

**THESES OF DOCTORAL (PHD) DISSERTATION**

**JÓZSEF LIPCSEI**

**GÖDÖLLŐ**

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**HUNGARIAN UNIVERSITY OF AGRICULTURE AND LIFE  
SCIENCES**

**DOCTORAL SCHOOL OF ECONOMICS AND REGIONAL  
SCIENCES**

**EXAMINATION OF THE NATIONAL TERRITORIAL  
DISTRIBUTION OF LAND-BASED SUBSIDIES, AND IMPACT ON  
THE RURAL ECONOMY - FOCUS ON THE MEZŐCSÁT DISTRICT**

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## **The doctoral school**

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## **1. BACKGROUND AND OBJECTIVES OF THE WORK**

The primary motivation behind the completion of my thesis was my experience as an agricultural extension intern, land trader/utilizer, former inspector at the Agricultural and Rural Development Office, active consultant, and as a leader of a family farm, where I observed significant disparities and irreversible concentration of subsidies in my environment.

The realization of broader rural development objectives could be achieved through the rational use of resources. In my opinion, if subsidies are not directed towards improving the ability of rural areas to retain their population, thereby ensuring rural livelihoods, the already disadvantaged regions will continue to suffer from adverse processes. Based on my experiences, in underdeveloped areas, through land concentration, large farms and estates concentrated in the hands of a single family have emerged, pushing out smallholders. With the narrowing of livelihoods, the workforce migrates from these settlements, services disappear, and disadvantaged areas further degrade. Recognizing the problem, the State limited the size of land use to 1200 hectares for animal keepers and seed producers, and to 1800 hectares, as mentioned by Szabó (2017). Before the law took effect, new economic associations were formed for the purpose of land fragmentation, against which the law could do nothing (see Szerletics, 2018 or Bureau–Mahé, 2015). For the current programming period, the European Union would have capped direct subsidies at 100,000 euros (Heinemann et al., 2018), which could have been a significant advantage for small and medium-sized farms. Unfortunately, such a restriction on subsidies was not implemented.

Based on the above, my research intends to present, from a practical perspective, the possibilities of drawing funds for the CAP 2014-2020 and the subsequent transitional years, with special attention to the utilizations preferred by what will later be interpreted as "passive" farming (requiring little input and offering a high volume of support), such as oilseed radish, asparagus squash, pumpkin, traditional orchards. In my study, I exclusively analyze the data from 2016-2021, and it's important to emphasize that I do not examine the CAP period of 2023-2027, the changes in regulations related to land-based subsidies, or their effects within the confines of this dissertation – except for a brief overview in the literature section. The relevance and significance of the topic stem from the fact that the legal frameworks of land-based subsidies (Agri-environmental management, Organic farming, Greening, Area-based subsidies, Production-linked subsidies) allow for multiple interpretations of the regulations, thereby questioning the objective of the support. Some subsidies apply irrespective of production, which in most cases strengthens a farming practice that omits production, aiming solely at acquiring subsidies,

thus diverting resources from farmers who engage in actual production. This farming direction is indifferent to regional economy but plays a significant role in maintaining the cultural landscape (Maącz, 2001), which is also a key objective of rural development policy. Lastly, regarding EU funds, the national rural development strategy emphasizes that rural and agricultural policy interventions, especially those involving subsidy policy tools and the use of public funds, must represent and generate community interest and benefits. In this process, the competitiveness of individual enterprises as well as the competitiveness of the local community and region must be considered (see NVS, 2012).

### **1.1. Problem statement**

During my research, my aim is to highlight the current shortcomings of the subsidy system, as well as the imbalances against small and medium-sized farms. I have set out to investigate the causes of the practical problems encountered and to draw attention to the diversity of agricultural databases and the continuously shrinking rural economic opportunities. Starting from the general issues related to EU land-based subsidies and the hypotheses formulated based on my practical experiences - which will be detailed below - the main goal of the dissertation is to demonstrate the peculiarities of the distribution of subsidy resources by area/economic size/applicants, exploring their possible correlation with regional inequalities, and then to formulate suggestions for solutions towards a fairer resource allocation.

### **1.2. Hypotheses**

**H1:** My assumption is that the concentration of land ownership and land use is continuously increasing for farm sizes over 100 hectares, in a way that the number of farms sized between 0-20 ha and 20-100 ha decreases, while the number of farms sized between 100-300 ha and over 300 ha increases, leading to the emergence of dominant farms in some localities. Thus, overall, the current form of agricultural regulation tends to favor large farms, sidelining the success of smaller farm sizes, with a more concentrated presence in certain districts.

**H2:** It closely relates to the previous hypothesis, but due to its significance, I separately address the starting position that non-individual applicants receive a larger proportion of EU land-based subsidies than local individual residents, concealing land concentration and causing further distributional inequality. While the legal form of farming may be influenced by tax optimization, I assume that non-individual applicants are overrepresented among farms exceeding 100 hectares, thereby receiving larger and more varied amounts of support compared to local individual residents farming smaller areas.

**H3:** My assumption is that it can be demonstrated that the value/quality of arable land, as a primary production factor, is not proportional to the total sum of available subsidies (fertile areas receive the same subsidies as less favorable ones, and the regulation does not aid in compensating for disadvantageous production conditions to create a level playing field).

**H4:** My assumption is that it can be shown that non-productive economic forms have spread more significantly on areas with unfavorable conditions/poorer agricultural quality, characterized by the pursuit of as large a subsidy amount as possible, known as *subsidy maximization*<sup>1</sup>. Beyond a certain land size, the primary goal of reduced-input, passive farming is to draw down resources for simple profit-making purposes. I also assume that certain legal titles may be particularly suitable for linking subsidies, *maximizing subsidy* gains.

**H5:** I assume that, at the district level, the examined subsidies contribute to shaping domestic territorial differences, and the unequal distribution of these subsidies is significantly correlated with other factors influencing territorial disparities.

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<sup>1</sup> In the case of non-labor-intensive agricultural activities, subsidy maximization is common. By this, I mean that the primary endeavor of agricultural enterprises is to acquire as much land-based subsidy as possible. In this scenario, the main emphasis is not directly on agricultural production but rather on acquiring and optimizing subsidies. For some subsidies, there is no obligation to produce; it is often sufficient to sow metal-tagged seeds and maintain the crop until flowering to meet the eligibility criteria for support. These conditions allow for the acquisition of maximum subsidies with minimal input.

## 2. MATERIAL AND METHOD

The doctoral dissertation is structured upon four research phases, and it is my hope that it will yield a new, unique professional outcome. Along these lines, I have employed the following methodological steps:

### 2.1. Foundational Primary Research

In my primary research, built with the assistance of professional consultations, I sought answers to questions regarding what kind of land-based subsidies the respondents had applied for, whether they considered production or subsidy as primary, what maximum area/subsidy cap they would determine for farmers in terms of subsidy payments for an applicant, and what farm size should be supported more.

Additionally, it was explored whether there should be regulations preventing the lands belonging to a settlement from becoming predominantly owned by one family/interest group, and whether the *maximum subsidies* should be determined by aggregating all lands (both personal and corporate) associated with an *individual*. Furthermore, respondents articulated their views on what labor market problems limit employment, whether there are alternative ways to alleviate labor shortages (robotization, public employment, involvement of disadvantaged and Roma workforce), what they consider to be the most important goal of land-based subsidies, and what changes they would make to the supports within the Rural Development Program.

The primary data collection was conducted in the spring of 2020 through a standardized questionnaire in electronic form, by contacting registered agricultural consultants of the National Chamber of Agriculture (600 individuals). As a practicing consultant, I directly approached my colleagues. A random sample within the target group provided responses from all counties of Hungary (205 responses).

In the questionnaire, I used open and closed questions, Likert and ratio scales, as well as knowledge-based questions. Among the results, notable from the perspective of my research are suggestions related to reducing subsidies based on farm size; improving the competitiveness of small and medium-sized farms; proposals for more equitable resource distribution; and emphasizing the challenges of rural areas from the respondents' viewpoint.

### 2.2. Examination of the Use of Land-Based Subsidies by Legal Titles

In the following section, I analyzed the distribution of all land-based measures of the 2014-2020 CAP according to the Disclosure Lists, examining their

distribution a) by area and b) by applicants for arable land<sup>2</sup> and orchards (Area-based support; Greening payment application; Support for industrial oilseed cultivation; Support for industrial vegetable cultivation; Support for fiber protein crop cultivation; Support for grain legume cultivation; VP-M10.1.1-Agricultural environmental management; VP-M11.1.1-Ecological transition; VP-M11.2.1-Ecological maintenance; Support for vegetable cultivation; Support for extensive fruit cultivation; Support for intensive fruit cultivation) based on measure categories<sup>3</sup>.

