LABOUR SHORTAGE, LABOUR RETENTION AND ROBOTISATION

PROBLEMS AND SOLUTIONS – AGRICULTURAL ORGANISATIONS

József Poór – Gábor Szabó-Szentgróti – Klára Veresné Valentinyi –
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(Editors)

MAGYAR AGRÁR- ÉS
ÉLETTUDOMÁNYI EGYETEM

2023

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Working paper

Hungarian University of Agriculture and Life Sciences
Gödöllő, 2023

Labour shortage, labour retention and robotisation – problems and solutions – agricultural organisations
József Poór – Gábor Szabó-Szentgróti – Klára Veresné Valetinyi – Erika Varga – Gábor Hollósy-Vadász – Zsolt Kőmüves (editors)

Authors:
Miklós Dús, master lecturer, Hungarian University of Agriculture and Life Sciences, Gödöllő (Hungary)
Gábor Hollósy-Vadász, PhD, assistant professor, Budapest Metropolitan University (Hungary)
Zsolt Kőmüves, PhD, associate professor, Hungarian University of Agriculture and Life Sciences, Kaposvár (Hungary)
József Poór, DSc, CMC, leader of the Agricultural Labour Market Research Group (ALMRG-MATE),
full professor (J. Selye University, Slovakia)
Katalin Szabó, PhD, associate professor, Hungarian University of Agriculture and Life Sciences, Gödöllő (Hungary)
Gábor Szabó-Szentgróti, PhD, associate professor, Hungarian University of Agriculture and Life Sciences,
Kaposvár (Hungary), Széchenyi István University, Győr
Bence Szeles, PhD student, (J. Selye University, Slovakia)
Katalin Tóth, PhD, senior lecturer, Hungarian University of Agriculture and Life Sciences, Gödöllő (Hungary)
Erika Varga, PhD, associate professor, Hungarian University of Agriculture and Life Sciences, Gödöllő (Hungary)
Klára Veresné Valentinyi, PhD, associate professor, Hungarian University of Agriculture and Life Sciences, Gödöllő (Hungary)
Virág Walter, PhD, associate professor, Hungarian University of Agriculture and Life Sciences, Kaposvár (Hungary)

Reviewers:
Dr. Csaba Berde
full professor
University of Debrecen, Hungary

PhDr. Imrich Antalik PhD
senior lecturer
J. Selye University, Slovakia

Web programming:
Dr. Róbert Sinka, e-learning expert

Text editor:
Dr. Tamás Kolbe

Professional supporter:
National Chamber of Agriculture (NCA)

This research report has been prepared within the framework of the international research project
"Employment strategies in the V4 countries – VEGA 1/0688/21".

Publisher:
MAGYAR AGRÁR- ÉS ÉLETTUDOMÁNYI EGYETEM
Hungarian University of Agriculture and Life Sciences
Gödöllő, Páter Károly u. 1., Hungary
Under the supervision of Prof. Dr. Csaba Gyuricza, rector

Research contributor:
Agricultural Labour Market Research Group – MATE

Year of Publication:
2023

ISBN: 978-963-623-061-6 (pdf)

CONTENT

INTRODUCTION (JÓZSEF POÓR)

'Social unrest and protectionism are the two main risks of the global economic crisis'.

Christine Lagarde[1]

In recent years, the labour market in the former Eastern bloc countries has changed significantly, altering the way workers relate to employers. Two or three decades ago, life-long employment in one company or organisation was common. Today, this is no longer the case.

One of the key issues in these countries today is the dramatic increase in labour shortages, which have been influenced by a variety of factors, including emigration after the regime change, adverse demographic factors, the economic crisis and wage differentials within the European Union (Brixiova *et al.,* 2009). Nowadays, the three factors are linked to the aforementioned causes: the global coronavirus epidemic, the economic opening and rebound, and the difficult economic situation due to the war in the present day (Karácsony & Pásztó, 2021).

The emergence of new technologies, robotisation and the rise of artificial intelligence will also have a significant impact on the labour market. If we look at the various projections associated with this, in a few years' time, for the first time, it is only traditional work (e.g., repetitive, physically demanding, etc.) that may not be short of labour, but a rather a significant labour surplus. The dominant views are that more and different jobs will be created than destroyed as a result of AI and robotisation (Morgan, 2022; Harari, 2018). Various views suggest that today's labour shortage areas will soon disappear as a result of the new type of robotisation (Faragó, 2022; Ford, 2016). According to research from previous years, 47% of jobs in the US are at risk from robotisation (Hess – Ludwig, 2017). A study published by international consultancy McKinsey in 2018 estimated that 1 million domestic jobs in Hungary will be affected by automation.

In the case of agriculture[2] and agribusiness, new digital technologies such as robotisation and artificial intelligence are expected to bring significant added value. In general, SMEs are at a significant disadvantage in this area compared to large companies (Madari, 2021).

If we look ahead to the longer term, the same situation could occur in the expertise- and knowledge-intensive areas (Susskind & Susskind, 2015).

In our present research, we have addressed the aforementioned trends (Fine *et al.,* 2018).

- First, we reviewed the most important literature sources on the socio-economic situation and labour market in Central and Eastern European countries, both in Hungary and in the neighbouring countries. This gave us a general picture of the labour market situation in our country.
- We developed an analytical model, based on which we have been able to investigate, through empirical research (online survey), the degree of labour turnover in the agricultural labour market, the main causes and the typical instruments of labour retention,
- We analysed the responses of the companies surveyed to identify government measures that help to address the problems and tensions in the labour markets.
- We also looked at what efficiency improvement and robotisation programmes are planned or have already been introduced by the respondent organisations.

[1] Cristine Lagarde (1956) president of the European Central Bank

[2] In our study we use the term agriculture for short, which includes agriculture, forestry and fisheries.

Our research report is divided into the following sections.

- In Chapters 1 and 2, we present the theoretical basis of our research and describe the research methodology we used.
- In Chapter 3, we present the main characteristics of our research respondents (n=144 organisations) (form of ownership, number of employees and revenue)
- In Chapter 4, we summarise the impact of the Coronavirus crisis and the Russian-Ukrainian war on organisations. We present the effects of labour shortages on organisations and analyse the typical effects of turnover.
- In Chapter 5 of our report, we examine the agricultural characteristics of the use of foreign labour (origin, sending countries and experiences).
- In Chapter 6, we present our research experiences on managing labour shortages and retaining staff.
- In Chapter 7 of our report, we summarise our research experiences on robotisation.
- In Chapter 8, we describe the main demographic characteristics of our respondents (gender, age, position and age).
- Our report concludes with an annex in which we provide the names of the organisations that contributed to the publication.
- The research described here cannot cover all aspects of the subject due to the limitations of space, time and capacity. Only the main trends and tendencies are outlined here.

