, so they are not sensitive to the price of their concentrate, as eating is decisive - 90-95 percent of the revenue - so it will not be a disaster if the price is 26 HUF / kg for the concentrate. In our economies where only concentrate is produced, there is a clear sense of price sensitivity. The subsidies maintained these plantations, preserved the uncompetitive structure. There should have been no support given without taking into account professional considerations, and this

is happening now and happened before. It is also unfair to receive the same amount of support as a low-quality producer as a professional. Our support system has to be transformed from 2021, only because substantive elements could be used by then. The aim is to support higher-quality production. There is a need for reform the investment aid. There should be a tendering system that is fast, efficient, viable and focuses on modern farmers and modern plantations. Expertise is also indispensable, there should be professional research and advisory stations, which has practically stopped in our country for 15 to 20 years, a producer who wants to improve, obtains the necessary knowledge from abroad. The only problem here is that foreign knowledge cannot be transposed into one, but it can only be adapted. In that case that there is a support system in which the farmer is interested in, and there is institution that serves him, then he will be happy to improve and build. There is a need for labor as soon as possible because the production of apples for domestic use per hectare requires three to four times more labor than industrial apples. Very important question to solve the irrigation, because it is not economically possible to grow apples without irrigation. If, in ten years time, we do not produce a stable quantity, half of it is industrial, and the other is for domestic use, the Hungarian apple production will go down on the slope from which it is difficult to reverse.

In other sectors, businessmen are already experiencing virtually no chance of survival without joint effort, organization and exchange of experience, so it would be extremely important for farmers to finally realize that farmers should work together if they want to work sustainably and efficiently. Agriculture in Hungary is still not competitive, but if it wants to become competitive, a change of attitude is needed in order to be able to handle the post-2020 support as best as possible. Good use of the funds can contribute, it is still not too late to develop the Hungarian agriculture prosper on its own, being a competitive sector and to remain if the subsidies are no longer available [28].

In order to change the individual, cultural factors, it is of the utmost importance to emphasize why it is worth the cooperation of a region's companies and to choose co-operation instead of competing. It is necessary to share information and relevant knowledge as well as to create a common use of physical assets and other resources, as local entrepreneurs can benefit by combining their resources and can become more competitive and to be able to act more easily on external markets and, on the other hand, they would be able to perform which they are not able to do alone. In addition it can be a further advantage if the public, private and civil sphere jointly take part in the realization of the economic activity [7][19][20][27].

In addition to demand-oriented networking, there is still a great room for supply-led market presence. This is especially true for smallholders, who have the most decisive local conditions and limited resources. This is due to the fact that the social institutions of horizontal integration (co-operatives, producer sales cooperatives (TESZ) and producer groups) play a prominent role in the networking in the European Union [9][16]. Abroad, more and more people

recognize that using such collaboration models can build up common capacities to compensate for the disadvantages and market positions of producers in the agricultural sector, in co-operation with joint management of inputs, capacity utilization and sales channels.

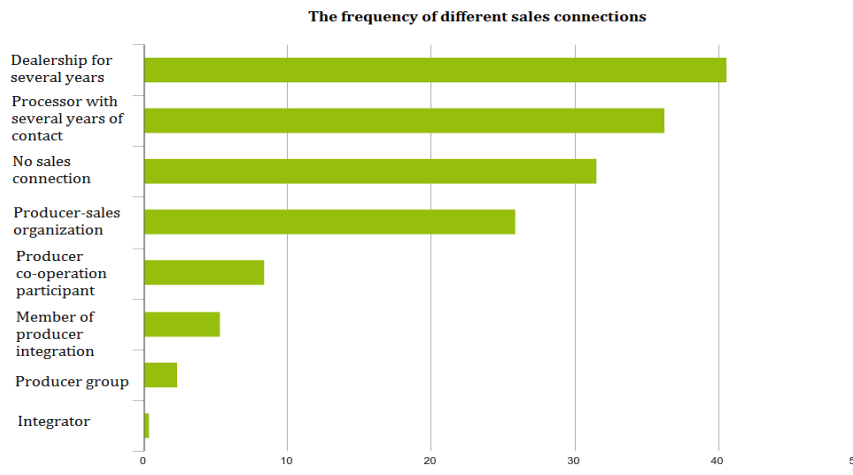


Figure 11.: Sales of agriculture connections

Source: KSH

Last year's census also highlighted the different sales channels, according to which the vast majority of farmers are in contact with or have no connection with a trader or processor. More than one-fifth is a member of a producer and sales organization. The statistical data support that there is an urgent need for the development of network connections.

Many people took positions in many places and provided suggestions on how to avoid a similar situation in the future, that is to say, when the processors want to buy the concentrate on a gratuitously low price. A producer-owned processor, managed by competent management, can operate as a TESZ, in a non-profit manner, not with the aim of generating more profits, but by selling the concentrate on a high price to the farmers; if they sell it on a lower price; of course they would pay less. But we need to acknowledge that a processor itself is not enough to solve this situation. Organization needed around the supply of raw materials, along with its input financing and consultancy.

7 Summary

Up until the Industrial Revolution, agriculture was the dominant sector in terms of value creation and employment. Today, in developed countries, it only accounts for only a few percent of GDP, the agricultural sector is small, as is the low level of agri-employment. While the production of most products and services is only tangentially influenced by the natural environment, the performance of the agricultural sector is influenced by the weather. Some of its products are perishable; such goods appear cyclically on the market. The production cycle is quite long and is inflexible as it is closely tied to real estate (land, farm buildings), so it is very difficult to optimize production by moving the production factors [21].

Farmers have to abolish the "nostalgia" characteristic of Hungarian society, and from somewhere deep, we have to find the "Hungarian virtue" that we have been so often called for. Furthermore, it is necessary to put the bitter hurt aside, to increase trust, to look ahead and to pay attention to the common goal. Without this, economic policy could give Hungarian farmers new tools, but will not be able to use the opportunities of technological development provided by the EU (a new CAP reform) and the sector remains vulnerable.

One of the greatest recognitions of our century is the acquisition of network theories. There are many publications in the literature from general theories to individual fields, but in most cases the networks still exist in theory only. In addition to this, the great technological discoveries efface human relationships; people are less trusting each other, so in addition to the practical penetration of network theories, another major challenge is to strengthen trust. If these artificially generated obstacles can transform mankind and learn to think in networks, success won't keep us wait for a long time.

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