Beyond detailing the legal titles, I also present alternative interpretations of the regulations through my experience as an inspector/consultant/farmer for the purpose of understanding *subsidy maximization*. The available databases enable the demonstration of subsidy usage by *local individuals* and *non-individuals*, as well as the geographical location of applicants. Moreover, it allows for the calculation of resource usage by *non-local* and *local-based applicants*.

Along the lines of farm size categories (0-20, 20-100, 100-300, >300 hectares), as informed by EU practices and literature, I illustrated changes based on a base ratio, and contrasted the resource usage between applicants - *individuals* and *non-individuals*.

I also examined the suitability of the legal titles for *subsidy maximization* and their correlation/connection to other supports. Using the SPSS program, the number of applicants, their identities, the total amount of resources, and geographical location can be determined from the Disclosure lists. Map representations aided in interpreting the results of territorial inequality studies. With the help of territorial and distribution ratios, I analyzed the data of geographically well-defined areas - districts and municipalities.

Through the comparison of temporal and spatial ratios, it became possible to study the usage and concentration of land-based subsidies, given the significant role of territorial equalization in the European Union's subsidy system. I sought novel correlations by examining territorial inequality dimensions (location, quantity, quality, role, structure, relationship, and the correlations of their positive and negative processes).

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<sup>2</sup> The maximization of subsidies is only relevant for arable land use; I did not examine other cultivation branches.

<sup>3</sup> I did not delve into the analysis of sugar beet and rice cultivation support due to the low number of applications.



### 2.3. Examination of Inequalities in the Utilization of Land-Based Subsidies

In the subsequent analyses, to examine territorial inequalities, I utilized the *Hoover index*, *Gini coefficient*, *Dual index*, *Herfindahl-Hirschman index*, *Pearson correlation*, *Factor analysis*, *Cluster analysis*, *Discriminant analysis*, *Descriptive statistics*, *Time series analysis*, *Cross-tabulation analysis*, *Two-sample t-test*, and *Analysis of variance*. Overall, the methods used to validate each hypothesis are illustrated in Table 1.

**Table 1: Planned Secondary Methodological Tools for Hypothesis Testing**

Hypothesis/ Investigation	H1	H2	H3	H4	H5
Hoover Index	X	X			
Gini Coefficient	X	X			
Dual Index	X	X			
Herfindahl-Hirschman Index	X	X			
Univariate Statistical Methods	Descriptive Statistics	Descriptive Statistics	Descriptive Statistics	Descriptive Statistics	Descriptive Statistics
Bivariate Statistical Methods	Time Series Analysis Pearson Correlation	Cross Tabulation Analysis Pearson Correlation	Two-Sample t-Test Analysis of Variance	Two-Sample t-Test Analysis of Variance	Two-Sample t-Test Pearson Correlation
Multivariate Statistical Methods		Cluster Analysis	Cluster Analysis	Cluster Analysis	Factor Analysis

Source: own creation (2024)

### 2.4. Járási primer kutatás

The goal of my regional-level primary research, using SWOT analysis and a qualitative approach, is to validate (or refute) my relevant hypotheses and support the analyses conducted in a specific region, the Mezőcsát District. When filtering the Hungarian State Treasury's (MÁK) Disclosure lists for the Mezőcsát District, significant differences are observed in the use of rural development (VP) resources between *individuals* and *non-individuals*.

Among the local residents, there are 96 *individuals* and 36 *non-individuals* based in the locality who have applied for support. During the 2014-2021 period, the local individuals used a total of 207 million HUF of VP resources, while the local *non-individuals* utilized significantly more, a total of 1,2 billion HUF in support. Additionally, there are 6 businesses that can be linked to *individual* local persons, and these *individuals* apply for additional support. Furthermore, in the case of 42 *individuals*, some family connection can be identified with another person, which further strengthens the concentration of subsidies in the district. The planned interviewees for the primary research, who are most familiar with the local conditions, were the following *individuals*:

Clerks:

- Gelej, Igrici, Tiszadorogma, Tiszatarján - Éva Burainé Hajdu;
- Mezőcsát, Ároktő, Hejőpapi - Zsuzsanna Kovács (was unable to provide substantial answers);
- Tiszakeszi - Tímea Kruj;

and Mayors:

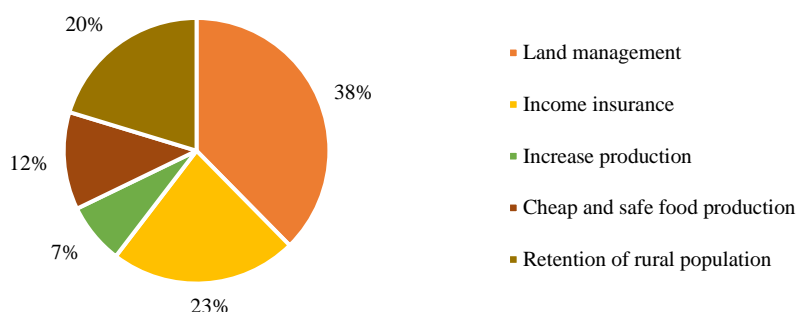
- Ároktő - Judit Szabóné Csizmadia;
- Gelej - Erzsébet Demeterné Nyeste (did not participate);
- Hejőpapi - Tibor Miskolci;
- Igrici - Sándor Tóth (works as a small farmer in a second job);
- Mezőcsát - Anita Siposné Horváth (was unable to provide substantial answers);
- Tiszadorogma - Zoltán Tóth;
- Tiszakeszi - Imre Sipos;
- Tiszatarján - Mrs. Lajos Bögre (due to chronic illness, I was unable to conduct an interview).

The collection of local information necessary for examining territorial inequalities, *subsidy maximization* and land concentration, as well as the relationship among applicants, was possible through consultations with the aforementioned individuals. An important aspect during personal consultations was to provide clear feedback to the respondent on the public utility and public interest outcome of the research. The relevance of the interview was ensured by my personal experience and local knowledge.

### 3. RESEARCH RESULTS AND DISCUSSION

#### 3.1. The results of the foundational primary research

I solicited the respondents' opinions on the primary objective of land-based subsidies (Figure 1). The question contained statements aligned with the goals of rural development. Out of 203 respondents, 38% indicated landscape maintenance, 23% income security, 20% the retention of rural populations, 12% the production of cheap and safe food, while only 7% identified increasing production as the primary goal.



**Figure 1: Distribution of the main objectives of land-based subsidies according to respondents' opinions (%)**

*Source: Based on our own survey, own creation (2024)*

For the CAP 2021-2027, the research focused on whether, according to farmers, the *maximum subsidies* (300 ha for individuals, 1200 ha for corporate enterprises, 1800 ha for seed producers and livestock farm operators) should be determined by aggregating all lands associated with an individual, both personal and corporate (Table 2).

**Table 2: Correlation table of the maximum support area and maximum support amount according to the respondents' opinions (%)**

	In your opinion, should the maximum amount of subsidies (300 ha for individuals, 1200 ha for corporate enterprises, 1800 ha for seed producers and livestock farm operators, based on land use) be determined by consolidating all the land owned by one person, both private and corporate?			
	Yes	No	DK/NA	Total
Do you agree with reducing payments for direct subsidies above 60,000 euros (approximately 20 million HUF) and with capping the upper limit at 100,000 euros (approximately 33.4 million HUF)?	66,8%	2,5%	2,0%	71,3%
	11,4%	5,4%	2,5%	19,3%
	5,9%	0,5%	3,0%	9,4%
<b>Total</b>	<b>84,2%</b>	<b>8,4%</b>	<b>7,4%</b>	<b>100,0%</b>

*Source: Based on our own survey, own creation (2024)*

84.4% of the respondents would support the idea that an individual should not receive multiple benefits from the common budget through corporations and other entities.

Subsequently, I sought to understand how applicants of various farm sizes relate to the maximization of Direct Payments. According to the results (Table 3), the largest farms were the most opposed, as well as farmers with 100-300 hectares. Respondents with less than 100 hectares agreed with reducing the resources, with the majority indicating a „yes” response.