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1. THEORETICAL FOUNDATIONS (ZSOLT KŐMÜVES AND JÓZSEF POÓR)

'It is impossible to understand the present without knowing the past'

David Hume[3]

1.1. LABOUR MARKET TRENDS (PAST, PRESENT AND FUTURE)

The labour market is a component of the market economy, and as such, it is an economic institution where the allocation and distribution of labour takes place, so the labour market is nothing more than the totality of relations associated with the sale of labour in a given period and under given conditions (Csehné, 2011). The labour market is a set of exchanges between two formally equivalent actors ('employee' and 'employer'), which involves the linking of workers to work experiences (jobs) and the movement of workers between work experiences (jobs) (Galasi-Varga, 2005).

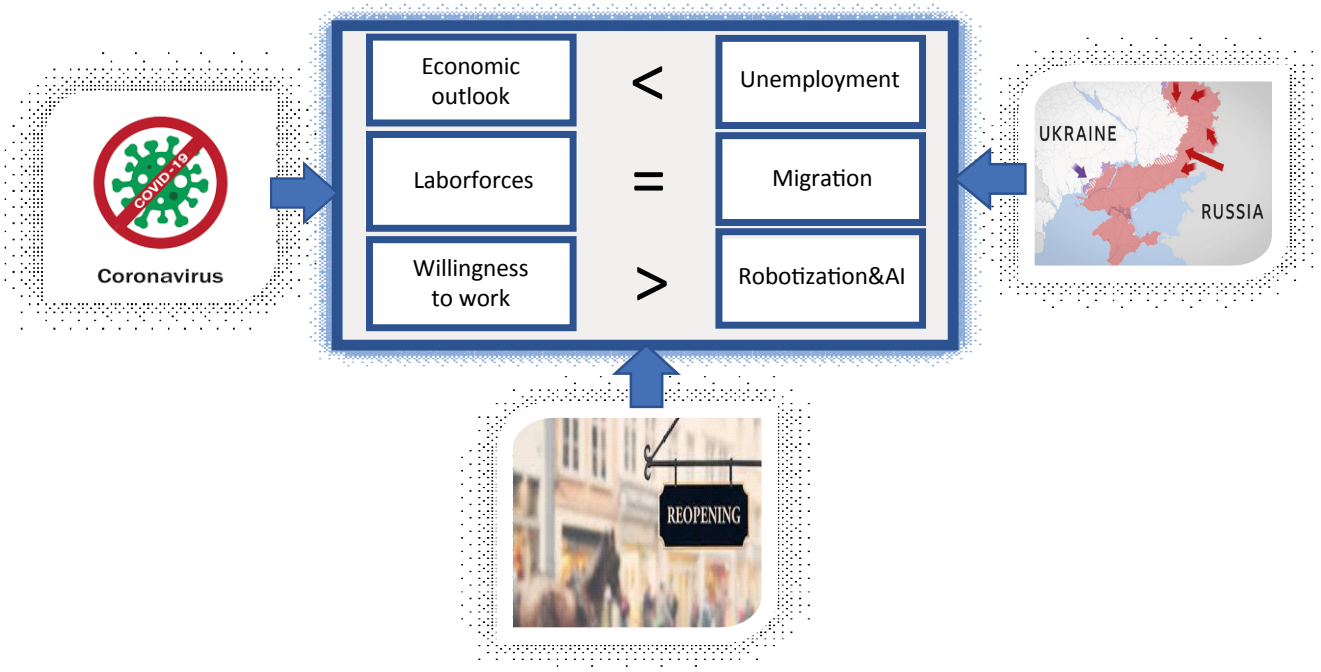
The basic categories of the labour market are wages, labour demand and labour supply, willingness to work. The equilibrium state of the labour market depends on their interrelationship (Tóthné, 2004). Factors affecting labour supply are as follows:

- demographic process (natural increase or decrease, migration, changes in age composition, etc.),
- the size of the labour supply (the population of working age, with adequate mental and physical capacity),
- the willingness of the working-age population to work, which depends on the choice of alternatives (leisure time vs. working time, wages vs. unemployment benefits),
- economically active population (employed, unemployed (Tímár, 1991).

The labour market is constantly and rapidly changing. We live in a world where there is enormous competition in all markets: in the market for goods and services for buyers, in the capital market for investors, in the labour market for the best labour. The image of work and the ideal employer is also changing rapidly, with globalisation, innovation and automation radically changing the supply and demand side of the labour market.

[3] David Hume (1711–1776), Scottish philosopher

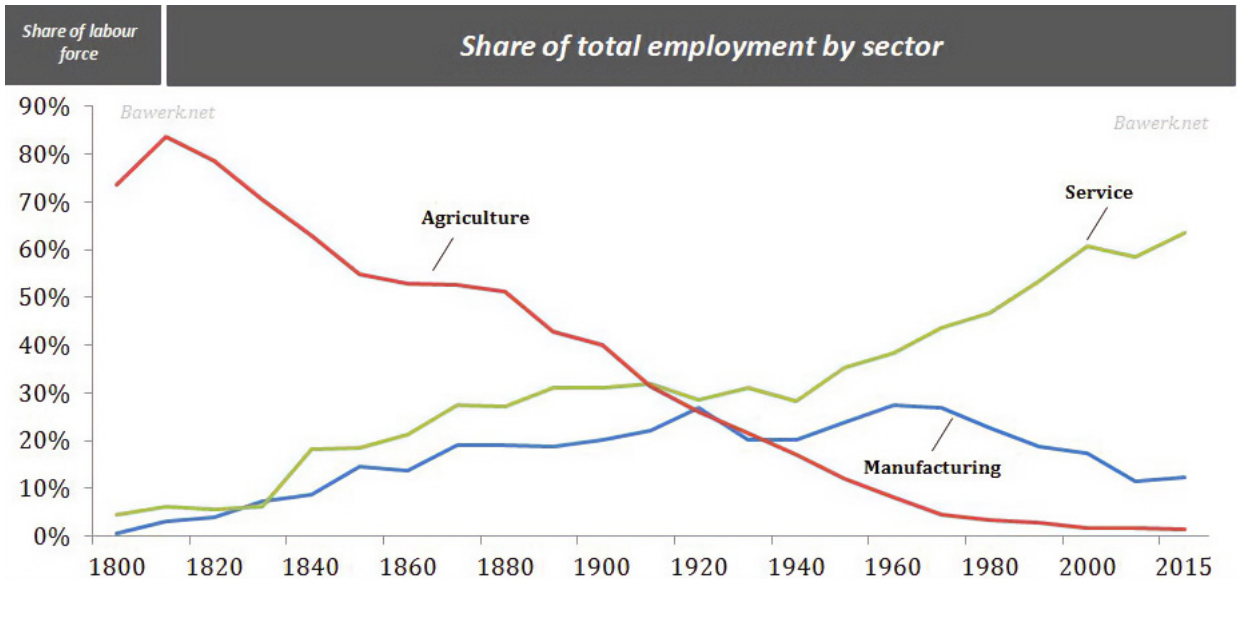
Figure 1: The most important parts and influencing factors of the labour market



