Resituating the Local in Cohesion and Territorial Development

D 6.2 Case Study Report

May a Producer Organisation prevent mass pauperisation? An example from Hungary

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RELOCAL
Resituating the Local in Cohesion & Territorial Development

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Abbreviations

CAP	Common Agricultural Policy
EAFRD	European Agricultural Fund for Rural Development
EAGF	European Agricultural Guarantee Fund
EC	European Commisssion
EFRD	European Fund for Regional Development
EGTC	European Grouping of Territorial Cooperation
ESF	European Social Fund
EU	European Union
EUR	Euro
GDP	Gross Domestic Product
HCSO	Hungarian Central Statistical Office
HUF	Hungarian forint
ISCED	Internaional Standard Classification of Education
KZR	Korai Zöldségtermesztési Rendszer [Early Vegetable-Production System]
LAU	Local Administrative Unit
NUTS	Nomenclature of Territorial Units for Statistics
PGI	Protected Geographical Indication
PO	Producer Organisation
R&D	Research and Development
SGI	Services of General Interest
SME	Small and Medium-Sized Enterprises
Szentes PO	Szentes Producer Organisation (Producer Organisation seated in Szentes)
TOP	Territorial Operational Programme

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Executive Summary

The case of the Szentes Producer Organisation (PO) is an outlier among the 33 RELOCAL case studies for two reasons. First, it reports on the social impact of a private economy actor, even though the PO is a non-profit co-operative, which indeed has regularly shared part of its profits with its members. (We must add in brackets: bonus payments have been calculated on the basis of sales, meaning that the larger producers were granted more.) Second, the PO represents a positive example in terms of social impact of its operation,

When we selected the topic and this particular organisation for case study research, we were aiming to answer the question whether a private-economy agent can do more and better in preventing mass pauperisation in rural areas. The answer given by the case study is 'Yes', in the short and medium run, and 'No', in the long run.

The PO's importance in terms of positive social impact on the local gardening community lies in providing refuge for a relatively wide group of small-scale producers in the town and in the region, so that they could earn their living as self-employed farmers in the harsh context of the early transition years. Smallholders did not only benefit from the main function of the PO, that is integrating and marketing gardeners' products. PO concessions such as access to in-kind annual loans in the shop of the PO covering a large part of input costs was extremely helpful for small-scale producers especially in the early years of operation, from 2002 to 2009. (Large-scale producers also took credit from the PO, but, for them it was one of many of the PO's provisions they used and probably not the most important.) The most vulnerable gardeners belonged to the ageing generation of members and who were mostly 'rescued' until it was time to retire. In this way, the decline in small-scale-producer membership of the PO largely took place as natural demographic change.

Another, equally important positive social impact of the PO was its incubating role played in relation to hundreds of entrepreneurs who have grown from part-time auxiliary gardeners to competitive farmers during the last one and a half decades. Ambitious upper and middle layers of the members could grow through absorbing the abandoned plots of those who left farming voluntarily, typically through retirement, or by pressure of circumstance such as inability to meet PO requirements, lack of successors or other reasons.

However, in the context of increasing market pressure and the turnover-based (growth-oriented) subsidy model of the EU's CAP, social aspects of the PO's operation have increasingly become secondary to market competition. What the PO successfully achieved in the last decade was to slow down the immediate impact of market-penetration on vulnerable small-scale producers. This is what will not be maintained, due to market pressures, change of the top-management and increasing differentiation among PO members. These factors will push the PO towards a more clearly capital-driven venture, in favour of big suppliers.

1. Introduction

The Producer Organisation (PO) presented in the case study exemplifies a successful case of EU supported co-operation with positive direct and indirect social impacts. Its significant societal integrative force is evidenced by job creation (approx. 160 permanent jobs) and the PO's ability to prevent small-scale suppliers falling into bankruptcy for a decade-long period, that is, long enough to let them retire. 'Incubating agricultural entrepreneurs' was an equally important social and economic achievement of its operation. These outcomes contributed to the integrity of local society and the emergence of a "home-grown", entrepreneurial (lower) middle class in a middle-sized town and across the Southern Great Plain.

The case study is based on mixed, quantitative and qualitative, methods of data collection, including notes of participant observation pursued by an early carrier researcher (Melinda Mihály).

The thematic structure of the case study follows the outline elaborated by the project team as a final step of commonly set methodological guidelines. Following an introduction (Chapter 1) and description of main methodological tools and approaches (Chapter 2), in the first part of the case study report, features of the area (the town of Szentes and its surroundings) are presented (Chapter 3) starting with the geographical contexts, natural resources of the area with particular emphasis on the "thermal field" between Szentes and Szegvár consisting of 14 thermal wells. This is the most precious natural asset of the area exploited by large and small-scale farms as well as by the town of Szentes (a detailed account on the importance and environmental aspects of exploiting the thermal energy in the region is available in Annex 8.5.) Analysis of social and economic data highlights the dominance of agriculture-related industries and the positive and negative consequences that follow, such as a high rate of employment, a low rate of highly skilled population, a low income level, and demographic shrinkage. Finally, the first part of the paper discusses fault lines within the gardening community revealed by the qualitative research, i.e. the divide between 'habitual gardeners' who were raised locally (or in the region) and learnt gardening skills at a young age, and labourers who came later and from 'outside'.

The second part of the study (Chapter 4) presents an organisation (a Producer Organisation), which has benefited over the last 1.5 decades from an EU intervention (the 'action'), which is part of the Common Agricultural Policy (CAP). Establishing and running such an organisation is supported by the CAP from its different budgets, from both EAFRD and EAGF respectively. The first chapter of the second main part of the paper (4.1) covers two broad topics: the growth and geographical expansion of the PO under investigation, on the one hand, and the degree of vulnerability of various groups of wage labourers, on the other. Most of the labourers concerned are employed seasonally by farmers (members of the PO) and the PO itself. The second chapter (4.2) provides an analysis of the PO and its operational principles in three sub-chapters revealing (i) the methods of co-ordination and the "disciplining" of members, (ii) decision-making mechanisms and (iii) the mobilisation of place-based knowledge. Then a synthesis of findings along three dimensions follows that highlights a.) promoters and inhibitors of the optimal realisation of the 'action', b) competencies and capacities of stakeholders and c) the connection of certain aspects of the PO's operation to distributive and procedural justice. The final chapter provides a conclusion based on the main findings.

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2. Methodological Reflections

The territorial focus of this case study was determined by settlements where most of producers, members of the Producer Organisation (PO), lived: the town of Szentes, where the PO has been seated, and the neighbouring villages (Szegvár, Fábiánsebestyén, Mindszent). As far as the methodological toolkit is concerned, a mixed methods approach was applied: official statistics, geo-coded census micro data (Annex 8.3) and the geographical expansion of members of the PO were mapped (Chapter 4.1). 39 semi-structured interviews and participant observation represented the qualitative methodological tools (Annex 8.1). Informants were selected in a way that permitted a sample of people holding in the PO different positions. A snowball method was also used in order to reach ordinary members. In advance, interviewees were informed about the project, its targets and data-protection policy with the help of an "information sheet". (Annex 8.4)

Participant observation took place in a heated greenhouse of one of the vegetable producers in the Szentlászló production site (one working day), (Field_notes _greenhouse) and in the packaging unit of the PO (two working days). This part of the research was conducted by Melinda Mihály, an early career researcher (Field_notes_packaging_area). She asked her informal interview partners about their feelings, explanations with regard their work and the operation of the PO (management, services). Furthermore, they were encouraged to raise any other topic they though important.

Working together with people let the researcher see how the actual work was organised by the producer within his own enterprise (heated greenhouse), and by one of the key leaders of the PO in the main production area (packaging site). The informal discussions during sorting and packaging peppers with the employees, or binding and pruning peppers with daily labourers of the greenhouses, provided not only an opportunity to better understand the working conditions of and relationships between workers, but also helped to build trust between the workers and the researcher. Participant observation helped the authors understand the relationship and the tone of communication between labourers and entrepreneurs/leaders in different contexts. In the meantime, workers' social background and their views on the easy and hard sides of their job were also revealed. From their stories about daily work in the greenhouse or at the production line, narratives on the position of different vulnerable labourer groups (such as seasonal workers, Roma workers) and their work experiences also emerged and were explained. Current issues regarding the changes in the higher ranks of the management were also shared and commented (e.g. the retirement of the chief manager of the PO in January 2019).

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3. The Locality

3.1 Territorial Context and Characteristics of the Locality

The geographical space of the "locality" was determined by the residence of members of the producer organisation, seated in Szentes (hereinafter called Szentes PO). The co-operative has members not only from a wide surrounding area in the NUTS-3 region (Csongrád county), but also in the neighbouring county, and sporadically in more distanced areas of the country (Table 1). From 44 settlements where members of the PO resided (see Maps 1-2) we chose three neighbouring villages for a closer investigation: Fábiánsebestyén, Mindszent and Szegvár. However, the main territorial focus of our study remained the centre, Szentes.

Name of Case Study Area	Szentes and its near surrounding (4 settlements)
Size	571 m2
Total population (2016)	39,936 inhabitants
Population density (2016)	70 inhabitants / km2
Level of development in relation to wider socio-economic context • Disadvantaged within a developed region/city? • Disadvantaged within a wider underdeveloped region?	Lower than average level of development but not disadvantaged.
Type of region (NUTS3-Eurostat) • Predominantly urban? • Intermediate? Predominantly rural?	Intermediate
Name and Identification Code of the NUTS-3 area, in which the locality is situated (NUTS 3 Code(s) as of 2013)	HU333 Csongrád-Csanád megye, Csongrád-Csanád county
Name and Identification Code of the NUTS-2 area, in which the locality is situated (NUTS 2 Code(s) as of 2013)	HU33 Dél-Alföld/South-Great Plain
Illustration: Geographical location of NUTS-3 (light green) and LAU-1 area in Hungary's territory	

Table 1: Basic socio-economic characteristics of the area

Source: HCSO, Detailed Gazetteer of Hungary; Eurostat, Statistics Explained

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3.1.1 Presentation of the case study area

Geography, natural and human endowments

The town of Szentes is located in the South Great Plain (NUTS-2) region. Its permanent population has been shrinking; 27,820 residents lived in the town in 2017. Szentes is a market town with national and regional significance regarding its economy and public services (Table 2)[1].

The area of Szentes is a lowland in the Hungarian Great Plain. Typical elements of this landscape are the associated black earth farmlands, the Tisza coast and the valley of the Hármas-Körös River. The territory's unique natural resource is its rich thermal water supply. The long hours of sunlight, the excellent fertility of the soil, the abundance of surface waters that compensate for the low rainfall, and the low-lying thermal waters together constitute the favourable natural resources which have formed the basis of the blooming agriculture of Szentes and its surroundings.

The utilisation of geothermal energy in the Szentes region is of great significance not only in Hungary but also from an international perspective. The geothermal field that can be found here is the largest in Hungary, and the densest in Europe. Built over a period of fifty years, this complex system is able to provide thermal energy for homes, public buildings, greenhouses, plastic tunnel plants, livestock farms and grain dryers, and it also supplies thermal water for the local spa and outdoor thermal baths.

The extractable thermal water reaches the surface at a temperature of 85-100 °C from a depth of about 2,000 meters, or 70-80 °C from a few hundred meters smaller depth. The installation of thermal wells happened continuously but in an undulating manner from the early 1960s, the last one being established a few years ago. For example, the 14 wells belonging to the Árpád Ltd next to the Szentlászló area, the largest production site used by around 160 PO members were drilled between 1964 and 1988. In the 1980s, each of the four large-scale agricultural cooperatives[2] in Szentes had one or more thermal wells. Of the surrounding settlements three thermal wells in Fábiánsebestyén and six in Szegvár satisfied the demand in heat energy of the local horticultural farms. (See more about the local use of thermal energy in Annex 8.5)

[1] Public services in Szentes include special healthcare and educational services (e.g. institutions for treating musculoskeletal and cardiovascular diseases, a school providing horticultural vocational training, a high school specialized in drama), and a military base.
[2] Árpád Vegetable-Producing Co-operative, Termál Co-operative, Május 1 Co-operative, Felszabadulás Co-operative (http://www.szentesinfo.hu/cd/helyismeret/varostortenet/html/oldal36.htm)

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Processes and trends, endogenous resources, socio-economic picture

HCSO data	Number of permanent population		Old age index (population of 60+ per -15)		Employed within the 15-64 age group	Unemployed among people of active age	Registered job seekers in the % of active age population	Public employment among people of active age	Monthly income per taxpayer after tax
Year	1990	2017	1990	2017	2011	2011	2017	2017	2017
Mindszent	7,912	6,784	1.21	1.95	51.7%	8.4%	2.4%	3.0%	131,464
Fábiánsebestyén	2,512	1,952	0.85	2.51	59.2%	7.5%	1.8%	1.8%	138,133
Szegvár	5,347	4,443	1.16	2.19	56.1%	7.8%	2.3%	2.5%	137,450
Szentes	32,823	27,820	0.97	2.14	59.1%	6.6%	2.1%	2.2%	155,219

Table 2: Socio-economic data of the study area

Source: Population Census 2011

Two opposing processes can be highlighted in the development of the area in the last one and a half decades: (1) the gradual decline following from its geographical location: the town lies in between two regional centres, Szeged and Kecskemét, connected by poorly developed road network and insufficient public transport, and (2) the availability of human and natural resources that can mitigate and partially offset the negative trends, on the other. Human resources appear in the form of a stable urban management; balanced, vivid local public life; a wide range of political and professional relations at national level; and in the people's ability to act in their own interests. *Openness to innovations, flexibility and adaptive attitudes simultaneously characterize the local economic, political and social elite*, which ensured the successful representation of the town of Szentes and the interests of the region under different political regimes. The most essential natural resource of the area is the already mentioned *thermal energy* that concentrates in Szentes and Szegvár, which has been continually exploited for public and private interest (i.e. intensive gardening).

From the perspective of demographical change, the outcome of the above mentioned opposing processes is negative. (Table 2) Over the past 15 years, *the number of permanent residents of Szentes has decreased by 12%*. The accelerating pace of outmigration has an important role in the decline, affecting primarily the more educated, motivated and younger population. This selective outmigration has ended up in a vicious circle: the proportion of women in childbearing age has been constantly decreasing, resulting in decreasing fertility rates, and contributing to the ageing of the population[3].

Employment data are less problematic: Szentes can be found at the end of the first third in the ranking order of Hungarian cities of similar size. For example, the proportion of the employed in the 15-64 age group is 4 percentage point higher than the national and county average, which corresponds with figures of the more developed regions. Compared to cities of similar size, the greatest shortcoming occurs in gross value added and wage levels, partly as a result of the sectoral structure of the economy. The distribution of local businesses and employees by sectors *in agriculture, transport, warehousing and commerce* shows a significant positive deviation from

[3] As Table 2 indicates, ageing index increased from 127% in 2001 to 190% in 2011, and to 213% in 2017. At the same time, the proportion of active-age people (15-64 years old) in the total population is declining at an accelerating rate, after 69% in 2001 it was still 68% in 2011, but it dropped to 63% by 2017.