**Table 3: Correlation table of possible farm size and maximum support amount according to respondents’ opinions (%)**

		Do you agree with reducing payments for direct subsidies above 60,000 euros (approximately 20 million HUF) and with capping the upper limit at 100,000 euros (approximately 33.4 million HUF)?			
		Yes	No	DK/NA	Total
What is the size of your farm (in hectares)?	small (under 20 ha)	63,2%	21,1%	15,8%	<b>100,0%</b>
	medium (20-100 ha)	86,7%	6,7%	6,7%	<b>100,0%</b>
	large (100-300 ha)	50,0%	38,5%	11,5%	<b>100,0%</b>
	giant (over 300 ha)	13,3%	86,7%	0,0%	<b>100,0%</b>
	<b>Total</b>	<b>71,9%</b>	<b>19,6%</b>	<b>8,5%</b>	<b>100,0%</b>

*Source: Based on our own survey, own creation (2024)*

The majority of small farm owners (under 20 hectares) (63.2%) support this measure, while the overwhelming majority of large farm owners (over 300 hectares) (86.7%) are opposed.

Among medium (20-100 hectares) and large (100-300 hectares) farms, the proportion of supporters was 86.7% and 50%, respectively. This indicates that the larger the farm, the less likely the owners are to support the reduction of subsidies. Overall, 71.9% of respondents support the proposed changes, while 19.6% oppose them.

Subsequently, I sought to determine what maximum area the farmers would set for their own farms to receive subsidies (Table 4). The majority of respondents by farm size would cap the area at 300 hectares. Among all responses, 1% would limit the farm size to under 20 hectares, 37.8% to 20-100 hectares, 28.1% to 100-300 hectares, and 33.2% would set the cap above 300 hectares.

**Table 4: Correlation table of possible farm size and maximum area according to respondents’ opinions (%)**

		What maximum area would you set for the payment of subsidies for an applicant (in hectares)?				
		small (under 20 ha)	medium (20-100 ha)	large (100-300 ha)	giant (over 300 ha)	<b>Total</b>
What is the size of your farm (in hectares)?	small (under 20 ha)	2,8%	30,6%	27,8%	38,9%	<b>100,0%</b>
	medium (20-100 ha)	0,0%	52,9%	30,3%	16,8%	<b>100,0%</b>
	large (100-300 ha)	0,0%	0,0%	34,6%	65,4%	<b>100,0%</b>
	giant (over 300 ha)	6,7%	0,0%	0,0%	93,3%	<b>100,0%</b>
	<b>Total</b>	<b>1,0%</b>	<b>37,8%</b>	<b>28,1%</b>	<b>33,2%</b>	<b>100,0%</b>

*Source: Based on our own survey, own creation (2024)*

I also sought to find out whether farmers would like the land-based subsidies to be paid out at a predetermined time each year. Out of 203 respondents, 199 agreed with the predictability of the payments. The research indicates a significant demand for change according to the responding farmers. A one-time and definitive restriction on farm size would solve the outlined requirements. 84% of respondents would limit farm sizes to 100 hectares and 71% would also determine the subsidies available for application with degressivity. Among the Rural Development (VP) programs, respondents would mostly reduce resources not directly serving production. The freed resources would be used by the respondents to increase support for small and medium-sized farms. The greatest consensus among respondents appeared in determining predictable payment dates for subsidies, with 98% answering „yes.” The results of the study clearly indicate significant public expectation for the revision of the CAP 2021-2027 cycle, with the introduction of area maximization and *subsidy maximization*.

### **3.2. Examination of the Use of Land-Based Subsidies by Legal Basis**

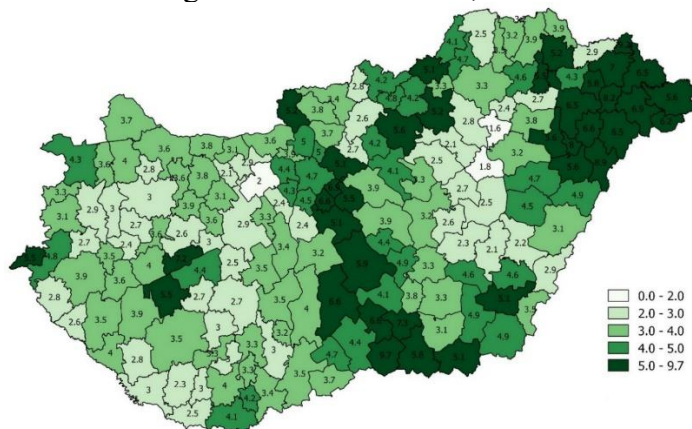
During my investigation, I have uncovered unique and novel information that has not been published before, based on the disclosure lists. The study conducted based on local residents and applicants offers a new approach to the inequalities and importance of land-based subsidies. I analyzed the land-based subsidy titles according to land ownership categories and types of applicants over a six-year average. I created district-level reports for each title, which included land use data and average subsidy amounts. Territorial inequalities were identified using inequality indicators. I modeled the pattern of subsidy payments using trend analysis and used cross-tabulation analysis to examine the differences between private individuals and non-private entities according to ownership category. Due to the scope limitations related to the theses, it is not possible to provide a comprehensive description of all

the titles used in my research. I highlighted the two most relevant forms of support, the *Area-based support* and the *Agri-environmental management support*, which best characterize the topics covered in my research theme.

### 3.2.1. Area-based Subsidy (Single Area Payment Scheme - SAPS)

According to the data from the Hungarian State Treasury (MÁK), there is a noticeable phenomenon of approximately a 10% decrease in applicants with less than 100 hectares. This year-over-year observable phenomenon has a positive effect on land concentration. The largest decrease occurred among applicants with 0-20 hectares of land size, where the number of applications decreased from 141,904 in 2014 to 131,122 in 2020. The most significant increase, 17.6%, was in the over 300 hectares ownership category. Based on my experience as an on-site inspector, consultant, and farmer, the concentration of land ownership is further exacerbated by overlaps between *individual* and *non-individual* applicants, and by connections according to interest groups.

Based on the TERA legal title sums for local subsidy applicants (Figure 2), calculated using the current HUF-EUR exchange rate and land registry data, the density of farmers in a given area can be determined. This novel data provides a new perspective on the territorial inequalities of districts. According to the indicator determined from TERA data, the Mezőcsát, Tiszafüred, and Bicske districts have the lowest density of local subsidy applicants (persons/ha). The definition of this indicator also allows for the determination of the average farm size. In the Mezőcsát district, the average farm size is 62.5 ha, in the Tiszafüred district 55.5 ha, and in the Bicske district 50 ha. The smallest average farm size is 10.3 ha, in the Mórahalom district.

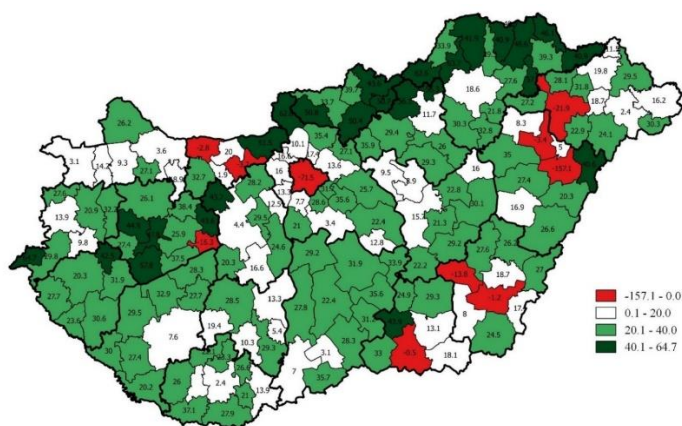


**Figure 2: Number of local individual residents per district applying for land-based subsidies for every 100 hectares of eligible area (persons/100ha)**

*Source: Based on data from MÁK, own creation (2024)*

The categorization of the indicator, showing the number of local individual residents per district applying for land-based subsidies for every 100 hectares of eligible area, indicates land use concentration among local farmers, with the smallholding category (0-20 ha) representing data values above 5. For the purposes of the study, the three districts falling into the 0-2 category and the 44 districts falling into the 2-3 value category are of significant importance. In these districts, there are fewer local farmers than average, resulting in resources not being utilized locally.

A detailed examination of non-local subsidy applicants (Figure 3) provides further novel and informative insights, highlighting the non-local utilization of land-based subsidies.



**Figure 3: Land use by non-local subsidy applicants (percentage of eligible area)**

*Source: Based on data from MÁK, own creation (2024)*

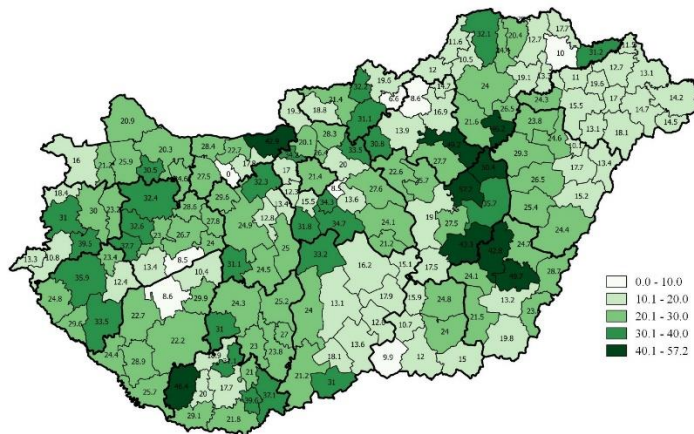
The data reveal that subsidies often concentrate in larger cities, which can be explained by several factors, such as commuting for cultivation, land use for investment purposes, and agricultural contracting/sharecropping.