Source: Authors' own editing

The major changes in the labour market in the developed world are illustrated by the US example in Figure 1-2, which illustrates the transformation that took place between 1800 and 2015. Today (US, 2021), the share of employment in agriculture is 1.3%, in industry 12.8% and in services 80%. Similar trends can be seen in EU labour market statistics: agriculture (3.8%), industry (16%) and services (80.2%).

Figure 2: Transformation of the US labour market (1800-2015)



Source: US, 2021

The domestic labour market has changed a lot in recent years. Employment has continued to grow and exceeded 4.5 million in the year before the Covid. The strong economic growth in the domestic labour market has induced significant labour demand. Foreign labour inflows from neighbouring countries (Serbia and Ukraine) have expanded to replace the diminishing labour supply. The government has facilitated the entry of women, retired people and students into the labour market (Fazekas *et al.,* 2020)

According to various literature sources, the number of people employed in Hungarian agriculture as a share of total employment was 8.1% in 1995 (Belovecz, 2016). The number of people employed in Hungarian agriculture decreased by almost 246.5% in the period 1990-2022, which nowadays represents 4.25% of total employment. This figure represents 2.87% of total employment in the food industry. The share of people employed in industry is 22%, while the share of people employed in services and other activities is 73.75% (Lőre & Kovács, 2019, KSH, 2022).

Table 1: Number of employees – total agriculture and food industry (1990–2022)

Years	Employees (person) in total		
	Total	Agriculture, forestry, fishing	Food, beverage, tobacco production
1990	4 880	693	234
1991	4 520	538	231
1992	4 083	460	210
1993	3 827	349	197
1994	3 752	328	180
1995	3 679	295	157
1996	3 648	302	165
1997	3 646	288	160
1998	3 696	275	159
1999	3 809	276	157
2000	3 856	256	154
2001	3 868	243	158
2002	3 871	241	161
2003	3 922	215	152
2004	3 900	205	141
2005	3 902	194	140
2006	3 928	190	141
2007	3 902	182	134
2008	3 848	168	127
2009	3 748	175	130
2010	3 732	173	122
2011	3 759	185	120
2012	3 827	193	121
2013	3 893	185	130
2014	4 101	190	143

Years	Employees (person) in total		
	Total	Agriculture, forestry, fishing	Food, beverage, tobacco production
2015	4 210	203	140
2016	4 352	217	144
2017	4 421	220	146
2018	4 469	215	144
2019	4 512	211	145
2020	4 603	213	143
2021	4 603	201	145
2022	4695	200	135

Source: KSH, 2022

Agriculture ranked 6th among sectors in terms of value added per capita in 2018. Madari's (2021:47) research in the agricultural sector indicates that 'the performance of micro-enterprises with less than 10 employees is not significant, with many operators operating at a loss, but the performance of small and medium-sized enterprises in the sector is high and in many cases these organisations are performing very well'.

It is also important to address our topic because, in addition to several factors (changes in product prices and inputs and year-to-year fluctuations in yields), the profitability of agriculture is fundamentally influenced by the evolution of the labour force (Belovácz, 2016).

Table 2: Gross value added in 2018 (thousands of euros per capita)

No	Industry	Gorss value added/person thousand EUR
1.	Education	46
2.	ICT	44
3.	Tourism	38
4.	Transport, logistics	36
5.	Processing	27
6.	Agriculture and food industry	24
7.	Tourism	23
8.	Construction, real estate	23
9.	Business services	23
10.	Retail and wholesale trade	19
11.	Financial system and its institutions	17
12.	Construction, real estate	17
13.	Healthcare	16
	Total	**24**

Source: McKinsey, 2016

Unemployment in Europe rose sharply during the crisis of the 1970s, remaining below 3 per cent in the EU15 until 1974, but fluctuating in the 7-11 per cent range from the 1980s onwards (Artner, 2018). Today, the labour market is in a situation of successive changes. In many European countries, high unemployment after the 2008 global economic crisis has been followed by a rapid decline. The labour market is already experiencing shortages in many jobs and organisations are finding it difficult to find the right people for those jobs, with a growing number of shortage professions.

There is a growing emigration of workers and a corresponding increase in the propensity to work abroad. With the accession of the transition countries to the EU, migration between Member States has taken on a new momentum and has generated a different pattern than before. The primary purpose of this new type of migration is to work. Skilled workers are leaving their home countries and Eastern European countries and heading westwards in search of a better living. Thus, labour shortages are becoming more frequent in the countries they leave, placing a heavy burden on organisations, which find it difficult to replace the missing labour.

Looking ahead, the labour market in the home and eastern European countries faces a number of challenges. Skilled labour is increasingly absent from the market due to labour shortages. After a situation of labour oversupply in the past, it is no longer workers who are typically looking for work, but employers who are looking for people. The problem for companies is, therefore, not improving the selection process but having no one to screen. The emergence of new technologies has also led to a need for new ways of communicating about recruitment. In addition to all this, there is also the need to face up to the fact that today's generation has different needs in the workplace. Generation Z and Generation Y have a harder time becoming engaged, but they also expect to take pride in their work and the company they work for (digitalhungary.hu).

The V4 countries, with the exception of Slovakia, have had negative natural population growth for a longer period. While the net emigration balance is negative, with the exception of the Czech Republic (Astrov, 2019).

The source country of foreign workers in the Hungarian economy has changed significantly over the past decades. For a long time, neighbouring countries were the most important resources. Nowadays, Far Easterners (from the Philippines or Vietnam) and Central Asians (Kyrgyz and Kazakhs) have emerged. There are now workers from 17 countries. Before the start of the Covid outbreak, the number of foreign workers in our country was 50,000. Today, this number has reached 70,000 (Hornyák & Nagy, 2023).