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the data of the county or of similar cities. These higher rates are the result of *more intensive demand for labourers in greenhouse and plastic tunnel horticulture* (with significantly longer growing time), as well as of *the associated warehousing, packaging, processing and trade activities*. The significance of lower profit-rate economic sectors in the town results in *lower average wage levels*. In 2017, the average monthly after-tax income per taxpayer was HUF 153,000 (EUR 494), which was well below the national average of the towns with 25-35 thousand inhabitants (HUF 179,000, EUR 577).

In low-wage employment (horticulture, packaging, poultry processing), labour shortage is now clearly present in Szentes. At the same time, the low number or even absence of jobs requiring higher qualifications continues to force many local young people to leave the town after graduation, even though the range and quality of services available and the favourable natural and social environment would be an attractive prospect for settling down in and around Szentes.

The sample area, the 'locality' of our research is the "core area" of the Szentes PO, which, in addition to Szentes includes Fábiánsebestyén and Szegvár that belong to the same district are directly connected to the town of Szentes, and also Mindszent that belongs to Hódmezővásárhely from an administrative point of view. The location and size of the three settlements show significant differences from a demographic and economic point of view, whilst from an employment perspective they are similar.

Fábiánsebestyén lies 18 km East of Szentes, and its outskirts are directly connected to the largest thermal field around Szentes. Szegvár is located along the River Kurca, 10 km south of the city, whereas Mindszent is situated on the banks of the River Tisza, at the mouth of the Kurca, at an equal distance from Szentes and Hódmezővásárhely (18 km).

Although the number of inhabitants in the three villages differs significantly, demographic indicators show a similar age structure and a continually declining population. The most serious problems in all three settlements are outmigration and ageing, but the extent of these issues is related to the size of settlements. Fábiánsebestyén with its current population of 1,952 (2017) has lost 20% of its population since 1990, and its ageing index (2.5) indicates rapid ageing in the future. The data of Szegvár with 4,443 (2017) inhabitants are slightly more favourable (16%, 2.2), while those of Mindszent with 6,784 inhabitants (2017) are better still (12%, 1.9). According to official census data, the proportion of the Roma population is 1-2% for all three settlements.

The employment and unemployment figures reflect curiously similar processes. The proportion of people at working age in all three settlements is around 62%, which clearly confirms our earlier statement on ageing. The proportion of the unemployed (registered job-seekers) and public workers among the active-age population in 2017 also had nearly equal figures of 2-2.2% and 2-3% respectively, while in 2011 the ratio of the unemployed among the working age group was 11-12%. All in all, the relatively favourable labour market situation, just like in the case of Szentes, gives way to lower wage employment, since the monthly taxable income per taxpayer is around HUF 130,000 in all three settlements, i.e. significantly lower than the national average (HUF 140,000) and also the average value for similar settlements.

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3.2 The Locality with regards to Dimensions 1 & 2

3.2.1 Analytical Dimension 1: Spatial (in-)justice within the locality

When we started our fieldwork and set up hypotheses about the potential socio-spatial and developmental role of the Szentes PO, we assumed that the residents of the scattered farmsteads located in the field area (*tanyák*) will be the ones affected most positively by the PO. We were mistaken. Our study revealed that from the perspective of the PO the disadvantaged population of Szentes and of the adjacent villages is much less relevant than expected. The reason for this is that the concentrated production sites of its members, like the already mentioned Szentlászló site have been more accessible from the town and the villages than from the scattered farm area therefore most of the members and labourers of the PO have been recruited from the inner town/village areas of the settlements.

To assess spatial vulnerabilities, we used the proxies of employment rate and low education rate by gender. We had access to geo-coded micro-data allowing for grouping by census districts, meaning 250 people. Maps convincingly show the close connection of the two indicators: *locations where low-educated women and men live almost entirely overlap with the ones where low employment rate* can be observed. Differences between male and female employment or education rates are also nicely visualised. (See Annex 8.3.a 1-2, 8.3.b 1-2).

Average figures for the research area are illustrated in the table below (Table 3).

Indices	Activity rates (%)	The rate of people with maximum education of ISCED-2[4]
	of the population between 15-64 years of age	
Female citizens	58.1 (58.7)	27.8 (22.1)
Male citizens	69.6 (68.2)	24.3 (22.4)

Table 3: Average activity and low-education rates in the study area among the population 15-64

Source: Population Census 2011

If we compare these figures with those of the county average (in brackets), some divergences are worth highlighting: employment figures are somewhat better in the case study area than the county average, whilst low-level education rates are significantly worse. County figures call attention to a relatively large gap (3.5 percentage point) in the study area between female and male citizens with low educational attainment (this does not apply for county figures), whilst the gap is similar between employment rates of women and men at county level and in the study area. The gendered education gap at the lowest end could be explained by the larger number of women than men (21,976 vs 20,065 in 2011) and with the higher proportion of elderly women who used to be under-educated in rural areas (mainly in villages, but also in rural towns) up until the end of the 20th century.

Getting closer to our main problematic, i.e. the intertwining social and spatial vulnerabilities and the way it is looked at / handled (or not) by the Producer Organisation in the case study area, one can say that in the hierarchy of prestige and appreciation within the PO the level of education does not matter too much. This is mainly because gardening is an expertise learnt to a large extent through practice. (Of course, we cannot find people with low educational attain-

[4] ISCED-2 indicates so called lower secondary level of education. Students enter this level in Hungary at the age of 10-11.

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ment in the leadership of the PO, but for example, one of the most influential figures within the top-management has only got secondary education, whilst quite some university graduates are to be found among ordinary producers.) At the same time, we also found that the PO values knowledge, therefore leaders always encouraged members of the PO to participate in various courses, or in study tours to the Netherlands. A network of advisors who helped producers with relevant know-how was set up in the early stage of the history of the PO (run already in the predecessor socialist co-operative in the 1970s). Advisors have been employed for spreading new technologies and counselling members but they also helped the PO management to estimate the expected amount of vegetables produced and to be sold, which is one of the cornerstones of the operation of the PO.

In the organizational hierarchy of the PO, place of residence matters to some extent. The leaders of the PO are residing in Szentes, but it does not create a major aspect of division between people from advantageous and disadvantageous social positions. What matters, however, is whether a gardener is recognized by the gardeners' community as a "good one": this recognition is usually based on capabilities measured by the total volume and quality of the produced vegetables.

In the case study area gardening is an expertise learnt, further developed and transmitted from generation to generation. The roots of gardening in the Szentes-Szegvár core area go back to the activity of so-called Bulgarian gardeners, who established irrigated early-season vegetable gardens as early as 1875. In addition to being knowledgeable in horticulture, what needed and appreciated at the PO is endurance, humbleness for the plant grown, pride for the straight rows and the beautiful products, and, last but not least, a passionate desire of success. (Interview_K9) Ironically, dividing lines amongst actors who possess these attitudes and those who are deprived of them do not correlate with the division line between owners of plantations and day labourers who work for them. To put it more precisely, the most important dividing lines do not run between these two groups. Instead, deep social divisions have been found between what we call *'habitual' gardeners* who had been socialised for gardening (who grew up in local gardening families) and labourers, who usually take on the job of a day labourer by force of circumstance: they come usually from outside of the area and therefore necessarily lack the required skills. In the context of increasing labour shortage, there are more and more unskilled, vulnerable labourers contracted from far-away (disadvantaged) locations hit by consequences of spatial injustice. Lacking gardening skills of hired labourers are perceived negatively by the employers, which increases social vulnerability of the workers.

> *"Nowadays we can't just send people away if we are not satisfied with their work, but we have to cajole them. …. the Hungarian pepper (a type of long red pepper grown in Hungary) story: first question (to the employee): are you color blind? No. Well, then we explain to them that the Hungarian pepper needs to be picked when it is red, otherwise it cannot be sold, it will be thrown away. Then you go to check up on the work and see that it's all green… you feel like you just go insane, you would fire them immediately. But then you look around and imagine the one million pepper that needs to be picked in the next 2-3 weeks and you know you won't be able to do it, and then you weigh it up what is better, that I am the cool guy who fires them, tells them off properly, or I just swallow and don't say anything… because these people don't know that our first income is only in June and we only start producing profit from late-August or September. They don't know that a young plant costs 250 Ft!" (Interview_K9)*

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3.2.2 Analytical Dimension 2: Tools and policies for development and cohesion

The change of regime in 1989-1990 caused a serious employment crisis in the region, but in contrast to the tendencies typical in other parts of the country, the major industrial and food industry factories as well as a transformed, large-scale agricultural cooperative, the Árpád Co-operative, continued to operate in Szentes, although with fundamentally restructured organizational structures. Thus, since the regime change, the economic structure of the city did not change fundamentally; agriculture, food processing, transportation, warehousing and trade remained dominant.

The town authorities tried to promote the development of the local economy and to strengthen its significance for employment levels by improving the competitiveness of the traditional branches of local economic and farming activities on the one hand, and by introducing new industries with higher added value, on the other. According to the mayor, it is only through such investments that higher wage levels and higher prestige jobs can be created, which is essential for reducing and stopping the outward migration of the population. The town also considers it a priority to further strengthen its high-quality and wide-ranging public services, providing up-to-date infrastructure to serve the renowned high school education, comprehensive secondary vocational education, high-quality in-patient and out-patient health care and remodelling social services to meet today's needs. In the opinion of the representatives of the local authorities, without strengthening the role of the town as a centre, and the retention and further development of the high level of services, Szentes cannot become an attractive investment target. The third priority of the development policy of Szentes is the establishment of a local environment close-to-the-nature which is healthy, liveable, suitable for recreation, and for offering services for tourism.

The parallel, mutually reinforcing support of these three directions of development has permeated local development policy. The tendering activity of Szentes and its ability to raise funds was outstanding not only in comparison with the surrounding settlements, but also in a broader comparison, which can be attributed to three factors: firstly, the excellent professional and political relations of the local economic and political leaders; secondly, to the wide-ranging cooperation also permeating development policy; and thirdly, to the fact that for decades, town leadership, cooperating with key players in the local economy, has been working on a concerted, jointly developed and professionally well-prepared vision of the future.

It is due to this fact that the successful tenders of the enterprises of Szentes do not only have a broader sectoral reach, but they also show a higher average value. In the agricultural economy machine procurement and technology development are dominant, too; but besides these, projects related to quality assurance and modern corporate governance also appear. The size structure of the winning businesses is balanced, and alongside larger businesses, small and medium-sized enterprises are more widely represented. Local authorities and micro-regional organizations have achieved significant results in the development of human infrastructure and the substantive development of services - essentially all service units have been renewed in their infrastructure and material facilities. Recently the focus has shifted towards the development of services and energy rationalization. The development of the municipal infrastructure involved almost all the important areas. Rehabilitation of the town centre, the renewal and extension of the public utility network (canal, rainwater drainage, drinking water network) and the wastewater treatment plant, the modernization of the district heating system, the development of a broadband internet network, the development of public lighting, the rehabilitation of the Kurca River, the renovation of the thermal bath were all accomplished as part of a significant local development project in the post-EU-accession period. These projects were complemented by road net-

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work development, flood protection and environmental projects, which also affected the town and its surroundings.

The tendering activity of the examined settlements and their ability to raise funds cannot be described as significantly different in either positive or negative terms compared to the settlements of similar size and location.

In the post-accession period, successful tenders were typically associated with larger settlements and businesses, so Mindszent, Szegvár and Fábiánsebestyén, albeit of different sizes, nevertheless received a similar proportion of development funds. The development of the technology of larger agricultural enterprises (purchase of machinery, manure storage, vegetable packaging) was the most important type of investments in these villages. Typically, the municipal infrastructure development programmes grew in numbers after 2007, when funds were available through the South Great Plain Regional Development Operational Programme and used for renewing the institutions of local public services and to renovate the town centre in several stages, and to move forward in the development of the local public utility network. Thus, from then on, local development was characterised by the dominance of local government; in particular, increase in the quality of local public services and utilities, as well as the creation of a liveable and healthy environment. Public employment[5] projects were typically used for supporting these purposes, namely, developing and refurbishing of public spaces of settlements and buildings of local public services.

[5] Public employment in the Hungarian context refers to a nationally financed employment programme that has typically targeted the unskilled, long-term unemployed. Its predecessor was brought about by the last socialist government in 2009, then, in 2012, the scope of the Programme was broadened, available funding was multiplied, and accessible income for individual participants was reduced to 75% of the minimum wage. Municipalities were entitled to apply for state-resources aimed at supporting local employment schemes.

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4. The Action

4.1 Basic Characteristics of the Action

The "action" investigated in this case study represents an example of an EU intervention, which is part of the Common Agricultural Policy (CAP). It aims at supporting fruit and vegetable producers via promoting a specific form of co-operation called Producer Organisation (PO) with the purpose of integrating producers of the sector and plays the role of a mediator to the markets. Establishing and running such organisations are equally supported by the CAP, from EAFRD and EAGF respectively. The selected PO, the largest in Hungary, is seated in the town of Szentes and works as a co-operative (non-profit organisation).

The fundamental restructuring of the agricultural sector in Hungary in the beginning of 1990s resulted in a polarised ownership and production system with large farms on the one hand, and fragmented small plots on the other. Cooperation between producers operating in the horticultural sector in this case was meant to reduce the vulnerability of smallholders and auxiliary producers and prevent a mass pauperisation of the lower strata of the rural population. The Producer Organisation presented in this case study has exerted a significant societal integrative force throughout its operation, which is further emphasised by its important role in job creation and in promoting the livelihood of its members (suppliers to the PO) with the opportunity of gaining income through exploitation of their own landed properties as self-employed or micro-entrepreneurs. Serving as an 'incubator' for would be farmers/entrepreneurs has been an equally important role of the PO in the context of emerging ('wild') capitalism in Hungary.

4.1.1. Establishment, growth and territorial expansion

The Szentes PO was established as a Producer Organisation during the pre-accession period in 2002, approved as a permanent Producer Organisation in 2003, and it has been operating since then with an ever growing membership, from 230 in 2002 to 521 in 2017, impacting the livelihoods of approx. 5,000 families. Its birth was not without antecedent. It was preceded by the so-called Early Vegetable-Production System [Early Co-op hereinafter], a co-operation of large-scale vegetable growers and organised small-scale gardeners that had been developed at the site of Árpád Agricultural Co-operative in Szentes. Established in 1975, it was the first systematised vegetable production in Hungary based on a Dutch model of the co-ordination of individual production (Csikai et al. 2010). Moreover, Early Co-Operation implied not only the coordination of production but also the common marketing of fresh vegetables produced by its member farms, whose number reached 3,500 by the mid-1980s (Tamási, 1986). The wholesale market of Budapest and foreign markets absorbed most of the vegetables at that time.

The process of structural transformation of the large-scale agricultural sector in the early 1990s resulted in the dissolution of the Early Co-operation: the member farms became either primary producers or continued as individual or joint private businesses, while part-time farmers gradually quit production. After a decade of lacking co-ordination of the production and marketing of products, the Early Co-Operation System reappeared in a somewhat changed form in the pre-accession period, when support was available for establishing PO from SAPARD pre-accession scheme.