### 3.2.2. Agricultural Environmental Management Support (AKG)

Subsidies related to the *Agri-environmental Management Scheme* application are an important component of my research objective from the perspective of *subsidy maximization*, which, in most cases, can be linked with *Natura 2000* support for grassland areas and with any *Production-Linked Support* for arable land. Based on my practical experience, the *Grass Protein Crop Production Support* is often combined with the AKG legal title. I examined the

applications from 2015 and 2016 collectively<sup>4</sup>. Based on averaged data, under the *AKG* legal title, 11,225 *individuals* and 1,211 *non-individual* applicants participated. The individuals eligible for support could receive subsidies amounting to 25,1 billion HUF.

In contrast, the *non-individual* applicants, who constituted a tenth of the individuals, were eligible for nearly half that amount, precisely 10,7 billion HUF in subsidies. Although the Hungarian State Treasury (MÁK) again refused to release public interest data to me, the district-level map (Figure 4) created based on the disclosure list vividly reflects the subsidy concentration problems formulated by my hypotheses and experienced in practice, a data filtering that cannot be fully performed from the available databases.



**Figure 4: Average land use at the district level by private individuals applying for Agricultural Environmental Management Support in Hungary, 2016-2021 (ha/individual)**

*Source: Based on data from MÁK, own creation (2024)*

Based on the data, it can be determined that the legal title is relevant from the perspectives of *subsidy maximization* and subsidy concentration, and in several districts, there is an overlap with the map of local individuals per 100 hectares (Figure 2), which shows the resource diversion by large farms.

The larger farm size is prominent in the Mezőcsát, Füzesabony, Tiszafüred, Kunhegyes, Mezőtúr, Gyomaendrőd, Békés, Esztergom, and Szigetvár districts. In these districts, the land size of individuals is significant above average and is directly proportional to the linkage of subsidies, with *subsidy*

<sup>4</sup> In the Disclosure lists, the two legal titles are not separated; the subsidy amounts are listed in aggregate. The Hungarian State Treasury (MÁK) has repeatedly refused requests for public interest data concerning these legal titles.





Legal titles relevant to *subsidy maximization* and passive farming include *Grass Protein Crop, AKG, Organic, and Vegetable Crop cultivation supports*. For each legal title, the dominance of farms over 100 hectares and the proportionally larger resource utilization were detectable. Only in the case of *Intensive Fruit Cultivation support* was there no *non-individual* applicant over 300 hectares. Based on territorial inequality indicators, it can generally be said that significant inequalities were demonstrated for farms over 100 hectares, indicating a concentration of resource utilization.

### *Examination of Spatial Inequality Indicators*

For the calculation of territorial inequalities (Table 5), I chose the Dual Index, the Unweighted Gini Coefficient, the Hoover Index, and the Herfindahl-Hirschman Index. Each indicator is suitable for analyzing inequalities both in terms of monetary amounts and the number of applicants.

**Table 5: Spatial Inequality Indicators (AKG)**

Agricultural Environmental Management Support 2016-2021 average data			Hoover index (%)	Herfindahl-Hirschman-index*	Unweighted Gini Coefficient (%)	Dual-index**
Private individual	0-20 ha	Σ f <sub>ö</sub>	3,94	305,68	63	7,97
		Σ Ft		294,00	63	7,79
	20-100 ha	Σ f <sub>ö</sub>	4,27	149,29	53	5,33
		Σ Ft		141,74	53	5,38
	100-300 ha	Σ f <sub>ö</sub>	3,22	170,08	61	7,61
		Σ Ft		173,65	62	7,81
	300< ha	Σ f <sub>ö</sub>	6,81	651,58	90	-
		Σ Ft		709,70	91	-
	<b>Total</b>	Σ f <sub>ö</sub>	<b>17,18</b>	<b>247,36</b>	<b>59</b>	<b>6,67</b>
		Σ Ft		<b>163,79</b>	<b>55</b>	<b>5,81</b>
Non-private individual	0-20 ha	Σ f <sub>ö</sub>	8,35	139,17	56	5,93
		Σ Ft		140,34	57	6,11
	20-100 ha	Σ f <sub>ö</sub>	5,62	122,01	52	4,94
		Σ Ft		123,23	53	5,07
	100-300 ha	Σ f <sub>ö</sub>	4,78	137,87	58	6,35
		Σ Ft		135,61	58	6,47
	300< ha	Σ f <sub>ö</sub>	14,62	184,24	69	17,64
		Σ Ft		228,66	74	16,40
	<b>Total</b>	Σ f <sub>ö</sub>	<b>19,46</b>	<b>114,95</b>	<b>49</b>	<b>4,68</b>
		Σ Ft		<b>117,48</b>	<b>53</b>	<b>5,42</b>

Note:

\* With equal distribution of sources, the HHI value is 56.82.

\*\* In case of missing data, values below average are considered as zero, thus cannot be calculated.

Source: Based on data from MAK, own creation (2024)

I examined the four farm categories both collectively and separately to more clearly demonstrate the distribution of resources in the subsidy system. The data for the analysis were provided by the number of district subsidy

applicants and the total resources they utilized. In the further parts of the research, I use these territorial inequality indicators for each legal title.

For individuals and *non-individuals*, based on the Hoover Index, I determined what percentage of AKG subsidies would need to be redistributed among the land units for an even territorial distribution. *Non-individuals* resulted in greater territorial inequalities in every farm category compared to individuals. When examining the combined farm sizes, 17.18% would need to be redistributed among the territorial units for individuals. For *non-individuals*, 19.46% of the subsidies would need to be redistributed among the territorial units. In both types of applicants, applications over 300 hectares result in the greatest inequality.

Within the framework of the Herfindahl-Hirschman Index (HHI) analysis, I quantified economic concentration. A specific minimized value, 56.82, was determined, indicating that in the case of equal resource distribution among districts, the HHI value would decrease to 56.82. The analysis also made it clear that inequality significantly increases parallel to the increase in farm size. The highest HHI value was found in farm sizes over 300 hectares, especially in the category of individuals, which shows the greatest territorial inequality.

The study conducted by aggregating farm size categories showed less pronounced concentration, but even in this context, a higher level of inequality was observable among individuals. The HHI, as an indicator of concentration and diversity, is of key importance in understanding and interpreting the distribution of financial resources among districts<sup>5</sup> and can potentially help identify areas where policy intervention and refinement of support policy regulations may be necessary to mitigate future inequalities.

Using the Unweighted Gini Coefficient, I calculated perfect equality (0%) and maximum concentration (100%). By separately analyzing the average number of applicants and the total amount of subsidies paid to them, I identified the Unweighted Gini Coefficient for *individuals* and *non-individuals*. The results generally approach 50% - indicating significant territorial inequality - for every type of applicant and farm size. Notably high values, around 90%, are characteristic of individuals with farm sizes over 300 hectares. Such a high Gini Coefficient, especially for farms over 300 hectares, indicates significant concentration and inequality in the distribution of subsidy amounts.

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<sup>5</sup> The support system is nationally uniform and independent of territorial conditions; areas with unfavorable conditions receive support to the same extent as those with favorable conditions.

I conducted a thorough analysis using the Dual Index, during which I determined how many times the average of the above-average values is of the below-average ones. The focus of the analysis was on data that allowed for the quantification and comparison of the relationship between the number of subsidies and the number of applicants. The data mostly showed a similar pattern, with one exception: the *non-individuals*” category for holdings over 300 hectares. In this category, the Dual Index rose to 17.64 for the number of applicants and 16.4 from the perspective of subsidy amounts.

These values highlight the degree of inequality between above-average and below-average values in this specific ownership category. It’s important to mention that a wide application of the legal title was observed, attributable to a strategy of *maximizing subsidies*. This strategy aims at achieving the highest possible subsidy amounts, optimizing the available resources for maximum utilization of subsidies.

The detailed analysis of the data shows that farm size results in significant differences in subsidy applications between *individuals* and *non-individuals*. The data indicate that smaller farms, primarily operated by individuals, are overrepresented in subsidy applications. This means that individuals working on smaller-sized farms apply for and receive subsidies in a larger proportion. Conversely, larger farms, mostly operated by *non-individuals* or larger companies, dominate subsidy applications among *non-individuals*. These differences arise due to the economic and legal environment, as well as the characteristics and conditions of the support programs.