It was previously thought that 200-300 thousand migrant workers would permanently reduce the labour shortage. According to recent political and chamber statements, this number has already risen to 500,000 (Volti, 2023).

In previous years, around 20% of guest workers, i.e., thousands of people, stayed in Hungary for short periods, using Hungary more as a stepping stone to other EU Member States. Hungary was more attractive for low-skilled workers.

Peak periods of work lasting a few months are a feature of agriculture, when the surge in farm labour demand requires large numbers of seasonal workers. In our country, the seasonal workers indicated in previous years were mainly domestic seasonal workers recruited from the older generation, as well as such workers from Romania and Ukraine, where wages are lower. From 80 percent of total seasonal workers at the beginning of the millennium, the share of seasonal workers has declined to 30 percent of total such employment. The expansion of employment opportunities in Western Europe and the narrowing of wage differentials between the domestic and neighbouring countries have played a significant role in the reported decline (Hamar, 2011).

Overall, the labour market is facing a future in which labour shortages are becoming more widespread in more and more countries and it is becoming increasingly difficult to retain staff within organisations. Reducing staff turnover is an increasing challenge for organisations. In the future, organisations will have to pay attention to this problem, as competition for skilled labour will increase. Those who can retain valuable staff and reduce turnover within their organisation will gain an advantage in the competitive market, and companies that can innovate, are open to innovation and are bold in their move towards robotisation and automation will make

significant progress. Certainly, there is a need for a thorough analysis of the negative or positive extent of automation, its effects on the labour market and how to respond to these effects in the future (Cho & Kim, 2018; Eurostat, 2018). So, a new opportunity, a new direction, is emerging as a solution to the labour shortage, and it is robotisation. The pace of development of robotics and artificial intelligence is a cause for concern, as it could lead to job losses, once described by Keynes (1930) as "technological unemployment".

1.2. GENERAL SOCIAL-ECONOMIC SITUATION

Before the Covid-19 pandemic at the end of 2019, the global, regional and national economies were in good shape. Growth data and prospects were encouraging:

- Developed world: 2%
- Global world: 3%
- Eastern Europe: 4%
- Hungary: 5%

Unemployment also showed a very positive picture in 2019:

- Global: 5.7%
- Hungary: 3.5%

The impact of Covid-19 was mainly observed in 2020, with the exception of a few countries (e.g., China, Ireland, etc.), with a significant economic contraction worldwide, but this was significantly corrected in 2021 as the economy rebounded.

Table 3: GDP growth worldwide

Areas	2020	2021	2022
Global	–4.80%	5.50%	3.60%
USA	–4.20%	4.20%	3.10%
China	2.60%	6.50%	3–3.7%
EU-27	–7.50%	5%	2.70%
EU-euro	–8%	5%	2.70%
Hungary	–4.8%	7.1%	3.60%

Source: Authors' own editing

Covid 19 caused unemployment to soar, but it was much lower than most experts expected:

- Global: 8% of 3.5 billion people employed
- Hungary 4.5% (now back to 3.5%)

The main labour market-related impacts of the three waves of the Covid-19 epidemic are summarised below:

- The coronavirus epidemic has devalued and made dangerous many jobs due to overcrowding (see health).
- Employers have had to find more complex and innovative ways to retain employees.
- The pandemic has led to the emergence of new HR functions: the pandemic plan (hygiene, health and safety, isolation) has become a strategic area of importance and organisations need to be prepared to operate flexible work organisation solutions in the long term.

After a year of war between Russia and Ukraine, most organisations are currently pursuing a cautious business strategy and are not yet prepared to take drastic change management steps. Nevertheless, they are looking for opportunities to exploit the market changes that the war has brought.

1.3. RETENTION

In today's organisations, it is not just attracting talent that has become increasingly difficult, but also retaining it. In most cases, it takes a long, time-consuming selection process to find the right potential employee for the job. In many cases, it is not even possible to do this alone, so we need to call in external specialists, recruitment agencies or headhunters. Today, it is as difficult for organisations to retain staff as it is to attract them. It is therefore necessary for companies to retain the workforce they have already acquired. How? First and foremost, by creating a work environment in which employees feel comfortable (Surji, 2013).

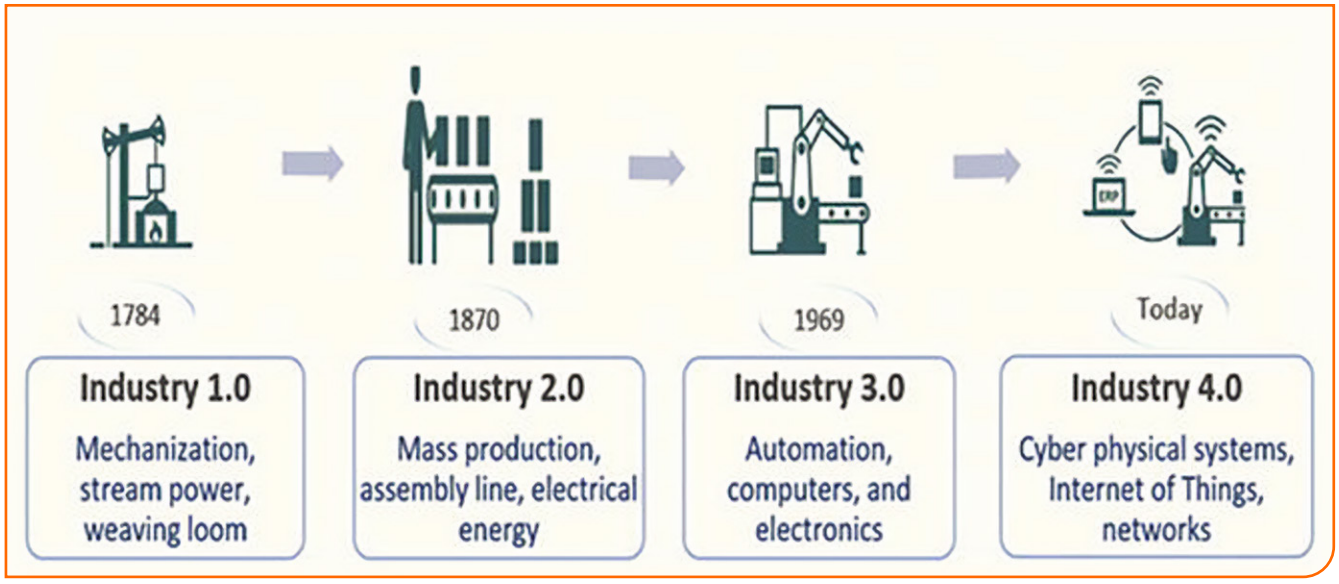
The level of wages and other benefits is also important for retention, but this trend is increasingly being overshadowed by other demands from employees. For the physical workforce, another influencing factor is treatment. If a worker's work is recognised, valued and his or her needs are listened to, this has a motivating effect on performance and engagement (Workforce, 2019, Gere, 2019).