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With the participation of the management of Árpád Cooperative, the only survivor of the political turn in 1989-1990, and the former members of Early Co-Operation, the Szentes PO was established in autumn 2002 with 236 members. Two factors played a role in the establishment of this organisation: one, the decreasing profitability of vegetable production from the second half of the 1990s on; and second, subsidies that were to be available from 2004, following Hungary's accession to the European Union[6]. „*We thought that if we can, then we should try to get hold of those subsidies and the decision was, let's do it*!" (Interview_K1)

Upon establishing Szentes PO, the founders have formulated social and economic goals to be achieved. The primary goal was to provide a secure income to the vegetable growers of Szentes and its surroundings, whether they are individual, family, or joint businesses. While establishing the organisation's profile, the issue of territorial and sectoral coverage was raised. The management of the Szentes PO decided to concentrate mainly on the integration of the vegetable producers, at the same time defining the territorial scale quite broadly (Map 1 and Map 2). To the question why they expanded beyond Szentes, the long-time director replied: „*because otherwise all these smallholders would have gone bankrupt, whether in the town or outside of it.*" (Interview_K1)

The Szentes PO was among the first POs in Hungary that acquired preliminary recognition, in 2003[7]. A year later it gained final recognition, which made it eligible for annual operational subsidies from the EU's CAP budget opening investment opportunities. The organisation has continuously been growing in economic terms and expanding territorially. It counted 480 members in 2018[8].

In addition to coordination from production to marketing, the Szentes PO had a major role in the selection of produced vegetable species and technological change. In 2010, the PO took steps towards protecting „paprika from Szentes" as branded product, including the recognition of its geographic origin (PGI), in order to ease the product's immediate identification by consumers. The cultivation area of „paprika from Szentes" now comprises eight settlements[9], essentially identical with the territorial coverage of the former Early Co-operation System of the 1970s and 1980s.

[6] A preliminarily recognised POs was entitled to, besides investment resources, 12% of its turnover. Following final recognition, a PO was entitled to an annual subsidy up to 4,9% and later 4,6% of its turnover.
[7] According to Decree 120/2003. (XII. 2.) FVM, preliminarily recognised PO
[8] A 120/2003. (XII. 2.) Decree of the Agricultural Ministry set the condition of 125,000,000 HUF turnover per year (500,000 Euro) for a preliminary recognition of producing organisation, which equalled 250,000,000 HUF (996,000 Euro) for permanent recognition.
[9] Derekegyháza, Fábiánsebestyén, Felgyő, Mindszent, Nagymágocs, Nagytőke, Szegvár, Szentes

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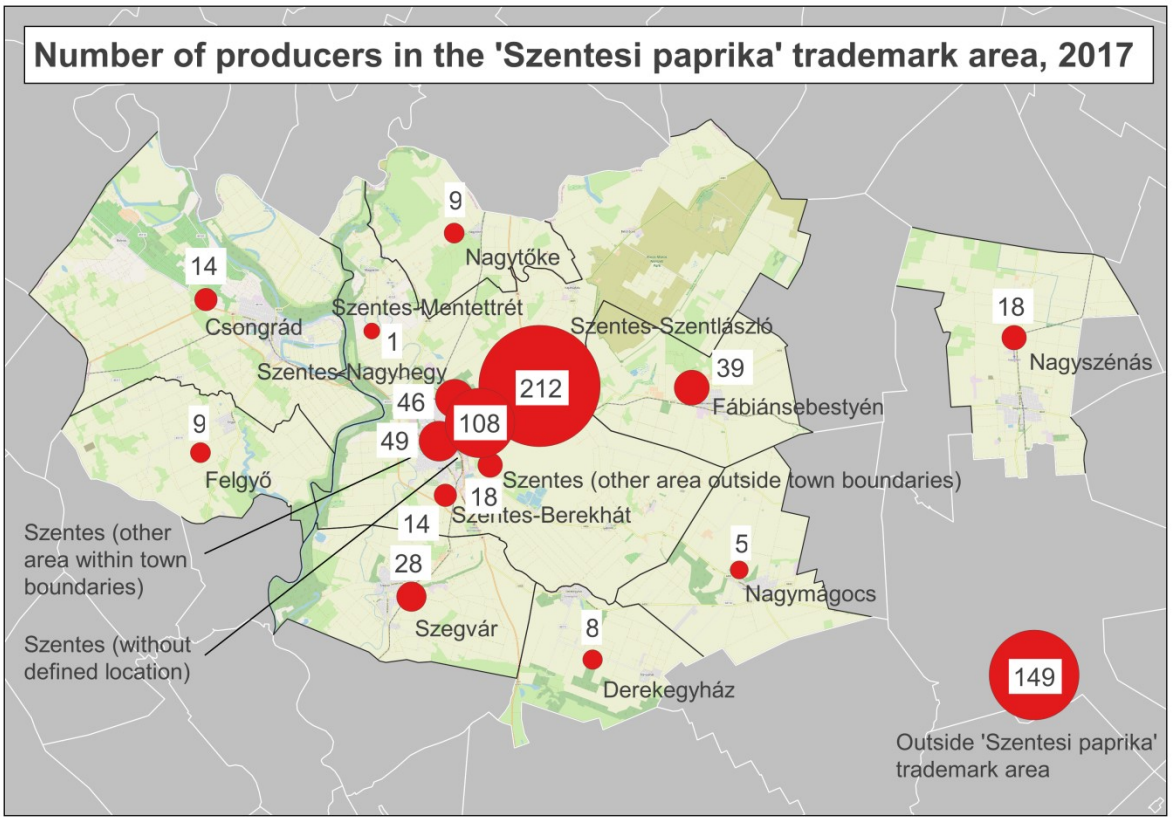
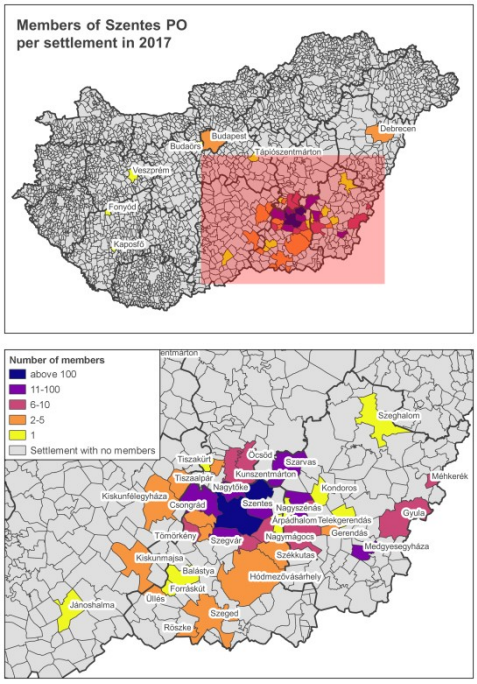


Map 1: The geographic coverage by the residence of the members within the trademark „paprika from Szentes" and beyond



Map 2: The geographic distribution of the members of the PO by residence

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Approximately half of the turnover of the PO is provided by its most influential and largest founding member, the Árpád Agricultural Ltd (i.e. the former Árpád Agricultural Co-operative), the PO's co-founder. This is what guarantees stability to the PO through the volume of its inputs. Moreover, cooperation with Árpád Ltd enables the PO accessing sectoral innovations. It is crucial, since the management expects a continuous technological development by the member farms for which Árpád Ltd provides the knowhow, the PO provides loans to its members. As formulated by the chief manager of the latter:, „*the leadership needs to be empathic, but technology isn't a question of democracy, it doesn't allow for contradiction or minority report*". (Interview_K1)

The growing financial support from the CAP and from national funding resources are indicated in the table below.

Purpose of the subsidy	Funding Source	2009.01.01.-2013.12.31.		2014.01.01.-2017.12.31.	
		Euro*	% of turnover	Euro*	% of turnover
Supporting the running costs	EU (EAGF)	900,064	5.5	859,388	4.0
	National	266,716	1.6	600,075	2.8
School fruit programme	EU (EAGF)	17,279	0.1	40,314	0.2
	National	7,763	0.05	49,892	0.23
Other	EU (EAGF)	28,535	0.2	-	-
	National	29,474	0.2	63,504	0.3
Total		**1,249,831**	**7.61**	**1,613,173**	**7.42**

Table 4: Subsidies drawn annually from EU and national funding by the Szentes PO 2009-2017

* Euro/HUF exchange rates: 284 HUF for 2009-2014 and 310 HUF for 2015-2017 calculated from figures provided by the European Investment Bank https://ec.europa.eu/info/funding-tenders/how-eu-funding-works/information-contractors-and-beneficiaries/exchange-rate-inforeuro_hu

Source for the subsidy data: Own calculations based on figures of subsidies gained by the Szentes PO, published by the Hungarian Treasury (Paying Agency) under the XVII Act of 2007

Source for the turnover data: Ledó - Nagypéter 2019: 35

Table 4 indicates the annual average figures of CAP EAGF and national subsidies in two periods of the PO' operation, 2009-14 and 2015-17. What is interesting to see, is the high rate of national support provided mostly for the same purpose, i.e. supporting running costs and covering an indirect state purchase action (school fruit programme). The amount of support increased by 30% between the two periods, whilst their percentage in the PO's turnover somewhat decreased from 7.61% to 7.41%. Parallel with returned growth in the Hungarian economy around 2015-2016, , the average sum of the national subsidies have increased significantly, both in absolute (more than redoubled) and relative terms, from 24% to 44% of the total of annual average of subsidies. The table also illustrates the compensatory role of national subsidies as compared to the provided EU subsidies. This is most clearly seen in case of the biggest amount of operational support.

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4.1.2 The hierarchy of labourers by social vulnerability in the production sites of the PO and its member-farms

As has been mentioned in the previous chapter, the Szentes PO is a non-profit organisation, a co-operative. However, this does not mean that it does not strive for profit. It operates like any market player, but then shares part of its profits with co-operative members either directly, through, for example, credit schemes, or incentives, or indirectly, through certain investments (such as centrally located and offsite sorting and packing devices). The PO can spend more for such investments and support since it is entitled to a significant amount of annual EU subsidy. On the other hand, as a market actor, it hires its labourers for as low wages as market competition allows, as do its members in their own gardening enterprises. In this chapter the hierarchy of labourers who work on farms and the PO's production site is discussed.

The bottom: workers recruited by labour brokers

The most vulnerable social group in the case study area, which has emerged recently, is that of day labourers working in greenhouses or under foil tunnels, who are recruited by so called brokers from deprived territories of the country, where long-term unemployment, miserable living conditions and extreme poverty have prevailed over the last one and a half decades, especially since the global financial crisis. Those who have been forced by circumstance to be subject of such temporary work deals usually belong to the most vulnerable labour force and are subject to spatial injustice: the locality where they live is often part of a larger disadvantaged region; they often live in segregated neighbourhoods there, therefore their access to proper education and employment is limited. Moreover, they have rarely had the chance to get the expertise needed for gardening and hence tend to make mistakes, especially at the beginning of their employment. Usually, no accommodation is provided for them on the spot; therefore they might be transported back and forth after and before the heavy daily workload that they must endure. Consequently, they are exhausted, especially because they are rarely used to heavy physical labour. Malnutrition also influences their scarce working capacities. Finally, the reproduction of their vulnerable social status is guaranteed because of the double exploitation they are exposed to: the broker agrees with the producer on a certain labour cost (usually hourly rate), but he pays much less to the labourer, and pays it only intermittently.

> *„[For the temporary work agency] nothing matters. We agree on the hourly wage, he pays only part of it to the workers, and then he makes them work hard throughout the day. The 'labour-broker' (bandagazda) asked me to give every day a lump sum after all the workers. Good. Then one of the workers comes to me: how many hours did I work yesterday? Because I got this and this much. And he shows it to me. Listen, I said, the deal with your boss was that I can't tell you how much hourly wage we agreed on with him. … It turned out that he only gave a wage for 5 hours of work to the person, whilst providing more to the other; the third one received even less, because the guy thought that should be enough for her, wages people had nothing to do with the amount of work they actually undertook... Then we realized that we should not work under these arrangements. We drew a circle with a radius of 50km, we bought four vans, and we try to recruit workers with this method. You can commute 50km in an hour, it is still a manageable distance." (Interview_K9)*

(Foreign) Migrant workers

Migrant workers arriving from abroad are in a similar, but yet in a somewhat better position than the above introduced labourers, because they are not necessarily as deprived as Hungarian

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distant day labourers. Employing migrant workers from neighbouring countries with a lower wage level (e.g. Romania, Serbia or Ukraine) is still relatively rare in the case study area, but it has been increasing recently. The reason for the scarce employment of migrant workers is two-fold. On the one hand, wages offered by the vegetable producers are not attractive enough for migrant workers. On the other hand, most entrepreneurs fear to employ them exactly for the same reason. "*For somebody who left his family behind to work 300 km from the Austrian border, where he could earn three to five times more than here, a deal does not matter. He just leaves from one day to the other*" – as one of the vegetable growers explained his reluctance towards migrant workers (Interview_K9). His fear was justified by the experience of another interviewee, who tried to employ -Ukrainian citizens of Hungarian origin, but due to the relatively low wages he could offer the Ukrainian workers quickly moved further towards Austria (Interview_P11).

Others, like a carman in the packaging area, was convinced that Ukrainian and Serbian labour force is still available, and the PO should work with them. "*The Ukranian and Serbian workforce value their wages and do work 12 hours without a word*" – he said. (Carman, Field_notes_packaging_area).

Middle rank: local labourers exposed to grey or semi-grey employment arrangements

The labour market of the South Great Plain region has always been characterized by informal employment, due to the wide-spread labour-intensive horticulture. Since 1997, when a first iteration of the legislation on *so-called simplified employment* was stipulated, grey employment has "whitened" to some extent – especially since 2009, when the second iteration of the law came into force with more severe arrangements accompanied with regular controls by the Labour Office.

> "*One time I was going out and saw people with guns and dogs on my estate. I asked them what they wanted, and they said they were looking for illegal workers. So this was the end of reciprocal mutual help among us, since how could I prove that my aunt or colleague works in my garden in exchange of me working in theirs a week ago?" (Interview_P1)*

The long-term impact of illegal employment of labourers is obviously detrimental especially for women not only because very few of them are able to set aside substantial savings, but also because female workers necessarily lost eligibility for the so-called early retirement scheme available since 2012. During our fieldwork we have come across two female workers in retirement age who were unable to prove the condition of eligibility, which would be 40 years of employment because of their durable informal employment. When working along and discussing with women during participant observation under the foil tunnel, it turned out that one of them was forced to work at the age of 68 exactly for this reason.

> *Erzsike was employed by one of the agricultural co-operatives during the socialist era. After the collapse of the agricultural cooperative in the 1990s, she worked in greenhouses mostly under grey arrangements. Even if she spent her working life in greenhouses, due to illegal employment she could not prove that she had a 40-year-long working relationship. Thus, she was not entitled to women's early retirement scheme.*[10] (Field_notes_greenhouse).