Smaller farms operated by *individuals* often need more support for sustainable operation, while larger farms managed by *non-individuals* can apply for larger amounts of support based on their capabilities. These data highlight the role of farm size in subsidy applications and distribution and draw attention to the inequality in access to support among different economic actors.

### **3.3. Exploring support maximization and passive management**

The income from poor-quality and low-fertility soils can be corrected through the stacking of subsidies for the purpose of *maximizing support*. Utilizing the five-year period of Organic Farming and Agri-environmental Management, along with drawing on Production-Linked supports, can significantly increase farmers’ income.

Traditional orchards provide the highest potential (calculated for 2021) for passive farming, with Organic Farming at 457,000 HUF/ha. Among subsidy titles - excluding Area-based support and Greening - Traditional orchards with Organic Farming generate 323,000 HUF/ha, Organic Vegetable support

provides 298,000 HUF/ha income per hectare without any market and production risk. The income from Production-Linked Vegetable support, at 68,000 HUF/ha, is also noteworthy, representing about a 50% revenue compared to oat income.

Beyond these, the positive and negative effects of passive farming associated with *subsidy maximization* should also be mentioned. Benefits include low environmental impact, maintenance of cultural conditions, low input requirements, farming independent of weather anomalies, supply exposure in convergence regions, predictability, and security of existence. The disadvantages, as modifications of market effects, include reduced demand-supply, decreased employment, and diversion of resources from active producers.

### 3.3.1. Connecting different legal subsidies

A correlation between the increase in land size and the demand for subsidy entitlements exists (Table 6). In farms larger than 300 hectares, values of 4.58 and 4.37 indicate the extent of subsidy concentration, showing that subsidies tend to concentrate in larger farms.

**Table 6: Linking land-based subsidies by landholding categories and applicant types (number, individuals)**

	Number of legal titles claimed by private individuals	Number of legal titles claimed by non-private individuals	Total number of claimed legal titles	Number of individual applicants	Number of non-individual applicants	Total number of applicants
under 20 ha	2,47	2,61	2,47	118491	3005	121496
21-100 ha	3,3	3,21	3,3	24926	2288	27214
101-300 ha	4,1	3,76	4,02	5483	1554	7037
over 300 ha	4,58	4,37	4,43	676	1762	2438

*Source: Based on data from MAK, own creation (2024)*

In terms of the number of applicants, *individuals* with land holdings exceeding 300 hectares represent 0.45%, while *non-individuals* represent 20.45%. In both cases, the category above 100 hectares stands out, where there is a significantly higher inclination towards the utilization and *maximization of subsidies*.

In examining the most common instances of *subsidy maximization*, the combined application of other land-based entitlements, such as Agri-Environmental Management and Ecological Farming, without the Basic Payment Scheme and Greening, is targeted. I compared the averaged data from 2016 to 2021 with other entitlements in the land ownership categories used in my research, and by the types of applicants (Table 7).

**Table 7: Combined application of land-based subsidies with AKG titles, categorized by landholding types and applicant types in Hungary (2016-2021)**

AKG	PRIVATE INDIVIDUAL				NON-PRIVATE INDIVIDUAL				Σ
	0-20 ha	21-100 ha	101-300 ha	over 300 ha	0-20 ha	21-100 ha	101-300 ha	over 300 ha	
Support for extensive fruit cultivation	2485	937	211	22	85	110	55	45	<b>3950</b>
Fruit orchard (until 2017)	2177	910	210	18	95	120	56	49	<b>3635</b>
Support for intensive fruit cultivation	999	427	82	8	63	71	36	36	<b>1722</b>
Support for industrial vegetable crops	13	48	32	6	0	3	4	16	<b>122</b>
Support for industrial oil crops	110	254	184	38	4	17	46	83	<b>736</b>
Support for fiber protein crops	1180	2700	1468	197	15	163	253	303	<b>6279</b>
Support for grain legume crops	123	597	423	52	4	42	99	139	<b>1479</b>
Natura 2000	509	1246	873	139	5	56	98	166	<b>3092</b>
THÉT	460	770	389	61	3	27	44	87	<b>1841</b>
Support for vegetable crops	352	358	187	23	15	26	38	66	<b>1065</b>

*Source: Based on data from MÁK, own creation (2024)*

The novel data also shed light on industrial/large-scale farming, revealing how *individual* entitlements are interconnected. My experience as an inspector and specialist advisor at the Hungarian Agricultural and Rural Development Agency (MVH) corroborates the observation that entitlements with lower labor requirements are favored by larger landholders, leading to increased subsidy acquisition.

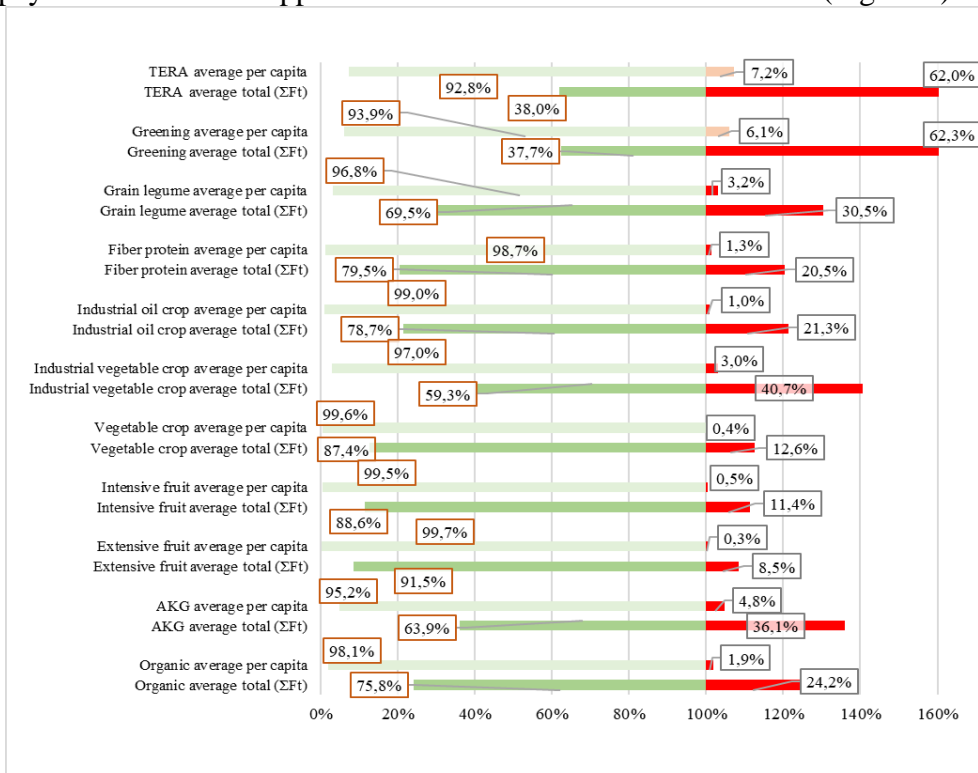
The number of *non-individual* applicants for the *Natura 2000* entitlement has increased in tandem with land size, as has been the case for *Agri-Environmental Management and Ecological Farming (ÖKO)*. The concentration of land holdings closely correlates with this finding from the study. The cultivation of forage protein crops, similar to grassland management, appears significantly in the research in terms of subsidy allocation. This is the most common entitlement association among both *individual* and *non-individual* applicants. Due to their low investment and labor requirements, concentration of land ownership and *subsidy maximization* are highlighted examples in this scenario. Among *individuals*, the highest number of applicants falls within the 21-100 hectare land category, with 2700 joint applications for *AKG* entitlement and 749 joint applications for *ÖKO* entitlement. The large number of applications exceeding 100 hectares is of significant importance in terms of resource utilization, greatly surpassing those below 100 hectares.

The regulation of entitlements does not limit this observation, putting small and medium-sized land categories at a disadvantage. Among *individual*

applicants for *AKG* entitlement, those applying for forage protein crop subsidies on land exceeding 300 hectares represent one-sixth of those with 0-20 hectares. For *ÖKO* entitlement, this ratio decreases to one-third, also indicative of *subsidy maximization*. For *non-individuals*, the number of applicants is directly proportional to land size, indicating *subsidy maximization* in this case as well.

### 3.3.2. Distribution and utilization of resources below and above the 100-hectare landholding threshold

On the data scale, I compared the number of applicants alongside the total payment amount for applications below and above 100 hectares (Figure 6).