In general, it has become increasingly important for most employees to work in a good atmosphere and to be given challenging but manageable tasks. In summary, retaining employees and reducing employee turnover is key to any successful organisation.

1.4. IMPACTS OF DIGITALISATION AND ROBOTISATION

Some argue that today's labour shortages will soon disappear as a result of the new type of robotisation (Ford, 2016; Hortoványi *et al.,* 2020). Previous research suggests that 47% of jobs in the US are at risk from robotisation (Hess & Ludwig, 2017). The development of new technology will transform nearly three quarters of physical jobs by 2030. However, we also need to take into account that the impact of new digital technologies will mean that not only physical jobs, but also intellectual jobs, will increasingly require less of the expert work that doctors, lawyers and various experts, among others, provide (Geoffroy-Schulz, 2015). Bolstrom (2014), in his book Superintelligence, argues that machine intelligence has the potential to surpass the human brain in all respects, defining it as superintelligence. Over the last 250 years, the mechanisation of industrial and agricultural farms has changed significantly. Some believe that the 5th Industrial Revolution (Industry 5.0) is imminent, offering humanity more humane and environmentally oriented solutions than ever before *(Figure 3)*.

Figure 3: Main stages of the industrial revolutions



Source: Elsayed, F & Abdelmajied, Y., 2022

In addition to the concept of Industry 4.0, as described above, we are already seeing the term Agriculture 4.0 (Landwirtschaft 4. 0, in English smart agriculture, smart farming or digital agriculture) (Szőke & Kovács, 2020). The trends in Agriculture 4.0 that have been highlighted include the spread of digital and drone technologies and smart farming (Nagy, 2022). The next 5.0 era in agriculture will see the widespread use of robots and artificial intelligence.

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Source: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://metszetek.unideb.hu/files/metszetek_201804_02.pdf

2. METHODOLOGICAL FOUNDATION OF THE RESEARCH (GÁBOR HOLLÓSY-VADÁSZ)

'No research without action,
no action without research'.

Kurt Lewin[4]

2.1. RESEARCH OBJECTIVES

The research presented in this paper aims to achieve the following objectives:

- The results of our investigations will show the situation of labour shortages in the sector under study, based on the responses of companies and institutions.
- The results of our investigations show the good practices that have emerged in the sector under study in terms of staff retention, based on the responses of companies and institutions.
- We also investigated what efficiency improvement and robotisation programmes are planned or have been implemented by the responding organisations.

2.2. RESEARCH METHODS AND METHODOLOGY

Our empirical study is basically ex-post (Usunier at al., 2017), i.e., we used the data of the observation period to investigate the practices related to labour shortages and labour retention as well as robotisation in Hungary. In the Hungarian literature, there are several examples where research on agriculture sticks to a descriptive treatment of data, using statistical tests and their associated significance calculations without looking for causal relationships and cointegration between variables (e.g., Mezei & Gombkötő, 2022; Béresné & Maklári, 2021). In line with this research attitude and the "Exit – re-entry – growth" approach (Poór, et al, 2022), we use descriptive statistical methods (e.g., percentages, mean, standard deviation) and do not aim to create statistical models. (Path analysis is one of the statistical methods that can be used for modelling. Path analysis can be used to examine latent variables through indicators (Hair, Ringle, Sarstedt (2011). Indicators are variables that we can measure directly. Latent variables are those variables that cannot be measured directly but can be made measurable through factor analysis via indicators (Kazár, 2014). For data analysis, we use the SPSS 26.0 software package. SPSS stands for Statistical Package for the Social Sciences. The use of this program has become particularly popular in social science research (Sajtos & Mitev, 2007).

In the future, we plan to re-analyse the data collected in this research using statistical modelling techniques (e.g., path analysis) and publish the results in international journals.

Our questionnaire contained a total of 24 questions. The indicated questionnaire uses closed questions in most cases to facilitate statistical analysis. These include multiple-choice questions as well as questions that can be answered on a 5-point Likert scale.

[4] Kurt Lewin (1890–1947) German-American social scientist

Of the pre-written answers, which cover a wide range of topics, respondents were asked to indicate the most typical ones. The questionnaire used consists of the following 4 main sections:

- The first part examines the data and main characteristics of the surveyed organisation (companies, institutions) and its activities.
- The second part of the questionnaire asks about characteristics related to staff turnover and shortages.
- The third part deals with questions on organisational (company and institutional) measures related to staff retention.
- The fourth part looks at opinions and experiences of robotisation.

Most of the responses were obtained through an on-line web-survey, the typical screen format of which is illustrated in the following questionnaire *(see Annex 1)*. The online survey was conducted in the summer of 2022.

2.3. LIMITATIONS

As we wrote earlier, labour shortages in various forms have become common in our region. Such a complex issue can be looked at from many different angles. Consequently, a number of limiting factors can be highlighted.

- The time and financial resources available in the present research allowed us to examine mainly the management and governance aspects.
- The capacity and data collection experience of the research partners allowed for a different number of responses to be collected.
- Since our research was essentially benchmarking (Evans, 1977) in nature, the responses collected are not representative.

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Source: https://devimpactinstitute.com/courses/data-management-and-analysis/training-on-research-methodology

3. RESPONDING ORGANISATIONS (GÁBOR HOLLÓSY-VADÁSZ AND JÓZSEF POÓR)

'We must continue on the path of globalisation. Globalisation is good ... when trade stops, war comes'.

Jack Ma[5]

3.1. RESPONDING ORGANISATIONS

The general trend in Hungary and in the European Union is that the number of agricultural enterprises is steadily decreasing, but this is not accompanied by a decrease in the volume of production. While the number of agricultural enterprises in Hungary was 350,000 in 2010, based on the new threshold calculation, it decreased to 234,000 in 2020 (KSH, 2020; KSH, 2022a; Valkó, Kincses & Kovács, 2022).

A total of 144 Hungarian organisations participated in the present survey. All of these organisations are active in agriculture.

3.2. OWNERSHIP

The 13,900 foreign affiliates, which account for just under 3% of all enterprises in Hungary, employ nearly 25% of the domestic workforce, but produce nearly half of the value added of the corporate sector (KSH, 2020).