[10] The amendment of the LXXXI Act on social security and retirement benefit in 2010 granted those women who could prove 40 years of labour relationship with full old-age retirement Act in force No LXXXI. of 1997. on social security and retirement as consolidated with the Government Decree No 168/1997. (X. 6.) on implementation

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Those nowadays working under the above-mentioned 'simplified employment scheme' will also realise the negative impact of this form of employment on their pension. Since no social security tax is paid after them by the employer, and the employers' contribution to the pension fund is miniscule, low income is guaranteed for old age pensioners with significant amount of previous employment within this scheme[11]. Moreover, as our interviews revealed, even this employment scheme is regularly abused by many of the vegetable growers, when they exceed time-limitations set by the regulation[12]. It is very common during the high season that about a quarter of the working time of the labourers is used illegally, in spite of fears that a Labour Office control might result in an investigation against the employers. This is why we consider this form of employment semi-grey which contributes heavily in creating and maintaining social injustice in the context of vegetable growing business.

There was only one interviewee who spoke with sympathy about those affected by the scheme and who did not agree with their hiring through simplified employment (Interview_K8).

> *"I used to emphasize repeatedly: we can't afford to be crooked with anyone, because they would just quit and leave us within an instant. Why don't we employ these people properly? Let's pay them well, tie them to us.*
> *'They've got arrears to pay, the tax office will immediately deduct these from their wages if we hire them. They don't want to be employed properly!'"*

Elderly people

Elderly people, mainly women pensioners, most of whom formerly working in one of the socialist agricultural cooperatives in Szentes or the surrounding villages, still provide a much-appreciated pool of workforce for the vegetable growers and the Producer Organisation. Their motivation is clearly existential: they need to earn pension supplement. Vegetable growers and the PO are highly interested in employing them for a number of reasons. Most of these elderly people belong to the group of 'habitual gardeners' who grew up in this profession from childhood and represent a tough, reliable, and highly experienced group of labourers: they for example "easily" work in 40-50 degrees in greenhouses) (Field_notes_packaging_area). Until their bodies permit it, their commitment and willingness to work reduce significantly their vulnerability to social injustice, but they will necessarily reach their limits, soon. Moreover, employing pensioners is cost-effective, since retired labourers cost much less tax for the employer than their active-age counterparts. During our fieldwork we met a 79-year-old retired man who has been an appreciated old member of the "crew" in a farm, where the leader of the enterprise was 75 years old himself. The owner of the farm was a brigade leader during the old days of the Felszabadulás agricultural co-operative (which ceased to exist soon after the political change in 1989-1990). Now they are both retired, but they work regularly together on the farm, they are still chief labourers on- and off-season alike (Interview_DL_5_6).

Women, Roma people, "locked-in" people

Both in the visited greenhouse and in the packaging area of the PO, women were overrepresented among the workers. They themselves explained the significantly higher ratio of female labour

[11] Act LXXV of 2010 on Simplified Employment https://net.jogtar.hu/jogszabaly?docid=A1000075.TV
[12] According to the Labour Code (Act no I. (LC) and that of the Act no LXXV per 2010 on "Simplified employment" the maximum duration of seasonal or occasional employment is 15 working days per month and one cannot employ more labourers than 20% of his/her total number of employees. Wages were revised in 2018, when daily remuneration for seasonal and occasional workers was fixed in 8,255 HUF (25 €) and 10,790 HUF (33 €) respectively.

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with low wages paid in this section of the PO. One of the women in her forties explained gender imbalances of the labour force with inequalities between women and men.

> *"This job here is not worth for a man. They refuse to work for such a low wage. Men in Szentes rather choose to become masons, painters, decorators, vegetable producers; or they take a job in the Mercedes Factory in Kecskemét* [a city 65 km far from Szentes]." (Field_notes_packaging_area)

> Tibor (a Roma man in his forties), who was working close-by, did not comment on this, despite – being one of those male labourers, who worked for "*a wage which is not meant for men*"–most probably he did not feel good about his colleague's explanation. (Field_notes_packaging_area).

Many active age people, like Erzsike, have found refuge at various phases of the crisis affecting the local labour-market through working in greenhouses or becoming gardeners themselves (Interview_P10 and P11). This means that access to the manual work provided by gardeners in the case study area has tempered the vulnerability of people to social injustice caused by the global financial crisis even among the ranks of the lower middle class. As of today, a part of the active age people seems to get locked into casual work in greenhouses. Ancsa is an accountant by education in her forties. She used to have an office job, but currently she does not work in any corresponding job. Instead, she works in the greenhouse along with Erzsike. The participant observation of Melinda Mihály revealed a lock-in effect.

> "*At first sight it seems that Ancsa decided to do gardening freely, out of passion, but after a longer talk with her I got the feeling that doing work in greenhouses is rather a constraint for her. Her previous job was at a funeral business. She used to work there as a funeral organiser, but lost her job. This was the time when she chose to work in greenhouses. Through our talk I had the feeling that she would be glad to have an office job, but the lack of language skills and the lack of a chartered accountant diploma hinder her in finding a decent office job."* (Field_notes_DL3_greenhouse by Melinda Mihály)

The PO itself has "whitened" its operation during the past decade and offers employment on average for 160 permanent employees, the majority of whom work in the storing and packaging department. They usually work extra hours (sometimes even 1.5 shifts) in the high season from May to October, when seasonal labour is also hired and paid in the framework of "simplified employment". The situation is similar in the case of larger producers, most of whom have been shifted to legal employment (at least considering the core staff of their employees).

> *To give an example, one of the biggest growers – who runs two hectares of intensive horticulture, two thirds with heated, one third with non-heated greenhouses – permanently and officially employs an average of ten people and hires roughly 30 seasonal workers from May to October*. (Interview_K9)

Both the PO and the largest producers were keen to improve working conditions of their enterprise in order to attract labourers. The packaging area of the PO was extended and air-conditioned some years ago; this is where small and middle-scale producers can sort and package their products during the season. Bigger producers can claim sorting devices from the PO. In some larger farms, these devices are accommodated in air-conditioned buildings.

> *"Since we work with a 3 hectare-floor-space of foil-tunnel, we have built a 600 sqm building for storing and cooling. We have also built 'social buildings'. We try to advance quality*

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of the physical environment, in order to make it a normal workplace. To make the people working for us feels that we take care of them."… (Interview_K9)

Intensive gardening demands a high number of knowledgeable and devoted workers. Labour demand has been increasing steeply in the study area for two main reasons.

a. Responding to the significant decline of the profitability of vegetable growing, producers were urged to intensify their production, thus compensating for the cheaper sales prices. For example, soil-less gardening as a major technological innovation has spread in the last decade to an extent that today 100% of the vegetables under greenhouses and 90% of those under heated foil tunnels are produced without soil and are "nurtured" artificially by computers. This innovation doubled, and in some cases even tripled, the amount of vegetables that have to be picked quickly and more or less all at once in 150 gardening enterprises. This generates a huge labour demand locally and in the broader region;
b. Another trend which had an impact on labour shortage has been influenced by a problematic generational renewal in the sector. Many former "habitual" gardeners grew old and retired. For the young generation, daily work under the foil tunnels is less attractive. They are not so eager to start five in the morning and continue work until late night, when the picked product from morning is waiting at the warehouse sorted and packed for being transported. It has been mentioned by many informants that younger people, especially males, might rather opt for a job at the assembly lines in the Mercedes factory in Kecskemét, or try the life of a migrant worker abroad.

The gap left behind by retired and opting out young labourers tends to be filled with vulnerable workers (see above) who usually lack adequate skills and capabilities needed for the tough working conditions, therefore the fluctuation of day labourers or their absence have become a serious threat for most gardeners.

If we haven't already employed at least a thousand people then none at all, maybe even more than a thousand. Earlier, if a worker was not sufficient, I went over to him/her and told that "we wanted something else" or so, we said good-bye to each other, and the next day we went to Superinfo to post an ad. Plus we are quite big farmers and quite well known in the town, so often in the evening people came over to our house to ask if there was any work, if they could come to work. Now, we have a group, the same group from Gádoros, which is about 30 km from here, who has been working for me for seven years now, we insist on keeping them." (Interview_K9)

4.2 The Action with regards to Dimensions 3-5

4.2.1 Analytical Dimension 3: Coordination and implementation of the action in the locality under consideration

Szentes PO is continuously providing support to its members in order to realise technological development, through for instance financing inputs and agronomic expertise. The system of expertise provision in the PO was organised on the basis of a Dutch model: the producers have been regularly visited by nine experts, and members are participating in trainings – so-called „plant circles". Despite advising services, the harmonisation of species and technology has led to the selection of members and the extrusion of small-holders from the PO. Losing ground is largely the consequence of spontaneous exits and, to a lesser extent, of exclusion, due to defaults in technological advancements (Ledó, 2014).

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Coordination of work and people at the Szentes PO is based on special incentives and sanctions. The PO which has maintained the organisation form of a cooperative is paying a bonus for its members at the end of each year, based partly on the quality produced and for shifting to biological plant protection. Further conditions include that the farmer should deliver over 90% of his/her vegetables to the cooperative, and should draw on the expertise provided and the input-materials recommended by advisors. Boni are covered by the financial results achieved. The most radical solution of the sanctioning toolkit is exclusion, if membership-related requirements is not fulfilled. During the period of transition to biological plant protection, for instance, there was a year when 10–12 members were excluded from the PO. According to the management, with changes introduced in its charter the organisation has experienced a profile purification.

4.2.2 Analytical Dimension 4: Autonomy, participation and engagement

Producer organisations face a number of internal challenges. One of these challenges is that the market expects them to be efficient in decision-making (Fodor 2013, 68), which would push the leaders towards a professionalised management system, which might get in conflict with the ideal of economic democracy, which is a basic value of cooperatives, and which, in principle, would secure access of members to decision-making processes. Such a tension between professionalized decision-making and economic democracy characterizes the internal dynamics of the Szentes PO.

Both de facto and de jure, the main decision-making body of the PO is the board, chaired by the president. The general assembly and the delegate assembly are democratically elected, but are rather uninformed about the backgrounds and consequences of decisions (and the financial plans). This hinders them to actively shape the final decisions.

The board and the president (chairman). The founding president (chairman) of the PO – who resigned in February 2019. He was and still is supported by all the producers we talked to (Interview_P4, P6 and Group interview_P7). His legitimacy has been full and unquestioned over time.

> *"I knew him [the former president of the PO] beforehand, and knew that he really was an agile and ambitious person. He was born to be a leader." (Interview_P4)*

The high level of trust between the members and the president of the PO helped maintain his legitimacy despite rigorous rules and consequent exclusions, but it also resulted in a relative dependency of the organisation on one person. His successor, the new president of the PO (since January 2019) was previously the financial manager of the co-operative.

Board members. Since 2009 four board members have been elected for five years, and two of them represent the Árpád Ltd (the founding member and biggest supplier of the PO). Even though before 2009 ordinary gardeners could become members of the board, they could barely influence the direction of the PO. This is how a small-scale vegetable producer remembers the period of his board membership:

> *"I felt good during those three years (when he was a board member) but if I want to be self-critical, I have to say that (…) we were not prepared enough for the post. (…) We needed to take financial and economic decisions on the board meetings. We [the PO] needed to meet requirements of the Agricultural Ministry. [Our president] outlined the agenda, but*

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> *we could not comment on it. We thought if it was good for him it should be okay for us, too." (Interview_P6)*

General assembly. The general assembly is gathering once, maximum twice a year. The role of this body is to approve the operational plan of the year, which had been prepared by the president and the financial manager, and which was already approved by the board. The most recent operational plan (2019) would increase the wages of employees of the PO. Further refurbishment of buildings is also planned (Interview_P6).

Delegate assembly. The main motivation of setting up a delegate assembly beyond the general assembly was practical: organizing a general assembly was more challenging than to organize a delegate assembly. (Group interview_P7) The delegate assembly was set up in 2015 (Group interview_P7). Everything that falls within the decision-making competences of the general assembly is first presented and accepted by the delegate assembly (Interview_P6, Group interview_P7). The delegate assembly meets once, twice, or three times a year (Interview_P6). The 53 delegates were nominated by the board and approved by the general assembly of 493 members (Interview_P4, Group interview_P7). According to some of our interview partners, the following criteria mattered in nominating the delegates:

- a producer on whose presence the presidency can count on
- an honest supplier
- there was no distinction between large- and small-scale producers (Group interview_P7)

Since the introduction of the delegate assembly, only issues approved by it will be forwarded to the general assembly. However, neither the delegate assembly, nor the general assembly has had a considerable influence on the strategic directions of the PO. The strategic decisions are taken by the presidency (mainly by the president), and neither the delegate assembly nor the general assembly debates these issues beforehand. Their function is to accept them (Interview_P4, P6).

> *"Being a delegate is like a bunch of numbers being told you about financial and economic issues of the PO in the previous year, which are usually so nice results, and basically one votes to approve this report. There might be one, two or ten questions that they answer, but the PO functioned so well in the past years that there was nothing to criticize about it." (Interview_P4)*

It seems plausible to state that the current decision-making mechanisms empower the producers to influence the direction of the development of the PO to a lesser extent than before the delegate assembly was established. The more professionalized decision-making structure since 2009 has been effective, but it reduced to some extent the space for democratic mechanisms within the co-operative, a factor which has not been criticized so far because of the profitable operation of the PO, on the one hand, and high level of trust towards the president, on the other hand.

The limited sense of criticism across the membership could also be driven by the fact that, in one way or another, each leader of the organization is at the same time a producer member. A nice illustration of this is related to the new president since February 2019. While he was "just" the financial manager, there were no expectations on him to be a producer. But he could only become the president after he had bought 600 sqm of foil tunnel space. The reason for this expectation was that he should share the common risk with the producers, on the one hand, and simply understand the life and views of an ordinary producer, on the other. „*The family of Feri* (i.e. the president) *used to go on vacation to the Mátra mountains. When they returned from vacation, they never came on the highway, but on the small roads from behind, in order to take a look*

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at their foil tunnel. Feri always represented the interests of simple small-scale producers, since he was one of us…" (Interview_K9) When in January 2019 the general assembly approved the change in presidency, it was done with a total respect towards both the resigning and the incoming president raised and trusted by the former.

Nevertheless, it seems that an era has just come to an end in the history of the PO. Besides its professional operation, this era was characterized by an all-encompassing aura of trust, and a leadership based on personal guarantees, humanity, good-will, and commitment. The new generation of leaders will most probably bring new directions of leadership inevitably with more emphasis on efficiency and economic interest.

4.2.3 Analytical Dimension 5: Expression and mobilisation of place-based knowledge and adaptability

One of the interviewed producers declared with self-confidence: "*we have got here everything which is important from the point of view of intensive gardening: people, sun (light and heat), and thermal water*." (Interview_P_1)

As we have pointed out in earlier chapters, skills of gardeners in the study area are historically shaped 'habitual' assets at the disposal of the PO's leaders, members (producers) as well as permanent workers. This knowledge is obviously place-based, although the action itself is not.