**Figure 6: Data on land-based subsidy applications for landholding categories below and above 100 hectares in relation to total applications, categorized by number of applicants and total amount of support**

*Source: Based on data from MÁK, own creation (2024)*

Through this visualization, it became apparent what percentage of resources each group of applicants utilizes. The data revealed that large farms, representing only a small percentage of applicants utilizing land over 100 hectares, receive a substantial portion of the resources, as my earlier hypotheses suggested. By representing the values in percentages, we can

analyze them from a different perspective. For the Basic Payment Scheme, 7.2% of applicants using land over 100 hectares receive 62% of the support. Higher proportions are observed for entitlements suitable for *subsidy maximization*. In the case of Vegetable Crop Support, 0.4% of applicants using land over 100 hectares utilize 12.6% of the support amount. For the most characteristic entitlement for *subsidy maximization*, Forage Protein Crop Support, 1.3% of applicants using land over 100 hectares utilized 20.5% of the entitlement's support amount. The division of the land category into below and above 100 hectares highlights the extent of support for large and giant farms. In the analyses, it was found that only 1.9% of those using the Ecological Farming entitlement farmed land over 100 hectares. However, this narrow group alone accounted for 24.2% of the total financial allocation for the entitlement. These data alone indicate the dominance of larger farms within the specific entitlement. A similar situation is observed for Agri-Environmental Management applicants, where farms over 100 hectares account for 4.8%, yet they receive 36.1% of the available support. The data corroborate my hypothesis that large farms significantly and disproportionately benefit from the subsidy amounts.

### 3.3.3. Cluster analysis

I summarized the data of the study in Table 8, illustrating how different groups performed based on various criteria. The average land-based support amount is 13,4 billion HUF, with 123 districts below the average and 52 districts above the average. The districts above the average form three clusters, utilizing a total of 66,3 billion HUF in land-based support, whereas the five districts below the average utilize a total of 54,7 billion HUF in land-based support.

**Table 8: Cluster analysis of land-based subsidies and applicants according to the Aranykorona land quality score**

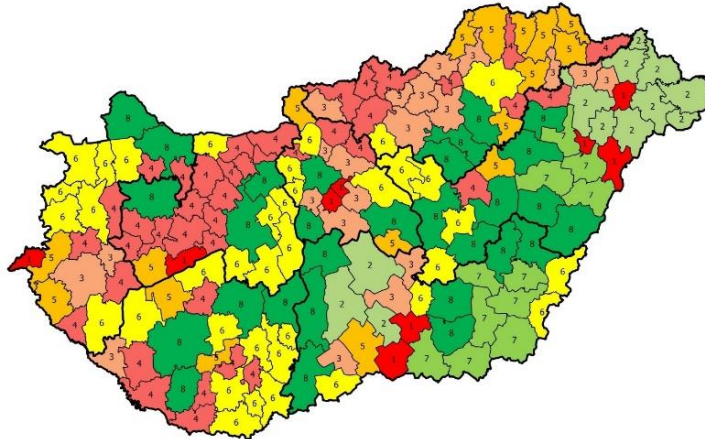
Number of clusters	Average of legal titles	Aranykorona land quality score	Private individuals residing per 100 hectares	Total number of local residents who are private individuals and local non-private individuals	Total amount of land-based subsidies	Number of cluster members
1	2,6	12,9	8,8	7,5	4 427 852 079	9
2	3,1	12,1	7,4	6,4	18 240 492 020	12
3	2,5	14,7	4,9	3,9	7 624 412 510	21
4	2,6	16,1	3,3	2,1	7 044 676 488	39
5	3,0	13,5	4,3	3,0	9 237 580 205	17
6	2,5	23,7	4,0	2,5	13 113 014 982	37
7	2,6	29,1	5,7	4,0	22 782 977 278	11
8	2,8	21,4	3,4	2,3	25 325 972 193	29

*Source: Based on data from MÁK, own creation (2024)*

I visualized the placement of clusters in Figure 7. Through the investigations, I discovered that high-quality land areas generally receive higher subsidies



than lower-quality ones. This stems from the fact that in the case of better-quality land areas, fewer farmers apply for multiple different subsidy entitlements.



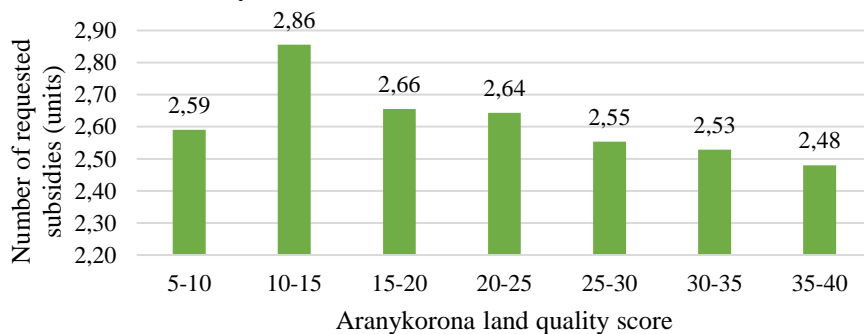
**Figure 7: Geographic distribution of cluster members by districts**

*Source: Based on data from MÁK, own creation (2024)*

In contrast, a larger number of applicants farming in areas with unfavorable conditions can access subsidies under the same conditions. However, this poses a disadvantage for them because the subsidy allocations are limited. This situation indicates that the current subsidy system does not differentiate between territorial conditions, aligning with my H3 hypothesis.

### 3.3.4. Relationship between land quality and subsidy application

Based on the study (Figure 8), it can be concluded that there are no significant differences in the practice of entitlement application. This means that a private *individual* and a *non-individual* applicant farming on fertile land operate with similar levels of support as those farming on less favorable terrain, given similar levels of subsidy allocation.



**Figure 8: Relationships between the number of requested subsidies and the Aranykorona land quality score**

*Source: Based on data from MÁK, own creation (2024)*

### **3.4. Examination of the relationship between regional differences and the analyzed subsidies**

Although this does not represent the primary focus of my research, as a supplementary aspect in this section of the dissertation, the main goal was to compare the districts of Hungary (excluding Budapest to avoid distortion).

The examination aimed to determine to what extent and in what aspects the districts differ from each other and whether these differences reflect the influence of agriculture and subsidies.

By conducting factor analysis, it was possible to explore the complex territorial development, socio-economic and infrastructural situations, agricultural conditions, and disparities, as well as examine the interactions among these territorial elements.

Based on literature on territorial differences, I initially included 57 variables from the TEIR database at the level of municipalities, along with the Aranykorona value and variables previously identified by myself.

I utilized the most recent data available (2021) for the analysis. If 2021 data was not available, I used data from 2020, or failing that, data from 2022. This approach aimed to seek connections among negative rural processes observed by me, local land concentration, and *subsidy maximization* to gain a more comprehensive and detailed understanding of differences between districts and to comprehend the interactions among various territorial elements.

During the analysis of standardized input variables, it proved ideal to establish seven factors, collectively explaining 66.24% of the total data mass.

To explain the differences between districts and the processes occurring within them, the factors structured by the rotated factor matrix appeared suitable for examining the segregation of the selected districts (Table 9).

I named the factors based on the data content they encapsulate: „*Socio-economic challenges*,” „*Economic activity*,” „*Youthful society*,” „*Rural development orientation*,” „*Actively supported declared agricultural potential*,” „*Tourism and development*,” and „*Aging active communities*.” These factor names reflect the underlying data structure and help provide a comprehensive understanding of territorial differences.