In 1993, there were only 250 dual-registered foreign-owned firms in Hungarian agriculture. This number increased to 800 in 2003. In both periods, the share of foreign-owned enterprises accounted for 10 percent of all enterprises (Antal & Guba, 2005). Today, this figure is probably very low, as no such data for agriculture appears among the 13 branches of the economy listed in the KSH publication "Foreign-controlled enterprises in Hungary, 2020" (2020).

The breakdown by ownership form of our present survey is illustrated in *Table 4*. The majority of the organisations (87.5%) are under private domestic ownership. There are 4 (2.8%) organisations in the study sample that are under domestic public ownership.

Table 4: Distribution of ownership (N,%)

Ownership form	N	%
Domestic private	126	87.5%
Domestic public ownership	4	2.8%
Foreign	9	6.3%
Mixed	5	3.5%
Total	**144**	**100%**

Source: Authors' own editing

[5] Jack Ma (1965), Chinese businessman, founding owner of AliBaba, a Chinese multinational technology company specialising in e-commerce, retail, internet and technology

3.3. SIZE – NUMBER OF STAFF

The total number of people employed in Hungarian agriculture, forestry and fisheries exceeded 200,000 in 2022, according to the Hungarian Central Statistical Office, of which nearly 55% are permanent employees and 45% are temporary workers. The distribution of the reported number of employees is 181,200 in agriculture, 18,000 in forestry and 2,200 in fisheries (Kiss-Vranett, 2020).

Table 5 shows that most of the organisations in the study (40.3%) employ between 10 and 50 people. Only 2 (1.4%) organisations with more than 1,000 employees were included in the sample. In other words, the vast majority of our study sample are small enterprises.

Table 5: Size- number of staff ratio (N,%)

Number of staff	N	%
0	4	2.8%
2–9	41	28.5%
10–50	58	40.3%
51–100	14	9.7%
101–250	13	9.0%
251–500	8	5.6%
501–1000	4	2.8%
above 1000	2	1.4%
Total	**144**	**100%**

Source: Authors' own editing

3.4. SIZE – REVENUE-BUDGET

Table 6 shows that more than one third (35.4%) of the firms had a turnover between 300,001 and 3,000,000 EUR. More than a quarter of firms (27.8%) had a turnover between EUR 3,000,001 and EUR 30,000,000. Three organisations had a turnover of more than EUR 300,000,000.

Table 6: Breakdown of revenue and budget (N,%)

Revenue	N	%
below 30.000 EUR	9	6.3%
between 30.001 – 300.000 EUR	29	20.1%
between 300.001 – 3.000.000 EUR	51	35.4%
between 3.000.001 – 30.000.000 EUR	40	27.8%
between 30.000.001 – 300.000.000 EUR	10	6.9%
over 300.000.000 EUR	3	2.1%
no reply	2	1.4%
Total	**144**	**100%**

Source: Authors' own editing

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Source: https://www.crowe.com/cybersecurity-watch/8-ways-organizations-responding-recent-high-profile-cyberbreaches-dgs

4. LABOUR SHORTAGE-LABOUR RETENTION (ZSOLT KŐMÜVES, GÁBOR SZABÓ-SZENTGRÓTI AND ERIKA VARGA)

'The sons bury their father in peace. In war, fathers bury their sons'.

Herodotos[6]

'We can successfully prepare for the challenges of the future by intelligently understanding what is possible from the past'

Jared Diamond[7]

4.1. IMPACT OF CORONAVIRUS CRISIS ON THE ORGANISATION

The impact of the coronavirus has taken many forms in the labour market, with some sectors being forced to shut down or go into recession, mainly those economic activities and sectors that require personal presence for production or those that rely heavily on inputs from global supply chains (James, 2020). In addition, there were sectors where traditional work was replaced by teleworking, and thus they were able to maintain continuity of operations thanks to digitalisation, thus reducing the risk of unemployment (Karácsony & Pásztó 2020). Finally, there were sectors (e.g., e-commerce, computing, food processing) that were positively affected by the coronavirus crisis due to increased demand for services or products from this sector (Gyenge, 2021; Fabian 2021). Measures restricting the free movement of people were introduced to slow the spread of the epidemic. Reductions in working hours, forced stoppages, digital education or home office options introduced in certain sectors have not been applied in most of the agricultural sector, as there is no teleworking in continuous production or animal care.

In the case of agriculture, the primary objective was to ensure the food supply of the population, and therefore the continuity of agribusiness and the minimisation of risks had to be ensured at the same time (Zsoldos, 2020). It was therefore important to retain the workforce and ensure that work could continue uninterrupted even during times of constraints. The lockdown restrictions (Government Decree 71/2020 (27.3.2020), which came into force on 28 March 2020, made it possible to carry out agricultural and forestry work, thanks to the contribution of the National Chamber of Agriculture (NAK). In addition, the NAK and the Hungarian Chamber of Commerce and Industry (MKIK) also proposed to provide for commuting and regular cross-border workers and to extend the cost of commuting to the use of private cars.

Table 7: Impact of the corona crisis on labour retention (N,%)

Impact	N	%
There is an impact	33	22.9%
There is no impact	111	77.1%
Total	**144**	**100%**

Source: Authors' own editing

[6] Herodotos; (484–425 BC) Greek philosopher
[7] Jared Diamond (1937) Pulitzer-prize winning American historian

The results shown in the table suggest that the Covid-19 crisis has not had a major impact on labour retention. The explanation probably lies in the fact that both employers and employees were adjusting to survive, so that neither actor had an interest in leaving the other. Employers were facing labour shortages, yet employees were facing economy-wide redundancies, so neither party sought to terminate employment, and consequently there was little need to employ retention strategies.

4.2. THE IMPACT OF THE RUSSIAN-UKRAINIAN WAR ON THE ORGANISATION

The Russia-Ukraine war in 2022 has caused serious problems for global agricultural markets, as both Russia and Ukraine are major exporters of cereals, wheat, maize, oilseeds (especially sunflower) and fertilisers. Energy prices started to rise as early as autumn 2021 but were regularly shot up after the outbreak of the war, which also underpinned the sharp rise in prices of key agricultural commodities and inputs. In Hungary, both the costs of agricultural production and the average prices of non-investment related inputs increased much more than the EU average (Szedlák, 2022). As described above, the outbreak of the war has fundamentally rearranged the problem map of enterprises/organisations (Becsák, 2022). Examples include the problems of disruption of supply chains, declining demand, declining exports and the impossibility of transport routes.