The other important asset is geothermal energy taken through more than a hundred wells in the Trademark Area due to the crucial significance of energy to the quantity, quality and economy of intensive vegetable production. Nowadays in Hungary, modern technologies capable of delivering marketable production require large-sized, well-ventilated, heated greenhouses or foil tents between December / January and May. In order to supply these with energy, besides geothermal energy several conventional methods for supplying heat can be used such as solid fuel (firewood, wood chips, sawdust, pellets, charcoal) or natural gas (gas tanks), heating oil, or some new methods like heat pumps or energy derived from sun or wind power plants. However, the cost of the production of the required heat energy is significantly lower for geo-thermal energy than for the other methods, this is why the production of vegetable during winter is restricted to farms using thermal energy for heating. (See more about geothermal energy in the Annex 8.4.2)

Greenhouses with state-of-the-art technology are solely in the hands of big capital joint companies: thus family farms, or small farms employing only a few people, are typically taking part in plastic tunnel farming using secondary thermal water or conventional methods to heat, and/or in unheated plastic tunnel farming. The need to increase yields in this horticultural segment also requires the development of technology, which is impossible without participating in tenders. However, participation in tenders requires long-term commitment, a business plan, sales of sufficient volume and a great deal of own contribution. These constraints explain the visible decline in the number of independent small farms, and the rapid growth of the average income and the size of the cultivated area per farm reflecting the accumulation of assets and professionalization of production. (See Figure 1 in the next chapter)

Hungary's EU accession resulted in an increased price competition. To stay alive in the context of ever increasing market competition, the Szentes PO facilitated among the gardeners the implementation of new technologies as a major tool for adaptation, through which the proportional yields per plants could have been increased. Hydroculture (soil-less growing) was one of

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these technological innovations. Jenő was amongst those who applied hydroculture first (See photos in the Annex 8.3.c. 1-5.).

> *"We were the very first. We were around 4-5 people that cooperated. The PO was really generous (…). They said they would pre-finance the [hydroponic] mats for us. Coconut was the material of the mats that time. They pre-financed our mats through another 100-day-long credit that time. We were really afraid. We also invested in an irrigation system, which was not a small investment either. When we started, we were really surprised that we could harvest one and two weeks earlier than usual. The plant was really intense and fast in growing and it produced a very good quality, too. It was almost incredible! We had a learning year, but I have to say that it is easier to produce without soil than with soil. The plant can get easily infected in the soil. (…) Soilless cultures are simpler, but not less demanding. Because of the control, we have to spend the same amount of time, or sometimes even more, in the greenhouses than earlier."* (Interview_P4)

With the increased economic risks, which came with the investment in the implementation of a new technology, the pressure increased on vegetable producers not to make any mistake.

> *"This hydroculture was a large step for us too. I have not seen it before, only on photos, videos or fairs. This technology needs a complete shift in mind, in operation, in everything. We left the roots of the plants to rot in the first year. We learnt from it, but with such an investment, you have to pay 20 million HUF yearly for 10 years, thus you should not allow yourself to let the roots rot again."* (Interview_P8)

The shift to hydroculture implied the need for an investment in an irrigation and fertigation system. As the vegetable producers did not have enough money to invest in the latest Dutch systems, they searched for cost-effective solutions to solve automated irrigation and fertigation. The solution of Jenő was to order an irrigation and fertigation system from a local mechanic for the quarter of the price of the original system. This machine automatically measures the electrical conductivity (EC) and the pH of the plant. The Molnár family (Group interview_P7), which lives outside the Szentes area, solved this issue differently.

Mr Molnár designed and built an own irrigation and fertigation system (see in Annex 8.6). This system is less automated though. EC and pH of the plants is measured mechanically through the leachate of the plants collected in a jar. The Molnár family has further economized through applying gravel in the hydroculture. Gravel as a producing medium can be used for a longer period (six years) than the coco or rockwool mat, and it is much cheaper as well.

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5. Final Assessment: Capacities for Change

Significant capacities for change are crucial at Szentes Producer Organisation from a number of aspects, most of which have been pointed out earlier in this case study. First of all, its development potential has been enormous, expressed in impressive augmentation of turnover and equity (three times more in 2018 than in 2003), membership and fixed assets (twice in 2018 than in 2003).

As emphasised, the PO is a profit-oriented enterprise that shares part of its profit with its members, for which it is clustered as a non-profit organisation. Part of the investments of the PO are benefitting its members, such as sorting facilities, others, such as the lump sum small credit scheme have been available decade-long for each members, while a third group of allowances served as an incentive: bonus payment has been given to producers who switched for biological plant protection, thus increasing the stock of healthy, safe and marketable vegetables of the PO. These ways of benefitting PO members have been in line with the values / convictions of the retiring president, who insisted to keep running the PO as a non-profit enterprise. The president also claimed himself to be somebody always paying attention to the interests of small-scale producers. It was his main concern when the co-operative was established and has remained so ever since. *"I urged that we should establish a PO for the whole region and not just for Szentes or Árpád Ltd., since I was aware of the danger of the small producers getting bankrupt would they be deprived of the opportunity of joining a PO."* (Interview_K_1)

However, despite being a protector of small producers, the president of the Szentes PO could not – and most probably was not willing to – block the gradual shifting of the PO towards capital-driven organisation. As it has already been introduced in a number of contexts, the adaptation pressure on producers has always been high in the 16-year history of the PO. The co-operative supported its members substantially but not at all fully when they were forced to change technologies in order to increase growth and ensure adaptation of their production to the needs of the PO being necessarily trapped by growth pressure since eligible subsidies (4,6%) have been calculated according to turnover from sales: the more turnover is earned, the more is the subsequent amount of annual EU subsidies received.

This explains that the social composition of the membership of the PO changed significantly in the last decade: both the rate of large producers (expressed with the category of sales) and the turnover of their sales have increased sharply, as the figure below illustrates:

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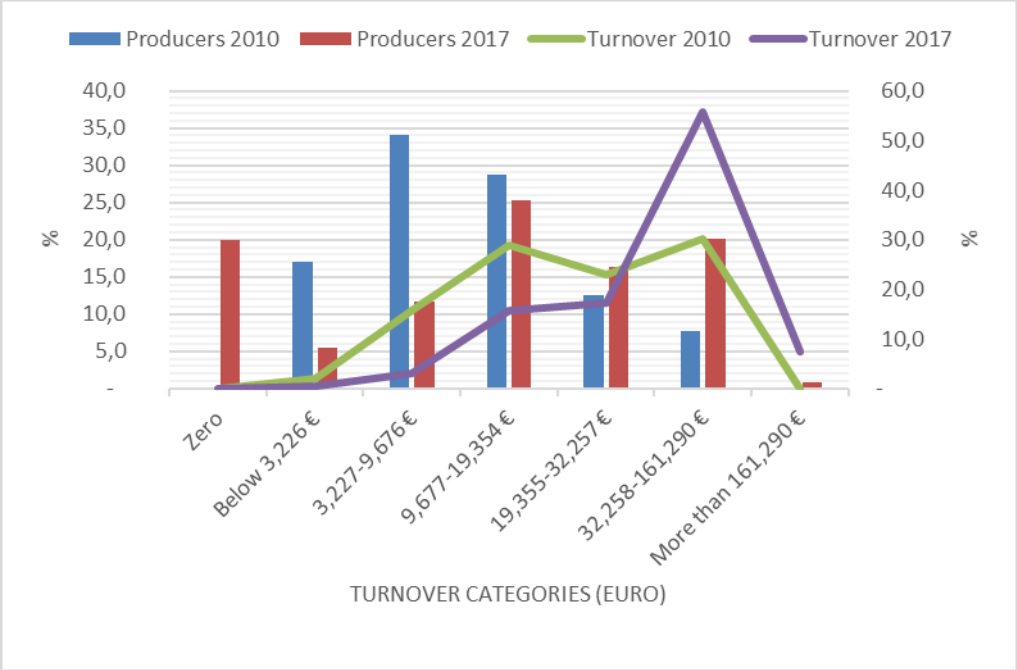

Figure 1: Changes of the social structure of the Producer Co-operative over time

The figure indicates how the PO has operated since EU accession as an incubator for hundreds of entrepreneurs who have grown from part-time auxiliary gardeners to competitive farmers. This positive social impact was reached through keeping the pace of differentiation between farmers and inequalities low for a relatively long period of time: the majority of small scale and ageing gardeners managed to keep their plots long enough, typically until they could retire. On the other hand, ambitious upper and middle layers could grow through absorbing abandoned plots of those who left farming voluntarily or by pressure of circumstance such as inability to meet PO requirements, lack of successors or other reasons. As a consequence, the social fabric of local capitalism has also been forged in a way that middle classes have become stronger through a strengthened entrepreneurial lower-middle class. Despite obvious social differentiation it has not been a model where a few became wealthy fast on the back of the poor. Instead, this is a model where appreciation and prestige have remained on meritocratic bases, where "social distance" between the head of the farm and permanent labourers has remained relatively small and strengthened by shared expertise, where leaders are expected to behave as any ordinary member. Such egalitarian expectations have rooted in the socialist past, kept alive through the continuity of the top management and promoted by the organisational form (co-operative) of the PO. It also related to the fact that the balance of forces has not changed much since the establishment of the PO: the chairman was unchanged until his retirement in February 2019, and the same chair, the 'founding father', headed the largest and most influential member of the PO, namely, the Árpád Ltd.

Synthesising Dimension A: Assessment of promoters and inhibitors (in regards to the action: dimensions 3 to 5)

The 'action' whose impact on spatial justice has been discussed in this case study report is the establishment and subsequent operation of a Producer Organisation in Szentes since the pre-accession period (2002). This was the first opportunity when funding from SAPARD, a pre-accession fund was available for farmers in the fruit-vegetable sector to bring jointly about a specific form of co-operation conform to EU regulations. The most important function of a PO is

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joint sales that provides small-scale producers access to markets they would not be able to reach otherwise, thus with joining the PO, risk of production for members decreases significantly. The Szentes PO was one of the first POs in Hungary that reached fast success and gained recognition within a year, having therefore become entitled to CAP Pillar I operational support (4,9% of their sales value) as well as so-called national top up. *Access to EU subsidies* has been the most important trigger of establishment and continuous promoter of the enterprise. These subsidies permitted large-scale investments, like the cooling and packaging facilities, which attracted large number of gardeners from the larger region to enter the PO and make use of its services.

Geothermic energy available for more than half of the members of the PO provides access to heating facility which is not cheap but safe, easy to work with (its operation does not need strict human inspection like most of the alternative heating material and devices) and permits a continuous operation of the farm on and off season. This is key to the multiplication of quantities, make sure good qualities and increase farm income; this explains that most of the largest entrepreneurs have got access to thermal energy (but only one of them has his own drilled well.)

A great deal of social capital of the leaders has been another important promoter of successful operation of the PO; the president of the PO has been chairing the so-called 'product-council' of fruit and vegetable growers for the second term. This is a nation-wide organisation and this position permits respect and opportunity to influence, to some extent, the broader market environment (or defence against it) from which the PO might have potentially profited.

Maturity also matters, namely, that the PO built to an earlier practice of co-operation and market-co-ordination rooting in the state socialist era. The predecessor partnership was established in 1975 by the largest agricultural co-operatives of the town that had been engaged in vegetable-production. Most of the co-ordination-techniques, even the network of advisors were developed already in these years; the model, as a local innovation was available, it just had to be adapted to the post-accession circumstances.

As far as inhibitors of further development are concerned, competitors, much larger co-operations in the East (especially in Poland) and more professional organisations in the West (in the Netherlands and Spain) were mentioned in the interviews. Increasing shortage of manual labour was also a matter of complaint among ordinary producers and leaders equally. Hard access to capital (big loans) and a too high risk of investment in the current market environment were referred by the biggest individual producers who still did not feel themselves strong enough in terms of their own source capital to invest – individually or collectively – to such basic infrastructure of production as thermal wells, pipelines or glasshouses.

Synthesising Dimension B: Competences and capacities of stakeholders

Professional leadership, and key decisions they brought, such as establishing the PO outside the Árpád Ltd. in a way that the influence of its leaders has been maintained since then secured stability to the enterprise and the largest supplier of good-quality products. In addition to the exceptionally high professional expertise of the PO leaders, especially that of its president, their broad professional network has always helped them to get access to information on time, either regarding policy decisions or market-related issues.

Institutional as well as individual learning started already in this partnership yielding experienced, disciplined and knowledgeable vegetable growers in relatively large numbers who could be relatively easily transferred from the status of auxiliary plot-farmers in the beginning of the

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1990s to entrepreneurs. They were disciplined by highly competent and committed leaders of the PO who "empowered" many of them in the context of "wild capitalism".

The social and cultural distance between leaders and ordinary members of the PO have remained relatively small, since leaders of the PO are producers themselves. Trust towards reliable growers still helps overcome critical situations. Shared interest and skills might bring closer the entrepreneur and his employee, especially in the context of the shortage of labour. The Szentes PO, on the other hand has limited capacities to empower the labourers; for whom seasonal employment is offered at best.

Synthesising Dimension C: Connecting the action to procedural and distributive justice

Distributive justice is provided by the PO's services to which each member has access to, such as lump sum credits, either in cash or in kind. Since the PO works as a non-profit co-operative and it is a profitable business venture, part of its profit is distributed as bonus among members. However, only those members have been eligible to bonus recently who have shifted to biological plant protection; in other words, it is used by the management as a tool for encouraging producers to stop chemical plant protection.

Procedural justice is safeguarded by established rules meant to serve common interests of members and safe operation of the PO. Those who break rules, have to leave the PO as it happened some years ago with one of the largest and most appreciated producers, when an illegal pesticide was identified in his product. The PO has kept the form of its organisation and still operates as a co-operative. The "one member = one vote" principle at decision-making then has had maintained, although to a somewhat changed manner, with making direct control of members over decisions of the management indirect, to some extent, via inserting the institution of delegates and Delegates' Assembly between the level of ordinary members and that of the co-operative leaders. The immediate purpose of this arrangement was to make sure that decisions are accepted by a forum which could be gathered more easily than the General Assembly where at least half of the membership must show up for making a decision. As the number of members grew and the geographical scope of their place of residence extended, this was a more and more difficult task. Since 2009, when the Delegates' Assembly was set up, it is convened 3-4 occasions a year whilst the General Assembly is called together only once a year and it always approves the suggestions of the delegates. The process of "indirect" decision-making is not the biggest threat, however, as far as the losing control over the leadership is concerned. It is rather a matter of lacking competencies of delegates which necessarily limit their abilities to argue against the suggestions of the leaders.

From the perspective of the manual workers employed by the PO or by its members, the Szentes PO has limited capacities by its 'nature' to fight deep social vulnerability. As a market operator, the PO cannot remedy marginalization of daily labourers; its social "sensibility" as a co-operative is limited to its members. Otherwise it strives for profit as much as any capitalist venture. What makes difference is the use of the profit. As a result, the exploitation of labourers, especially the most vulnerable layers such as women and the Roma, is as much present in the PO as in its profit-oriented member-farms.