**Table 9: Rotated factor matrix and factor contents (factor loadings)**

Variables	Factors						
	1	2	3	4	5	6	7
2021 Registered job-seeking graduates, per 100 individuals aged 15-29	0,857						
2021 Registered job seekers, per 100 individuals aged 15-64	0,855	-0,337					
2021 Average monthly number of regular child protection beneficiaries, per 100 individuals aged 0-18	0,806	-0,453					
2021 Ratio of registered job seekers under 25 years of age (percentage)	0,787						
2021 Ratio of registered job-seeking graduates (percentage)	0,768						
2020 Participation in public employment (average annual data) per 1000 residents	0,751	-0,363	0,311				
2021 Ratio of disadvantaged preschool children (percentage)	0,722	-0,478					
2021 Domestic migration balance, per thousand residents (per mille)	-0,654					0,355	
2021 Ratio of disadvantaged pupils in daytime education (percentage)	0,652	-0,533					
2021 Ratio of registered job seekers with a maximum of 8 years of primary education (percentage)	0,623	-0,55					
2021 Income tax payers, per 100 residents	-0,616						
2021 Ratio of job seekers registered for more than 180 days (percentage)	0,565						
2021 Income tax payers in the annual income bracket above 5 million HUF, per income tax payer in the annual income bracket below 1 million HUF per 1000 residents	-0,557				-0,499		
2021 Income tax payer; Individual entrepreneur, per 1000 residents	-0,517		-0,376			0,316	
2022 Travel time to Budapest by road on the fastest route (minutes)	0,504	-0,363		0,3			
2021 Beneficiaries of social meals, per 1000 residents	0,469	-0,333					
2022 Travel time to the nearest highway interchange by road on the fastest route (minutes)	0,406						
2021 Registered crimes, per 1000 residents	0,404						
2016-2021 Average of entitlements	0,358			0,328			0,351
2021 Registered businesses in services (number)		0,824					
2021 Ratio of individuals employed in high prestige occupational groups (percentage)		0,822				0,32	
2021 Ratio of registered agricultural businesses (percentage)	0,308	-0,781		0,372			
2021 Average number of students in primary schools		0,722					
2021 Population density (people per km <sup>2</sup> )		0,719	0,303				
2020 Operating businesses, per 1000 residents	-0,474	0,69				0,346	
2020 Operating agricultural businesses, per 1000 residents		-0,679	0,475				
2021 Per capita income tax base from domestic income (HUF)	-0,619	0,649					
2021 Individual telephone mainlines, per 1000 residents		0,638	-0,307				
2021 Ratio of homes connected to the sewage network (percentage)	-0,326	0,61					
2021 Income tax payer; Agricultural small producer, per 1000 residents		-0,608			0,594		
2021 Local government business tax revenue, per resident (1000 HUF)		0,603					
2021 First-time registration of personal cars in Hungary, per 1000 residents	-0,415	0,584					
2021 Registered individual entrepreneurs, per 1000 residents	-0,563	0,578				0,359	
2020 Disbursed VP 2014-2022 support; per 1000 residents (HUF)		-0,46		0,396			0,392
2022 Travel time to the own county seat by road on the fastest route (minutes)		-0,46					
2021 Population aged over 65, per 100 individuals aged 0-14		-0,924					
2021 Ratio of the 0-14 age group in the permanent population (percentage)		0,899					
2021 Ratio of the 65-x age group in the permanent population (percentage)		-0,897					
2021 Residential population, per 100 dwellings		0,837					
2021 Natural increase/decrease (per mille)		0,31	0,819				
2021 Household electricity consumption, per 100 residents			-0,623			0,564	
2021 Ratio of residents per family and pediatrician			0,614				
2021 Civil organizations, per 1000 residents			-0,597				0,551
2021 Children aged 3-5 per kindergarten spot			0,512				-0,399
Number of local private and non-private individuals per 100 hectares				0,839			
2021 Registered businesses, per 1000 residents				0,768			
2021 Ratio of registered businesses in industry and construction (percentage)	-0,391	0,321		-0,566	-0,364		
2021 Elderly individuals receiving day care services, per 100 spots				0,373		-0,353	
2021 Ratio of homes connected to the drinking water network (percentage)	-0,322			-0,359			
Total amount of land-based support					0,905		
Total eligible area					0,878		
Value of Aranykorona					0,614		
2022 Travel time to the own district seat by road on the fastest route (minutes)					0,398		
2021 Local government tourism tax revenue, per resident (1000 HUF)			-0,326			0,653	
2021 Housing built during the year, per 1000 dwellings	-0,367	0,459				0,53	
2021 Ratio of household waste selectively collected from the population (percentage)						0,493	
2021 Household gas consumption, per 100 residents					0,427	0,476	-0,447
2021 Internet subscriptions on xDSL network, per 1000 residents		-0,3				0,359	
2021 Members of creative cultural communities, per 1000 residents							0,515
2021 Children enrolled in kindergarten, per operating spot			0,449				-0,489
2021 Children enrolled in daycare (methodology valid from 2017), per operating spot							-0,328

Source: Based on TEIR data, own calculations and editing (2024)

My correlation analysis conducted with the indicators used in factor analysis confirmed half of my H5 hypothesis, which states that the distribution of subsidies contributes to the formation of territorial differences. This correlation can be observed based on the 4th and 5th factors, as well as the indicators aggregated within them.

To confirm the second part of the hypothesis (that the distribution of subsidies, and thus the related indicators, significantly affect the development of other factors), I conducted correlation analysis using indicators representing the territorial distribution of subsidies, as well as economic and social indicators included in the factor analysis. I attempted to uncover correlations along the lines of basic indicators used in factor analysis and indicators I developed to represent the territorial distribution of land-based subsidies. I highlight correlations that go beyond those identified within individual factors.

Unsurprisingly, indicators representing land-based subsidies typically exhibit strong correlations with each other. For example, there is a very strong positive correlation of 0.94 between „Total eligible area” and „Total sum of land-based subsidies,” indicating that larger areas correlate with higher amounts of subsidies. Similarly, there is a strong positive correlation of 0.537 between „2021 personal income taxpayers in agricultural smallholding, per 1000 inhabitants” and „Total eligible area,” suggesting that areas with larger sums of land-based subsidies have more agricultural smallholders. A negative correlation of -0.57 exists between „2021 personal income taxpayers in the income bracket above 5 million HUF annually per taxpayer, per 1000 inhabitants” and „Total eligible area,” indicating that areas with more eligible land have fewer high-income taxpayers.

For the first factor, I demonstrated that there is a positive correlation between the average entitlement claimed for land-based subsidies and indicators indicating social and economic decline. Thus, the correlation between the connection of subsidies and territorial lag/decline can be confirmed in the case of this indicator. However, overall, it can be concluded that the correlation between indicators representing land-based subsidies and other economic and social indicators is generally weak. Additionally, the weak correlation between soil quality and development can be highlighted. Higher soil quality values typically coincide with higher rates of gas and water supply and lower numbers of job seekers, recipients of regular child welfare benefits, and participants in public employment schemes.

In the correlation analysis specifically focused on the variables related to the obtained factors, land-based subsidy claims, and soil quality (Table 10), the correlations observed align with the relationships already identified among the

factors and the indicators contained within them, as described during the presentation of the factors.

**Table 10: Correlation Table of Factors and Agricultural Variables**

	Total sum of land-based subsidies	Average entitlements claimed	Total eligible area	Aranykorona land quality value	Number of local residents (both private individuals and legal entities) per 100 hectares
<i>Social-economic challenges factor</i>	0,026	<b>,358**</b>	0,052	-,261**	0,062
<i>Economic activity</i>	0,006	-,152*	-0,115	0,074	0,023
<i>Youthful society</i>	-0,103	0,127	-0,136	-0,098	0,139
<i>Rural development orientation</i>	0,082	<b>,328**</b>	-0,002	-,272**	,839**
<i>Actively supported declared agricultural potential</i>	,905**	0,031	,878**	,614**	-,201**
<i>Tourism and development</i>	-0,049	0,03	-0,038	0,106	-0,067
<i>Aging active communities</i>	-0,03	<b>,351**</b>	-0,067	-0,041	-,249**

\* P<0,05

\*\* P<0,01

*Source: Based on own research and editing (2024)*

What can be highlighted is once again the correlation with the average entitlements claimed, as the results show correlation not only with the first but also with the 3rd and 7th factors. This means that with the increase in the average entitlements claimed for the examined land-based subsidies, the social/economic challenges of the affected areas intensify, their rural development orientation strengthens, while they are typically characterized by aging but active communities.

Thus, I could only prove my hypothesis that the distribution of land-based subsidy claims, and related indicators, exacerbate territorial inequalities along one indicator. Since I couldn't fully validate my personal practical experience at the national level using secondary methods, I believe further investigation is necessary to examine my H5 hypothesis in my future research. Methodology in such cases may benefit from primary research. In connection with this, I will present the results of my interview-based research conducted exclusively on the selected district in the following sections.

### **3.5. Results of the district-level primary research**

During the in-depth interviews, four main topics were examined, the first of which was the question of land concentration. The mayors and secretaries unanimously confirmed that the number of small farms is decreasing, while the dominance of large farms is strengthening. It was mentioned that the number of smaller-scale farmers is sharply declining in many settlements, and their lands are being acquired by larger farms, further centralizing land ownership and concentrating EU subsidies.

The second topic, „*Non-individuals*” resource utilization,” also discussed essential aspects of local agriculture and the use of EU funds. The responses provided by mayors and secretaries varied greatly between negativity and a kind of pragmatism. Some mayors expressed the need for economic companies and would not sharply distinguish between those who use local and non-local support. However, the majority would prefer locals, as they believe they are integral parts of the local economy, contributing to the livelihoods and job opportunities of the area.