Table 8: Impact of the Russian-Ukrainian war on labour retention (N,%)

Impact	N	%
There is an impact	33	22.9%
There is no impact	111	77.1%
Total	**144**	**100%**

Source: Authors' own editing

The question arises whether these problems have an impact on employment and whether they cause problems in retaining staff. Looking at the impact of the negative consequences of the war, just under a quarter (22.9%) of responding organisations reported that retention had been a problem as a consequence of the war.

4.3. IMPACT OF LABOUR SHORTAGE ON THE ORGANISATION

Even before the outbreak of the armed conflict, there were already significant labour shortages in domestic markets, and the war has exacerbated these trends *(Table 9).*

Table 9: Has your organisation been affected by labour shortages? (N,%)

Impact	N	%
There is an impact	80	55.6%
There is no impact	64	44.4%
Total	**144**	**100%**

Source: Authors' own editing

According to *Table 9,* 55.6% of the responding organisations reported staff shortages and related problems. This is explained by the fact that agricultural work is not a popular occupation for either young or old people.

This is true even though working conditions have improved a lot in recent times (air-conditioned cabins, precision farming, etc.) Much of it is hard physical work, working conditions are poor – exposed to the weather – and crop and livestock farming is dangerous, dirty and odourless. The working hours are not optimal either, as livestock farmers have to work on holidays and Sundays, while crop farmers cannot work 8 hours a day in summer and are out of work in winter. Not to mention that a permanent farm worker can only be employed with the right qualifications and skills. It is not possible to approach animals, techniques or even plants without serious training. In fact, with the advance of Agriculture 4.0 and precision farming, more and more skilled workers are needed.

Table 10: Hard-to-fill jobs in each country (N,%)

Positions	N	%
skilled worker	5	3.5%
animal keeper	11	7.6%
butcher	1	0.7%
project writer	1	0.7%
buyer	1	0.7%
warehouseman	1	0.7%
manual / physical labour	24	16.7%
milker	7	4.9%
developer	1	0.7%
machine operator	20	13.9%
animal breeder	3	2.1%
locksmith / welder	1	0.7%
manager	8	5.6%
cashier	2	1.4%
herdsman	2	1.4%
maintenance worker	3	2.1%
plant breeder	1	0.7%
scale	1	0.7%
service technician	4	2.8%
finance officer	1	0.7%
administrator	2	1.4%
mechanic	1	0.7%
vineyard worker	1	0.7%
poultry keeper	2	1.4%
logistician	1	0.7%
electrician	3	2.1%
consultant	1	0.7%
calving assistant	1	0.7%

Positions	N	%
groom	1	0.7%
regional representative	1	0.7%
exhibition organiser	1	0.7%
veterinarian	1	0.7%
cook	1	0.7%
casual work / day job	1	0.7%
salesman	2	1.4%
No answer	26	18.1%
Total	**144**	**100%**

Source: Authors' own editing

The three most difficult agricultural jobs to fill *(Tables 11)* are headed by the following three job groups:

1. Physical workers
2. Engineering jobs
3. Sales jobs

Among the jobs requiring agricultural skills, the most problematic shortages are in the occupations of machine operator, milker, animal keeper and animal breeder.

As described above, it is therefore obvious to support and fill the vacant positions through a significant influx of foreign workers, mainly from Ukraine, China and India (Nagy, 2022). According to estimates, the number of Ukrainian workers in Hungary is currently estimated at around 100,000. The overwhelming majority of them have been working in Hungary for several years, i.e., long before the outbreak of the war, mainly in agriculture, construction, electronics, manufacturing and catering. Their accelerated employment was also facilitated by a government decree of 10 March 2022, which states that "employers who employ people arriving from Ukraine after 24 February will receive a subsidy of 60,000 forints per month for up to one year. The subsidy is conditional on the employer providing for the organisation of the conditions for the employee's travel to work and accommodation for the employee and his/her child." HR expert Mihály (2022) said that "there is a constant need for new staff at the moment, so they are happy to reduce the shortage of partners.

4.4. REASONS FOR LABOUR SHORTAGE

Table 11 shows the general factors that led to labour shortages in the jobs identified in the research. For each of the jobs studied, there are a number of factors that influence the development of labour shortages, but different factors have different degrees of influence on the development of labour shortages.

Table 11: Causes of labour shortages in the region on average (Average)
(Please rate the prevalence of each cause for the given job 1=not at all and 5=very high)

Reasons	Specialists with a higher education degree	Buyers	Administrative staff	Physical workers
Labour-draining effect of competitors	3.15	3.25	3.08	3.59
Wages are too low	3.12	2.87	3.20	3.40
Lack of skilled labour	3.71	2.93	3.01	3.75
Emigration abroad	2.74	2.73	2.57	3.14
Problem with the education system	3.09	2.76	2.75	3.11
Poor working conditions	2.31	2.18	2.02	2.53
Emergency situation due to Covid 19	2.15	2.43	2.23	2.26
Situation due to the Russian-Ukrainian crisis	2.10	2.28	2.06	2.13
Lack of transport infrastructure (difficult access to workplace)	2.36	2.18	2.22	2.41
Difficulties in reconciling work and private life	2.80	2.64	2.31	2.61

Source: Authors' own editing

When looking at job groups, the results show that the main reasons for the shortage of skilled workers at tertiary level are the lack of skilled labour, the draining effect of competitors and too low wages. As is well known, there are shortages of occupations where there is very strong competition from organisations for young, newly qualified professionals. These include agricultural engineers, inseminators and production managers. Often, larger organisations contract their future colleagues during the students' university years as part of a mentoring programme. The main reasons for the labour shortages in the administrative and sales job groups are competition from competitors. The labour shortages in the manual worker job group are very high, due to a lack of skilled labour, the draining effect of competitors, and the lower number of people of working age in the labour market due to excessively low wages. As is known from international and national research data, the labour outflow has been highest for manual and skilled jobs.

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Source: https://www.impactmapping.org/

5. HIRING FOREIGN WORKERS (VIRÁG WALTER AND KLÁRA VERESNÉ VALENTINYI)

'Foreign aid is a way for the United States to maintain its position of influence and control around the world'.

John F. Kennedy[8]

5.1. EMPLOYMENT AND DATE OF EMPLOYMENT

According to a study of 2019 prepared by the European Parliament, in 2018, 4.1 percent of the EU working-age population (20-64 year olds) were long-term residents in different Member States. This level of mobility can be considered relatively low when compared to the United States, another continent-sized integrated economy, where two percent of citizens move to another federal state each year. In both the US and the EU, labour mobility is free, but the single common language used in the US and the easier recognition of qualifications are said to be the key differences in the labour market. In the EU, 24 official languages are used and the recognition of professional qualifications in the Member States is also difficult (European Parliament, 2019).