Main promoters of the successful operation of Hungary's largest Producer Organisation in Szentes and its surroundings are locally determined. Firstly, geothermic energy heating greenhouses, secondly, continuity provided by a partnership that was established as early as in 1975 establishing the tradition of co-operation long time ago. Institutional and individual learning started already in this partnership yielding by 2003 experienced, eager, disciplined and knowl-

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edgeable growers in high numbers. However, the PO operates in the context of Capitalism, therefore since the establishment in 2002, a high degree of differentiation between producers has been taking place ending up in diminishing number of small producers. Integration to the increasingly competitive markets was run by the logics of the economies of scale. Market pressures put an ever growing need on the PO and its members for professionalization through technological development and the concentration of land. Introducing hydroculture to the production was part of the technological development pushed by market pressure. As producers had limited capital to buy the latest Dutch systems, they searched for cost effective solutions to solve automated irrigation and fertigation. Some of the less well-to-do producers constructed themselves the machines or bought them from a local mechanic. Those who lacked capital or family labour or both left the PO. From their point of view, the PO as a capitalist enterprise inhibits their membership. Beyond market pressure, climate change and the challenge of invasive species put further challenges on the producers (see annex 8.5).

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6. Conclusions

The Szentes PO is Hungary's largest producer organisation with broad networks of vertical and horizontal branches penetrating to the vegetable (mainly paprika and tomato) growing sector in an area that extends more widely than the Szentes District. It exemplifies (i) valorisation and appreciation of local human capacities (highly competent leaders and managers, well skilled ordinary vegetable growers, support schemes for co-op members), (ii) an adequate investment policy based on middle-term strategic planning and maximising the absorption of EU and national financial supports and (iii) a clever marketing policy, wide business networks, strong lobbying capacities and outstanding achievements: the Szentes PO played a major role in 2010, the PO took steps towards protecting „paprika from Szentes" as a branded product, including the recognition of its geographic origin (PGI) for better market positions home and abroad. These are the fundaments on which the PO more than doubled its membership and extended its catchment area across the NUTS-3 region and beyond (to 480 settlements).

However, it has not been an easy path. The pressure to adapt has been high and steady in the 16-year history of the PO. Constantly trapped by the pressure to increase growth, the co-operative supported its members substantially, but not fully, when it obliged them to invest in new technologies to meet its increased demands. The key to such a pressure is eligibility rules of registered PO-s for EU subsidies, which have been based on turnover of sales. Energy costs for heating have also become increasingly costly, whether from thermal energy or other energy sources. This explains why the selection process of the past 1.5 decades strengthened the large producers at the expense of small-scale gardeners.

The opting out of small-scale producers took place gradually: most of the small-scale and ageing gardeners managed to keep their plots long enough (typically until they could retire) whilst ambitious upper and middle layers could grow through absorbing their abandoned plots. In this process, the social fabric of local capitalism has also been forged in a way that middle classes have become stronger through a strengthened entrepreneurial lower-middle class. Despite increasing inequalities, it is not a model whereby the few became wealthy fast on the backs of the poor. It is a model where appreciation and prestige remained on meritocratic bases, where the social distance between the head of the farm and permanent labourers remained relatively small, and where leaders were expected to behave as ordinary members. Such egalitarian expectations, rooted in the socialist past, were kept alive through the top management and promoted by the organisational form (co-operative) of the PO.

The caesura of February 2019, when the head of the PO retired, will probably bring in a new era, when an all-encompassing aura of trust between the leadership and members will not permeate the operation of the enterprise as much as it did in the past. It is also likely (and natural) that the new generation of leaders will bring in new concepts of leadership directed towards increasing the competitiveness of the PO, which will further decrease social allowances in the form of both accessible direct support and the indirect social impact of the PO.

Outlook

New leaders of the PO will likely move toward strengthening its competitiveness through new investments and further growth. The relevance of the PO in tempering social differentiation and preventing social vulnerability will, therefore, further diminish.

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8. Annexes

8.1 List of Interviewed Experts

Nr.	Code	Description	Role	Length Hours: minutes	Documen-tation	Au-dior ec.
1.	Interview_L1	The mayor of Szentes. Inter-viewed by Gábor Velkey and Tünde Virág May 2018.	local leader	1:30	field notes	no
2.	Interview_L2	The vice mayor of Fábiánse-bestyén and the plant protec-tion advisor at the PO. He was inter-viewed by Melinda Mihály on the 14th of May, 2018.	local leader	2:20	transcription	yes
3.	Interview_L3	The mayor of Mindszent. He was interviewed on the 15th of May 2018 by Melinda Mihály.	local leader	2:25	transcription	yes
4.	Interview_L4	The mayor of Csongrád. He was interviewed on the 16th of May 2018 by Melinda Mihály.	local leader	1:00	transcription	yes
5.	Interview_L5	The mayor of Csongrád. He was interviewed on the 25th of October, 2018 by Gábor Velkey.	local leader	0:36	field notes	yes
6.	Interview_L6	Vice mayor of Szentes. He was interviewed on the 25th of October, 2018 by Gábor Velkey.	local leader	0:56	field notes	yes
7.	Interview_L7	The mayor of Szentes. He was interviewed on the 3rd of De-cember, 2018 by Gábor Velkey and Melinda Mihály	local leader	1:14	field notes	yes
8.	Interview_L8	The head of industry Chamber. He was interviewed in May, 2018 by Tünde Virág	local leader	1:48	transcription	yes
9.	Interview_L9	A local history researcher from the archives. He was interviewed in May, 2018 by Tünde Virág	local re-searcher	1:39	transcription	yes
10.	Interview_K1	The chairman at the PO. He was interviewed on the 14th of August 2018, by Katalin Kovács and Katalin Rácz.	key actor	3:30	transcription	yes
11.	Group inter-view_K2	Two founding members and sales managers of the PO. They were interviewed on the 14th of August 2018 by Katalin Kovács and Katalin Rácz.	key actors	2:02	transcription	yes

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12.	Group inter-view_K3	Chief gardener and one of the middle men of the Árpád ZRT. They were interviewed on the 14th of August 2018 by Katalin Kovács and Katalin Rácz.	key actors	1:30	transcription	yes
13.	Interview_K4	Leading gardener of the Árpád cooperative. Interviewed on the 17th of January 2019 by Katalin Kovács.	key actor	1:28	transcription	yes
14.	Interview_K5	A supplier-producer of vegetables and sales manager at the PO. Second, follow-up interview. Interviewed on the 17th of January 2019 by Katalin Kovács.	key actor	1:48	transcription	yes
15.	Interview_K6	Member of the PO, plant protection advisor, interviewed on the 16th of January 2019 by Katalin Kovács.	key actor	1:40	transcription	
16.	Interview_K7	Member of the PO, vegetable producer (heated greenhouses), plant protection advisor. Interviewed on the 17th of December 2018 by Melinda Mihály.	key actor	0:40	transcription	yes
17.	Interview_K8	Chief Executive Officer of the Árpád Agrár LTD. interviewed by Katalin Rácz, in August, 2018	key actor	1:59	transcription	yes
18.	Interview_K9	Producer, former member of the Leaders' group interviewed on the 15th January, 2019 by András Vígvári and Krisztina Németh	key actor	2:15	not yet	yes
19.	Interview_E1	A senior researcher at the Corvinus University. Earlier he played the role of an advisor of a documentary film called "Földi paradicsom" dealing with gardening entrepreneurs during the 1980s. He was interviewed on the 14th of August 2018 by Katalin Kovács and Katalin Rácz.	expert	1:13	only voice	yes
20.	Interview_P1	Former member of the PO. Larger, heated greenhouses, own thermal well. Interviewed in August 2019 by Katalin Kovács and Katalin Rácz.	producer	1:37	transcription	yes
21.	Interview_P2	Outsider to the PO in Csongrád, scattered farm area. He was interviewed by Katalin Kovács and Katalin Rácz on the 23rd of October 2019.	producer	1:14	transcription	yes

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22.	Interview_P3	A gardener consultant, seeds salesman and small producer in Szegvár, outsider to the PO. He was interviewed by Katalin Kovács and Katalin Rácz on the 23rd of October 2019.	producer	0:45	field notes	no
23.	Interview_P4	Member of the PO. Heated greenhouses in the Szentlászló site. They mainly produce Hungarian White Pepper. Interviewed on the 7th of January 2019 by Melinda Mihály.	producer	1:35	transcription	yes
24.	Interview_P5	External member of the PO. Unheated greenhouses and outdoor cultivation of Chinese cabbage in Szegvár. Interviewed on the 22nd of January 2019 by Melinda Mihály.	producer	1:20	transcription	yes
25.	Interview_P6	Member of the PO. Area: Szegvár. Interviewed on the 7th of January 2019 by Melinda Mihály.	producer	1:50	transcription	yes
26.	Group interview_P7	Members of the PO, outside the Szentes area. The 3 interviewees (mother, father and son) run a family vegetable producer enterprise. Interviewed on the 7th of January by Melinda Mihály	producer	2:20	transcription	yes
27.	Interview_P8	Member of the PO. Interviewed on the 15th of January 2019 by András Vigvári	producer	1:45	transcription	yes
28.	Interview_P9	Member of the PO, former member of the Leaders' group. Interviewed on the 15th of January 2019 by András Vigvári	producer	1:39	transcription	yes
29.	Interview_P10	Member of the PO, interviewed on the 15th of January 2019 by Krisztina Németh.	producer	1:10	transcription	yes
30.	Interview_P11	Member of the PO, interviewed on the 15th of January 2019 by Krisztina Németh.	producer	2:29	transcription	yes
31.	Interview_P12	Member of the PO and his wife, interviewed on the 16th of January 2019 by Krisztina Németh and András Vigvári.	producer	2:11	transcription	yes
32.	Interview_P13	Member of the PO, interviewed on the 16th of January 2019 by Katalin Kovács.	producer	2:10	transcription	yes
33.	Interview_P14	Member of the PO, Interviewed by Monika Váradi on the 15th of January 2019.	producer	1:23	transcription	yes

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34.	Inter-view_P15	Member of the PO, Inter-viewed by Monika Váradi on the 17th ofJanuary 2019.	producer	1:29	transcription	yes
35.	Inter-view_P16	Former member of the PO. Small scale producer, heated greenhouses. Interviewed by Melinda Mihály in February 2019.	producer	0:20	field notes	no
36.	Inter-view_P17	Member of the PO. Leader of the Szentlászló greenhouse coop. Interviewed by Melinda Mihály in February 2019.	producer	0:45	field notes	No
37.	Interview-_Emp_1-2	Two female group leaders of the PO working with selecting and packing Interviewed by Melinda Mihály in January 2019.	employees	1:13 2 days	transcription and field notes Field_notes_p ackag-ing_area	Yes
38.	Discus-sion_DL_3-4	Two female day-labourers, participant observation by Melinda Mihály	male day labourers	8:00	field notes Field_notes _greenhouse	No
39.	Interview-_DL_5-6	Two male foil-tunnel workers interviewed by András Vigvári, Krisztina Németh and Monika Váradi in January 2019.	employees	0:30	field notes	No

8.2 Stakeholder Interaction Table

Type of Stakeholders	**Most relevant 'territori-al' level they operate at**	**Stakeholders' ways of in-volvement in the project (What do we gain, what do they gain)**
Local politicians	Local level. Mayors and vice-mayors of the investi-gated localities: Szentes (3), Fábiánsebestyén, Mindszent, Szegvár and the neighbouring Csongrád (2)	Have taken part in individual interviews (6)
Associations representing private businesses	Key actors, producers and employees of the PO	Have taken part in individual interviews (25)
Other local community stakeholders	Chamber (1), Archive (1), outsider producers (3), labourers (6)	Individual interviews (11)
Colleges and universities	Expert, univ. professor	individual interview (1)

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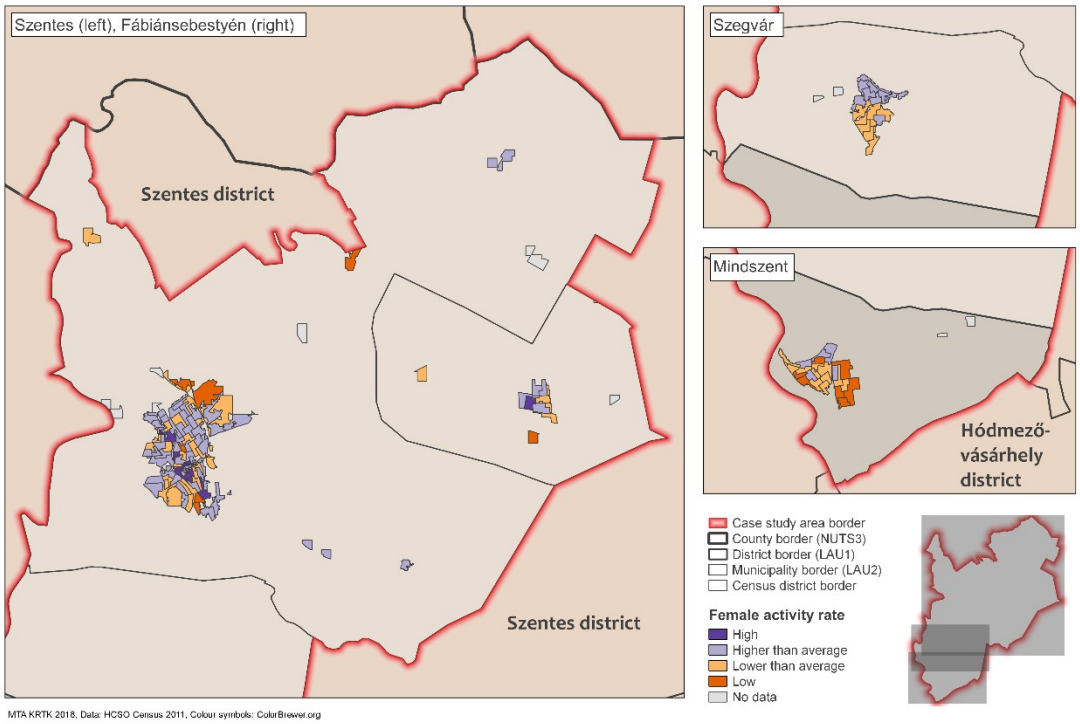
8.3 Map(s) and Photos

Annex 8.3.a. 1-2)
1

Female activity rate in Szentes case study area (Szentes TÉSZ), 2011



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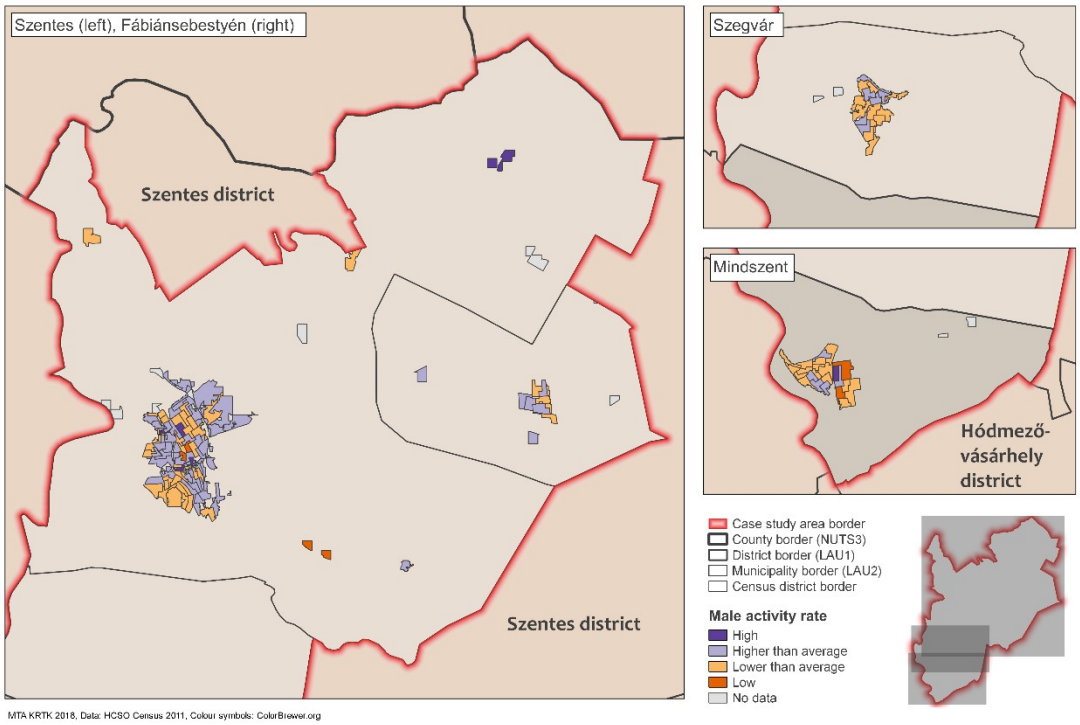
2