The third topic („conditions-independent resource distribution”) brought out several important questions and answers regarding the correlations between land-based subsidies and land quality, as well as in the context of EU and domestic support mechanisms. Primarily, I was curious whether the current land-based subsidies and land quality are proportionate according to the local leaders and secretaries. Respondents who could provide substantive answers mostly represented the viewpoint of imbalance between subsidies and land quality.

The fourth topic, focusing on passive farming and *maximizing subsidies*, raised several profound questions and addressed the connection between land-based subsidies, the local economy, and social impacts. The respondents emphasized that subsidies not only strengthen the economic stability of the district but also have beneficial social effects. Their opinion on passive farming was also interesting: they highlighted that this form of farming counteracts the negative environmental effects of intensive agricultural activities and supports biodiversity while protecting soil, air, and water resources.

#### 4. CONCLUSIONS AND RECOMMENDATIONS

Based on the research, I recommend strengthening/maintaining the control of land concentration and increasing support for small and medium-sized (under 100 hectares) farms in order to reverse the negative trend. Beyond the regulations coming into effect from 2023, in my opinion, mitigating land concentration can be achieved by setting support ceilings and considering interests tied to a single individual when determining eligibility for support. Additionally, based on my research findings, it is important to introduce measures that support small and medium-sized farms and encourage more sustainable and diversified farming practices, contributing to the economic and social strengthening of rural areas. Similarly to the views of Magda et al. (2021), I believe the support system should reflect the dynamics between land concentration and the diversification of rural economies, and establish mechanisms that promote economic growth of local communities and strengthen the population retention capacity of rural areas.

When designing and implementing a support system, it is crucial to consider the various regional characteristics and the factors that influence the accessibility of support for different groups. In my view, the support system results in distortions in regional development, as it does not always adequately take into account regional characteristics, such as location or the gold crown rating. During the review of the support system, it would be important to provide additional supplementary support and offer application advantages for the aforementioned groups. In developing the support criteria, it should take into account how much support each applicant can access, and should examine the nature and impact of their activities in a complex manner, including ecological sustainability and socio-economic benefits. Furthermore, the support system must be flexible and transparent, enabling the provision of differentiated support based on regional characteristics and the specific needs of farmers. The support system should reflect the diversity of rural economies and support the development of local value chains, access to local markets, as well as the introduction of environmentally friendly and innovative farming practices.

Determining the operational goal of farming is an essential step towards sustainable and efficient agricultural cultivation. For this purpose, it is crucial that each farmer is aware of whether they want to base their enterprise on active farming (i.e., specifically for production purposes), or on passive farming (which primarily considers environmental objectives). If we decide in favor of intensive agriculture, subsidies linked to production should be prioritized, while in the case of environmental goals, agri-environment-climate measures (AECM) and organic farming programs should be

specifically highlighted. I recommend the efficient reallocation of subsidies to serve EU and national objectives maximally, targeting small and medium-sized enterprises, as well as supporting less advantaged areas.

The introduction of the concept of passive farming, which I use and identify as fundamentally important, is necessary because the intensive agricultural utilization of poor-quality areas negatively affects our environment. The large estate and field sizes characteristic of intensive agricultural production adversely impact rural employment and the rural population's retention capacity due to technological advancements. The development of machinery and the use of larger machines reduce labor demand and simultaneously decrease biodiversity. Based on the above, it is suggested to operate a long-term differentiated support system that takes into account not only the type of farming but also the regional characteristics and the long-term sustainability of farming.

In my studies, I have uncovered that the distribution of land-based subsidies is a determining, factor-shaping element of Hungary's district-level territorial differences/variances. However, it was not conclusively proven that the uneven distribution of subsidies reinforces territorial disparities. Nonetheless, the linkage of subsidies showed a correlation with social/economic challenges, rural development orientation, and aging yet active communities. Unraveling and deepening this relationship also requires further investigation.

Among my further research objectives is the complex examination of the relationships between the rural economy and the aforementioned factors, which, in my experience, cause certain negative rural processes, despite not being able to fully prove this during the factor analysis.



## 5. NEW SCIENTIFIC FINDINGS

1. During the analytical process, I chose a novel approach to examine the territorial distribution of agricultural holdings and related subsidies, departing from conventional statistical methods. Instead of conventional land categories, I defined four new land categories (0-20 hectares, 20-100 hectares, 100-300 hectares, and over 300 hectares), each with unique characteristics and posing different challenges to the subsidy system. I defined the resource usage per legal title by ownership category. In most legal titles, farms over 100 hectares predominantly received subsidies. I proved that larger farms accessed more resources not only because of their size but also through the linking of subsidies, thereby benefiting more from fixed subsidy budgets.

2. Through my research, I identified and analyzed in detail the quantity and nature of subsidies requested by *local individuals* and *non-individuals*, demonstrating not only the amount of subsidies but also the demand for different subsidy categories and their territorial (district-level) distribution. The examination revealed that *non-individuals* receive a higher proportion of subsidies and avail themselves of more subsidy categories. I demonstrated the amounts of subsidies used per category, in which cases the use of resources by *non-individuals* was disproportionately high.

3. In connection with my research, I introduced, defined at the district level, and mapped the indicator "number of local individual residents per district applying for land-based subsidies for every 100 hectares of eligible area". The examination revealed the concentrating effect of district seats and the outstanding land use of economic companies registered in Budapest and other major cities. I uncovered current practices in subsidy utilization, which farmers employ to *maximize subsidies*. Through a detailed analysis of the number and nature of requested categories, I demonstrated that the *maximization of subsidies* was most common in the case of *AKG* and *Fibrous protein plant subsidies*.

4. I introduced the concept of „Passive farming,” which is a form of farming associated with *subsidy maximization*. I typically detected this practice in the application for less labor-intensive categories. By eliminating the need for development and production, the sustainability of small and medium-sized farms could be increased if subsidies were more targeted. While passive farming can strengthen sustainable farming practices in small and medium-sized farms by providing high subsidy eligibility with low investment, I also found that this practice is more prevalent among large farms.

5. Based on the territorial distribution of the examined land-based subsidies, I developed eight different clusters through cluster analysis. I highlighted how land quality can influence the number of applicants and the number of categories they apply for. I demonstrated that the primary goal is often not to optimize production capacity or increase production but to draw resources, regardless of territorial conditions. On good-quality land, applicants use more resources under various categories, especially *non-individuals*. Thus, the subsidy system influences the decisions of farmers and subsidy applicants to a certain extent.

6. Using TEIR data, I developed seven factors through factor analysis, which characterize district-level differences. Based on their included indicators, I named the factors as follows: „*Socio-economic challenges*,” „*Economic activity*,” „*Youthful society*,” „*Rural development orientation*,” „*Actively supported declared agricultural potential*,” „*Tourism and development*,” „*Aging active communities*.” Based on factor analysis, I proved that the territorial distribution of the examined land-based subsidy applications is a determining factor in Hungary’s district-level territorial differences. Through correlation analysis, I was able to demonstrate a correlation between the accumulation of subsidies (average number of requested categories) and the development of territorial underdevelopment (strengthening).

7. Through in-depth primary research in the Mezőcsát district, I confirmed the results of my secondary research and showed that the patterns discovered in quantitative data reflect real local dynamics. Based on the qualitative approach - focusing on the local level - I made significant findings regarding rural development. These include: the disappearance of small farms increases migration; targeted support for small and medium-sized farms is necessary, with consideration of land quality; *subsidy maximization* is linked to land concentration, which can exacerbate negative rural processes; and finally, passive farming can be beneficial as a farming method that prioritizes environmental measures over intensive and industrial agriculture.

## 6. AUTHOR'S PUBLICATIONS RELATED TO THE SUBJECT OF THE THESES

### 6.1 Journal articles

#### *Scientific articles published in foreign languages*

LIPCSEI J. (2021): Analysis of average market and purchase prices for certain fruit species. In: *Studia Mundi–Economica*, 8 (2), 74-83. p. DOI: <https://doi.org/10.18531/Studia.Mundi.2021.08.02.74-83>

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LIPCSEI J. (2022): Territorial Inequalities in Vegetable Plant Payments in Hungary. In: *Visegrad Journal on Bioeconomy and Sustainable Development*, 11 (2), 94-99. p. <https://doi.org/10.2478/vjbsd-2022-0013>

#### *Scientific articles published in Hungarian*

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LIPCSEI J. – RITTER K. (2020): Barriers to employment of public and roma workers from the perspective of agricultural employers. In: Győri, Tímea; Arany, Ferenc; Egri, Zoltán (szerk.) CHANCES AND CHALLENGES FOR THE EUROPEAN RURAL DEVELOPMENT (2021–2027) Peer-reviewed Scientific Conference Proceedings, Szarvas, Magyarország: Szent István Egyetem (2020) pp. 124-132. , 9 p.

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