Male activity rate in Szentes case study area (Szentes TÉSZ), 2011



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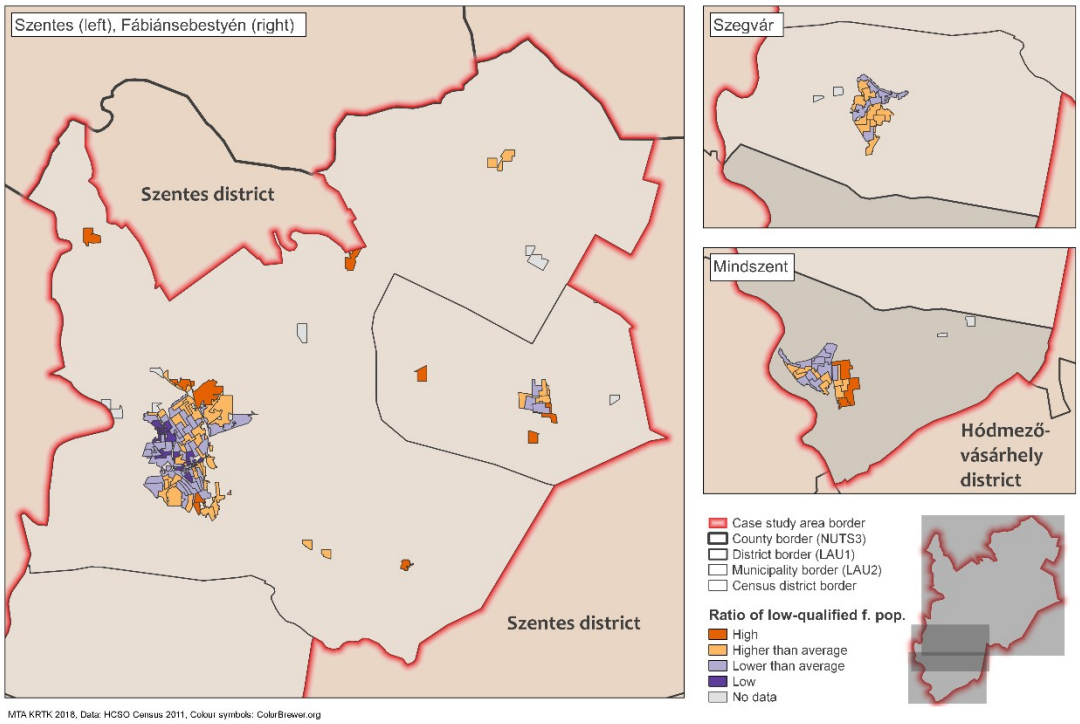
Annex 8.3.b. 1-2)

1

Ratio of female population with low qualification (ISCED 0-2) in Szentes case study area (Szentes TÉSZ), 2011



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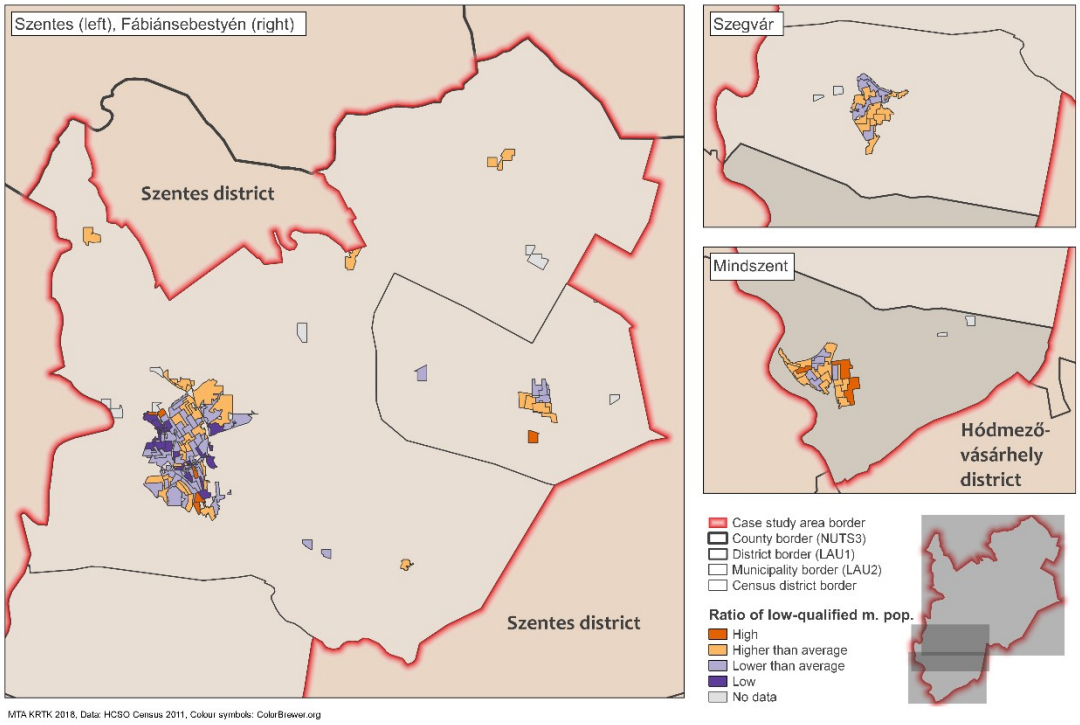
2

Ratio of male population with low qualification (ISCED 0-2) in Szentes case study area (Szentes TÉSZ), 2011



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Annex 8.3.c. 1-5)

1. The largest production site: Szentlászló. The photo was taken by Katalin Kovács August 2019

2. Growing without soil in rockwool bricks. The photo was taken by Melinda Mihály, December 2019

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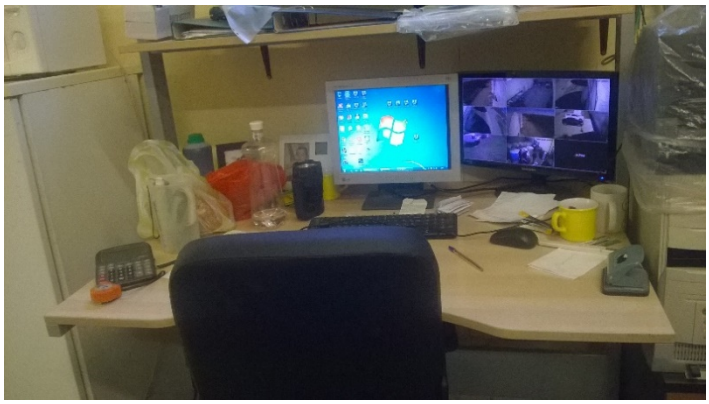
3. A “backoffice” to the foil tunnels. Photos were taken by Katalin Kovács August 2019



4. The ‘Szentesi paprika’ brand under a foil tunnel. Photos were taken by Katalin Kovács August 2019

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5. Home-made irrigation and fertigation systems. Photos were taken by Melinda Mihály, December 2018

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8.4 Additional information – Info-sheet used at fieldwork (in Hungarian)

RELOCAL - Resituating the Local in Cohesion and Territorial Development

A „Resituating the Local in Cohesion and Territorial Development" (*A „helyi" szint szerepe a területi kohézióban és fejlesztésben"*) című projektet az Európai Unió H2020 keret-programja támogatja. A 2016 őszén kezdődő, és 2020-ban záródó kutatásban 11 európai országból összesen 13 partner vesz részt. A konzorcium magyarországi tagja a Magyar Tudományos Akadémia Közgazdaság- és Regionális Tudományok Kutatóközpontja. A kutatás fő kérdése az, hogy a vizsgált országokban az EU által vagy más forrásból finanszírozott területi alapú fejlesztési projektek mennyiben tudják megvalósítani a térbeli és társadalmi igazságossággal kapcsolatos szakpolitikai célkitűzéseket. A kutatás nem csak az elmúlt évek területi alapú fejlesztési beruházásainak a tanulságait fogja elemezni, hanem megpróbál olyan szakpolitikai javaslatokat megfogalmazni, amelyek a jövőben növelhetik a hasonló beavatkozások hatékonyságát.

Kutatási kérdés és motiváció
Az utóbbi években az EU közép- és hosszútávú célkitűzései között egyre hangsúlyosabb szerepet kapott a területi kohézió, és a területi egyenlőtlenségek csökkentése. Ugyanakkor a 2008-as válság során, illetve az ezt követő megszorítások időszakában az EU által finanszírozott, területi alapú beruházások ellenére az egyenlőtlenségek a legtöbb esetben nem hogy nem csökkentek, hanem adott esetben nőttek is. A kutatás legfőbb célja, hogy ezt az ellentmondást minél jobban megértse, és a fejlesztési beavatkozások sikeréhez vagy kudarcához vezető tényezőket feltárja.

A kutatás rövid bemutatása
A kutatás két legfontosabb kulcsfogalma a területi igazságosság és a lokalitás, a HELY.
A területi igazságosság vizsgálata során kíváncsiak vagyunk a kiválasztott kutatási terepeken való megnyilvánulására vagy éppen hiányára, arra, hogy a helyi döntéshozók milyen lépéseket tettek illetve tesznek a javak és erőforrások igazságosabb térbeli eloszlásának érdekében.
A lokalitás középpontba helyezése azt a célt szolgálja, hogy a kutatás során végig előtér-ben maradjanak a helyi igények, a helyi lehetőségek és a tágabb folyamatokról alkotott helyi perspektívák. A vizsgált területi egységek léptéke az egyes esettanulmányok esetében eltérő (pl. városnegyed szintű fejlesztések, járási szintű fejlesztések, stb.), illetve ezeknek az egységeknek a határai sem mindig egyértelműen meghatározhatóak, a „helyi" szempontok és értelmezések vizsgálata a projekt eredményességének záloga.
A kutatás egyik célja, hogy az EU elméletben területi igazságosságra törekvő Kohéziós Politikája és a helyi sajátosságok közötti távolságot minél inkább csökkentse. Bár az el-képzelhetetlen, hogy a sokféle helyi sajátosságra (fejlesztési igényre, intézményi berendezkedésre, történeti és kulturális sajátosságokra) egységes választ tudna adni a Kohéziós Politika, de a helyi és uniós folyamatok közötti szakadék csökkentése elengedhetetlen lépés a területi igazságtalanságok mérsékléséhez.

Esettanulmányok és módszertan
A kutatás során a 13 konzorciumi partner összesen 33 esettanulmányban vizsgálja a fenti kérdést – ebből intézetünk négy magyarországi esettanulmány elkészítéséért felelős. Egy esettanulmány során a kutatók egy adott szűkebb területen zajló fejlesztési beavatkozást (vagy beavatkozások sorozatát) elemeznek, majd következő lépésben adott szempontok szerint ezeket az esettanulmányokat hasonlítjuk egymáshoz.
A kutatás módszertana sok elemből tevődik össze. Részét képezik az esettanulmányok helyszíneit leíró társadalmi, gazdasági és területi statisztikai adatok elemzése; a fejlesztési projektekre hatással lévő szereplőkkel készülő interjúk kvalitatív elemzése; az esettanulmányok helyszíneit

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jól ismerő szereplőkkel történő fókuszcsoportos beszélgetés a terület múltról, jelenéről, és a lehetséges jövőbeli szcenáriókról. A módszertan fontos része a „helyi" és a nagyobb léptékű (regionális, nemzetállami szintű, uniós léptékű) folyamatok egymásra hatásainak a vizsgálata.

A magyarországi vizsgálati terepek

A négy esettanulmány különböző léptékű területi egységeket és különböző típusú beavatkozásokat vizsgál: a pécsi kutatás az egyik legnagyobb szegregátumban, a György-telepen megvalósult telep-programok hatásait és ellentmondásait tárja fel; az Encsi járásban folyó vizsgálat az immáron negyedik generációs Gyerekesély Program kapcsán próbálja megválaszolni azt a kérdést, hogy beváltja-e a Program a hozzá fűződő társadalmi inklúziós reményeket. Míg eme két esettanulmány a már bekövetkezett, megcsontosodott szegénységből való kilábalás esélyeit kutatja, a másik kettő a prevenció lehetőségeit vizsgálja („Éltető Balaton-felvidék LEADER, Szentes-központú TÉSZ.).

Dr. Kovács Katalin, igazgató, MTA KRTK Regionális Kutatások Intézete
a magyarországi kutatások vezetője (06-30-470-0727, kovacsk@rkk.hu)

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8.5 Geothermal energy in the Szentes-Szegvár area and its use in intensive gardening

The utilisation of geothermal energy in the Szentes region is of great significance not only in Hungary but also from an international perspective. The geothermal field that can be found here is the largest in Hungary, and the densest in Europe. The second largest geothermal heating system in Europe, second only to the one in the Icelandic capital of Reykjavik, operates in the area of Szentes. Built over a period of fifty years, this complex system is able to provide thermal energy for homes, public buildings, greenhouses, plastic tunnel plants, livestock farms and grain dryers, and it also supplies thermal water for the local spa and outdoor thermal baths.

The extractable thermal water reaches the surface at a temperature of 85-100 °C from a depth of about 2,000 meters, or 70-80 °C from a few hundred meters smaller depth. The installation of wells happened continuously, but in an undulating manner from the early 1960s, the last one being established a few years ago. For example, the 14 wells belonging to the Árpád Cooperative in the Szentlászló area were drilled between 1964 and 1988, with the highest number equalling half of all the wells drilled between 1978 and 1980. In the 1980s, each of the agricultural cooperatives in Szentes had a thermal well. Of the surrounding settlements three thermal wells in Fábiánsebestyén and six in Szegvár satisfied the demand in heat energy of the local horticultural farms.

Energy has crucial significance to the quantity, quality and economy of forced vegetable production. Nowadays in Hungary, modern technologies capable of delivering marketable production require large-sized, well-ventilated, heated greenhouses or foil tents between December / January and May. In order to supply these with thermal energy, besides geothermal energy several conventional methods for supplying heat can be used such as solid fuel (firewood, wood chips, sawdust, pellets, charcoal) or natural gas (gas tanks), heating oil, or some new methods like heat pumps or energy derived from sun or wind power plants. However, the cost of the production of the required heat energy is significantly lower for geothermal energy than for the other methods.
Nevertheless, in terms of cost of equipment geothermal heating systems are significantly more expensive than any other heating system. The unit investment cost of a production well together with all the other necessary equipment (degassers, buffer tanks, heat exchangers, wires, etc.) amounts to five to six times the cost of investment produced by conventional methods, and 20-30% higher than heat pumps that also require a high level of investment.

Background information: regulations in the EU and Hungary
The most recent legislation directly affecting groundwater is Directive 2000/60 / EC of the European Parliament and of the Council, which requires Member States to:

- preserve and restore groundwater bodies in a good state,
- keep a balance between extraction and supply,
- prevent or limit the entry of pollutants into groundwater,
- designate and register the necessary protection areas in order to reduce pollution and pollutant concentrations.

Thus, the EU rules consider re-injection acceptable only on the condition of the protection of the water bases. This also implies indirectly that sustainability, i.e. the balance between extraction and supply, is proposed to be achieved by adjusting (limiting) the rate and extent of extraction to natural replenishment.

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Domestic regulation only partially follows this logic. The Environmental Protection Act (Act LIII of 1995 on Environmental Protection), in line with EU rules, stipulates that in the case of groundwater, water protection means protecting the water supply, taking into account its quantitative and qualitative characteristics, and it also extends the protection to aquifers and their covering layers (Section 18 (1)). The Water Management Act (Act LVII of 1995) also emphasizes the preservation of the balance between water abstraction and supply (Section 15 (1)), which is supplemented by a 2003 amendment (Act CXX of 2003, Section 10) which requires the preservation of good water quality, adopting the specific wording of the EU directives.

However, this amendment incorporated into law the obligation to recycle thermal water "extracted exclusively for energy utilization" (Section 15 (3)). At this point, domestic regulation diverges from international practice, since it assumes that the long-term sustainability of water bases can only be assured by prescribing re-injection.

Local stakeholders considered this amendment, together with the modification in the regulation of the concession contained in the Mining Act (Act XLVIII of 1993), which also aimed at ensuring the utilization of thermal water for energy purposes more widely than before by means of a concession tendering procedure, to be a deliberate destruction of the agricultural utilisation of thermal water (Interview_P1). Thus, several people assumed that scheming by competitors was behind the new emphasis on environmental protection and water resource management and the relevant stricter regulations (Interview_L6, P1).

However, the regular examination of the thermal wells in the Szentes region has clearly proved that the enforcement of water resource management principles, for example, can only be achieved by stricter regulations, since the level of resting water calculated at ground level decreased by 25-40 metres in the peak season of extraction in the 1980s. This slowed down in the first half of the 1990s as a consequence of the economic downturn following the regime change.
The used thermal water - following the practice of the last half century – is channelled from six wells to the Kurca Main Canal (stream), from five wells to the Kórogy Main Canal, from four to the Talom Canal, and from two to the Nagyvölgy Canal. All of these bring the water to the Tisza via a shorter or longer route, ensuring proper storage time and dilution. The water of the fourteen wellsnext to the Szentlászló unit (with about …. production sites) is channelled into the Veker River, but in fact the water, cooled down and partially purified from the dissolved minerals, reaches here after leaving behind the two artificial thermal ponds created at the outskirts of the town, in the vicinity of Szentlászló unit. Two interconnecting, 40 and 100 hectare cooler lakes, which provide sufficient storage time, ensure that the environmental impact is controlled within the conditions described above. The lakes that were established several decades ago were accepted by the local society, and they do not feel that they pose disproportionate risk to the environment. Moreover, all the respondents mentioned it as a positive example that the smaller lake directly receiving the used thermal water has become an ornithological observation site for 176 species of birds, thus enhancing biodiversity, and at the same time assuming important nature conservation functions by supplying food by its wildlife for the nesting birds that spend the winter here. Local development plans also aimed to exploit the larger water reservoir for fishing, recreational, or sporting purposes, but the idea of the use for fishing was abandoned due to the "thermal taste" of the fish (interview with Demeter), and the other aims were also only partially realized.

Arguments strongly opposed to the obligation of re-injection, in addition to the manageability of environmental risks associated with surface disposal, refer to disproportionately large, almost unfeasible investment costs, and technological problems related to re-injection (interview with Interview_L1, L6_P1_K8).

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In view of all the circumstances, in the absence of significant tendering opportunities, it could not be expected that within a few years following the change in the legislation imposing the re-injection obligation there would be substantial progress, especially for larger systems operating multiple thermal wells. Therefore, in the absence of other options, the actors concerned sought to resolve the problem by softening the legal requirements, extending the grace period and helping the investments by seeking tender funds.

Prior to the end of the transitional grace period, the Mayor of Szentes, who was also a parliamentary representative of the district, initiated an amendment to the Water Management Act in order to maintain the operability and preservation of the geothermal energy utilisation system in Szentes. His amendment proposal (Act XCIX of 2009) consisted of only two paragraphs:

1. The first paragraph of the bill attempted to alleviate the unequivocal stipulation of the obligation of re-injection by delegating the right to allow temporary exemption from the re-feeding of thermal waters to the public authorities. However, as a prerequisite, the applicant was required to have a valid water exploitation license (on 30 September 2009), and the water abstraction rate was not allowed to jeopardize the sustainability of the water base in either quantitative or qualitative terms. That is, the balance between water extraction and supply had to be ensured.
2. The second paragraph provided an opportunity for the water user to reduce the amount of contribution to the water resource fund to the amount of the certified costs incurred in connection with the creation of a re-feeding well (up to a maximum of HUF 300 million).

The latter provision essentially intended to relinquish the contribution payable to the state in favour of the financing of the re-injection well. In the case of companies operating several thermal springs, the amount of the contribution thus transferred could be of considerable help in launching the developments.

As a result of the Szentes lobby's ability to convince both the government and the opposition parties to support it, the bill was finally passed by Parliament. Besides local politicians and Members of Parliament irrespective of party affiliation, the leaders of the more significant local horticultural companies (Árpád Ltd., Szentes PO) active in the nationally renowned economic advocacy organizations also played an important role in the lobbying activities.

According to the government decree adopted on the basis of the amendment (Government Decree 147/2010. (IV. 29.), Section 77 (4)), exemption can be granted from the re-injection obligation, based on individual application, in the case of water bodies with a low or decreasing water supply, until 22 December 2014, and in the case of water bodies with a fair water supply, until 22 December 2020 at the latest.

Since the stakeholders were granted only a few years' extension, the lobbying activity continued. After the change of government in 2010, the local government and opposition MPs acting jointly – often the same persons as before, but now in reversed roles – lobbying closely together with the professional advocacy organisations and local economic leaders achieved that the government extended the temporary exemption period by further three years.

This exemption, however, now only applies to the thermal wells that produce energy linked to agricultural activity. The exemption has been suspended not only for the completed (licensed) wells, but also for those to be installed by 30 June 2015 (Government Decree 1002/2012 (I. 11)).

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In accordance with the Government Decree, Parliament first amended the Water Management Act in 2012, and then again in 2013. The second amendment permanently abolished the requirement for obligatory re-injection. Coordinated lobbying has therefore reached its goal. With this, the issue of re-injection has been removed from the agenda, thus the sustainability, quantitative and qualitative protection of deep water bases can be regulated, at most, by issuing water rights permits.

Under these conditions, achieving a balance between extraction and supply can mainly be facilitated by two factors:

- financial interest by raising fines, royalties, fees and sources of funding to facilitate re-feeding;
- technological advancement, which may result in a reduced rate of extraction due to lower energy requirements.

For example, the energy needs of today's state-of-the-art greenhouses are at least 50% lower than ten years ago.

Research has shown that after the conventional two-step utilisation (before draining or re-feeding), 60-80% of the energy obtained through direct use can be extracted by using a heat pump, i.e. energy efficiency can be increased by more than 50% through substantial investment, but at minimal operational costs. However, the introduction of heat pump systems has so far only appeared in long-term plans, whereas current or short-term development is characterised by the construction of greenhouses, the renovation or modernization of former plants, the development of plastic tunnel cultivation technologies and the modernization of other elements of infrastructure (buffer tanks, degassers, heat exchangers, wires, etc.).

Nowadays the continuous monitoring of technological development is an indispensable condition for efficient, effective management. Sales prices have been almost unchanged for many years, but the costs (raw material prices, costs of technology and employment) are growing steadily and dynamically, therefore efficient production can only be achieved by increasing revenues. The development of production technologies presents constant pressure to invest for producers, in which capital strength, creditworthiness and available tender systems play a key role. It is therefore no coincidence that only one thermal well in the area - the one with the lowest depth – is being run by a family farm.

Greenhouses with state-of-the-art technology are also solely in the hands of big capital joint companies, thus family farms, or small farms employing only a few people, are typically taking part in plastic tunnel farming using secondary water, and / or in unheated plastic tunnel farming. However, the need to increase yields in this horticultural segment also requires the development of technology, which is an almost impossible task without participating in tenders. However, participation in tenders requires long-term commitment, a business plan, sales of sufficient volume and an own contribution. These constraints explain the visible decline in the number of independent small farms, and the rapid growth of the average income and the size of the cultivated area per small farm, i.e. the accumulation and professionalization of production.

Parallel with this, the number of people engaged in ancillary activities, the number of pensioners, the frequency of involving family members as “licensed small-scale producers” for tax optimisation is decreasing, which appears formally in the continuous increase in the number of exits. In addition to organizational changes, it is an important consequence of technological development that technological discipline has come to the fore. In the case of the plastic tunnel gardeners of the Szentlászló unit who use secondary water, this is a problem because of the fluctuating quantity and temperature of the thermal water supplied by Árpád Ltd. They are trying to

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resolve this by the introduction of automatic ventilation, which requires extra investment (Interview_P17, P18).

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8.6 The influence of climate change and invasive species on vegetable production

The state of climate change in Hungary

From the beginning of the '80s an intense warming started globally, which is observable in Hungary as well. It affected the Hungarian summer most seriously. In the past 36 years the average temperature of the Hungarian summer rose nearly with 2 Celsius (Lakatos et al. 2018)

Greenhouse shading becomes important with increasing drought periods in the summer. Greenhouses can overheat in sunny weather. Plants can be protected from excess heat by shading and ventilation. Climate change already impact vegetable producers directly:

> "*Earlier, about 5-8 years ago, it was enough to shade greenhouses only once in the summer. As of today, we got to the point, when we need to shade greenhouses already in April (…) and there are Septembers that are so hot, that we need to shade greenhouses over again.*" (Group interview_P7)

Special shading paints mean extra costs for the producers. Due to climate change shading costs increased (by 300%, Group interview_P7), but irrigation, fertigation and fertilizing costs rose as well, especially in soilless cultures, which is 90% of the greenhouses within the Szentes PO. Greenhouses provide an ideal moist, temperate environment for the spread of powdery mildew, a fungal disease[13].

The protection costs of powdery mildew rose with increasing heat-waves. The continuous spread of **invasive species** (such as thrips or brown marmorated stink bug) increase the challenges vegetable producers face. Various greenhouse **thrips** have been observed in Hungary in the last century (see Ripka 2010). Since most of these species originate from tropical areas, they are not able to overwinter outdoors in Hungary (Orosz et al. 2017, 141). On the other hand, due to climate change winter is getting milder year after year, which is favourable for pests. It brings more risk, that the soil cannot get frozen in the heated greenhouses, the pests can easily overwinter (Group interview_P7).

> *"(…) they [thrips] flee to our greenhouses [the interview was conducted in January]. [From the] honeydew melon producers [that] are in our [greenhouses'] neighbourhood. Thrips is on melon as well. This is a new phenomenon. The pests put a terribly high pressure on us."* (Group interview_P7).

The brown marmorated stink bug (Halyomorpha halys) and **the southern green stink bug** (Nezara viridula) are another invasive species that put high pressure on vegetable producers in Hungary. The southern green stink bug (Nezara viridula) originated in Eastern Africa spread all over the world in the last 250 years (Rédei and Torma 2003, 365). It was first found in Hungary in 2002 (ibid.) and got widely spread in the country soon after that. Beyond some field crops, fruit trees and ornamental plants the southern green stink bug is an economically important pest of many vegetables (e.g. bean, green bean, cabbage, eggplant, tomato, potato, cucumber, water-melon) (ibid. 367).

> *"If we spray against southern green stink bug our biological control gets destroyed. So my son picks those peppers that were stung by the stink bugs by hand as 100 small larvae hatches from one little stung spot. Stink bug is the most serious and most unblockable trouble of our time."* (Group interview_P7)

[13] https://en.wikipedia.org/wiki/Powdery_mildew

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The brown marmorated stink bug is native to East Asia and has recently become an invasive pest in Hungary and in other countries of Europe. It is considered a nuisance pest as well as a significant economic pest causing damage to a wide range of crops. Following its first record in Budapest, Hungary, in 2013, repeated reports confirmed its establishment in the country. In late summer 2016, growers began to complain about stink bug damage to dry bean and forced green hot pepper (Vétek and Korányi 2017, 131). So it is expected that the stink bug pressure will continue to grow on vegetable producers in the near future.

Biological plant protection (biological control or biocontrol) was introduced to the Szentes PO in 2003 as an important component of their quality policy and integrated pest management (IPM) program (Ledó and Nagypéter 2018, 10). Biological control is a method of controlling pests such as insects, mites, weeds and plant diseases using other organisms (Flint et al. 1998). It relies on natural mechanisms, like predation or parasitism, but typically also involves an active human management role[14]. 26% of the territories were involved in biological plant protection in 2003, this ratio reached 90% by 2017 (Ledó and Nagypéter 2018, 10-11). Since 2008 those producers who apply biological plant protection can get access to a quality premium. Some of our interview partners were among those who started biological plant protection in 2008. The representatives of one of the family enterprises share their concerns regarding increasing plant protection costs, due to the increasing pressure coming from invasive species.

> *"We needed to "implement" [natural predators] only once a year, before the blossoming of our pepper. Prior to that we controlled thrips with chemicals. (…) [Now] We need to take care of them [the natural predators] very carefully. E.g. we need to be really precise with humidification as it washes them [the predators] away".* (Group interview_P7)

To sum it up both the climate change and the spread of invasive species influenced negatively the life of vegetable producers. This negative effect can also be seen in their plant protection costs that are constantly increasing. Biological control is one of the pest control mechanisms that put financial burden on the producers. However biological control is used to reduce reliance on chemicals it shall be further studied exactly what risks may biological control (such as alien predators) mean to the natural habitat of the Szentes area. On the other hand, from an ecological economics perspective (e.g. the materiality of scale, see North 2010) it could be also argued that the vegetable production system the Szentes PO and their producers are part of is resource intensive, thus it further amplifies mechanisms resulting in climate change (e.g. increased oil consumption and CO2 emission through transport during the lifecycle of the product).

[14] https://en.wikipedia.org/wiki/Biological_pest_control#cite_note-1

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