According to Dennison (2019), labour shortages threaten the sustainability of agricultural production in the US. Since 2000, more than 50% of those employed in crop production have been unregistered (illegal) foreign workers. Given that 6% of agricultural businesses account for 75% of agricultural production, the lobbying power of these organisations is crucial in making policy decisions on migration.

According to the Hungarian Central Statistical Office, the number of foreign nationals residing in Hungary in 2022 increased by 38% compared to 2015. While previously 27% of them stayed in the country for employment purposes, by 2022 this proportion has risen to 37% (KSH, 2022a).

Employment characteristics differ between sectors of agriculture. In the livestock sector, labour demand has remained unchanged, but in crop production, seasonal work is more common. There is significant labour migration from the western part of Hungary to Austria, while a significant number of seasonal workers arrive from the east to the eastern borders of Hungary (Orbán & Szabados, 2017).

Large numbers of seasonal workers are needed during peak periods of a few months for the agricultural workforce. (Hamar, 2015)

Table 12 shows the distribution of employment in responding organisations.

Table 12: Employment of foreign workers

Employment	N	%
Foreign workers are employed	15	10.4%
Foreign workers are not employed	128	88.9%
No answer was given	1	0.7%
Total	**144**	**100%**

Source: Authors' own editing

[8] JFK (1917–1963) American politician who was the 35th President of the United States from 1961 until his assassination in 1963.

The small size of most of the responding organisations (more than 60% have fewer than 50 employees) explains why 88.9% of them do not employ foreign workers and only 10.4% make up for the labour shortage with foreign workers.

According to KSH data for the first quarter of 2022, there are 87,000 job vacancies in Hungary. The different structure of supply and demand in the different sectors makes it difficult to fill vacant positions in several areas. In this context, the number of workers of foreign nationality employed by domestic employers has continued to rise, increasing by 18% to 67,000 in one year (KSH, 2022b). One of the reasons for the labour shortage in Hungary is unfavourable demographic trends (Poór *et al.,* 2018; Gelencsér *et al.,* 2020; Hárs, 2016). According to Szabó (2020), the HR practices of domestic SMEs have not been transformed, but new ones have emerged as a result of labour shortages and new action plans have been developed. According to Bakó-Lakatos (2022), employers are increasingly in need of foreign workers due to the increasingly limited labour supply in Hungary. In 2019, an annual average of 56.4 thousand foreign people worked in Hungary in enterprises with at least five employees and in budgetary institutions. This number decreased slightly in 2020 due to the epidemic, but showed a steady increase in 2021, resulting in an average of 61.3 thousand foreign employees.

Table 13 shows the year in which the employment of foreign workers started in the organisation.

Table 13: Date of employment of foreign workers (Question: 15.c.)

Date of employment	N	%
Never	127	88.2%
1999	1	0.7%
2010	1	0.7%
2017	1	0.7%
2019	2	1.4%
2020	2	1.4%
2021	4	2.8%
2022	6	4.2%
Total	**144**	**100%**

Source: Authors' own editing

As is seen in *Table 12,* the trend of hiring foreign workers shows a significant increase in their employment by the responding organisations from 2019 onwards, and an even more dynamic increase in 2022.

According to the European Commission's study on labour mobility within the EU (2022), in 2020, countries with the highest number of emigrating workers were Romania (20%), Italy and Poland (together 20%), and Portugal, Croatia and Bulgaria (together 20%). The countries receiving the largest number of workers were Germany (1/3 of total mobility) and Spain, Italy and France (also 1/3 of total mobility). The 20-49 age group accounted for 55% of labour mobility. The sectors most affected by labour mobility within the EU are the construction industry and the hotel and catering industry. According to the study, foreign workers from other Member States are under-represented in agriculture compared to domestic workers (European Commission 2022).

According to data from the National Employment Service (NFSZ), only 2.7% of the individual work permits issued in Hungary in 2021 were for employees in the agricultural, forestry and fishing sectors. In terms of territorial distribution, the region of Central Hungary stood out by more than 60%. The inflow of workers mainly came from the Far East (Vietnam, China, South Korea), but the number of workers from India and the Philippines has also increased significantly in the last year. In the case of employment of workers from other EU Member States and certain third countries subject to specific legislation, employers have only notification obligation. Employees belonging to this group were mainly employed in the region of Northern Hungary, mainly in agriculture, forestry and fishing, with a rate of employment of 12.3%, followed by the processing sector. The share of Ukrainian workers is the highest, yet their number has decreased by 12.6% compared to the previous year (NFSZ, 2021), which can be explained by the effects of the Russian-Ukrainian war.

Bakó & Lakatos (2022) agree that most foreign workers come from Ukraine, accounting for one third of foreign workers in 2021. Romania and Slovakia rank in second and third places, albeit with significantly smaller numbers, but it should also be noted that these countries are sending and receiving countries at the same time. Serbia ranks fourth in terms of the number of foreign employees, but workers also come from as far as Vietnam, India and Mongolia. *Table 14* shows the countries from which workers arrive to the organisations.

Table 14: Countries of Origin

	From EU-countries	From non-EU-countries	Asia	Others	Total
Total	**3**	**6**	**3**	**3**	**15**

Source: Authors' own editing

According to the responding organisations, most of their foreign workers come from European countries that are not members of the EU (Ukraine, Serbia), followed by foreign workers from EU countries (Romania, Italy, Slovakia) and Asian countries.

According to Bakó & Lakatos (2021), mass labour migration is still not desirable in Hungary, but the recruitment of foreign workers has been increasingly demanded by the Hungarian economy in recent years. In recent years, there has been a tendency among workers to arrive from distant countries, partly in an organised way, but the sending countries have still been mainly neighbouring non-EU countries such as Ukraine and Serbia. From July 2017, it has become legally much easier for citizens of these two countries to work in Hungary. As a result, in 2019, 52,000 non-Hungarians were employed by businesses employing at least five employees, more than double the number of such employees in 2015. Foreign workers were typically employed in unskilled jobs that didn't require professional expertise and could be filled after a short training session.

The article in World Economy (Világgazdaság, 2022) reports that Hungary has been receiving a good number of workers from neighbouring countries, but the current Russian-Ukrainian situation has forced HR services companies to rethink their recruitment practices and replace the Ukrainian workers, whose number has been decreasing due to the war. According to a government amendment to Government Decree 407/2021 (8 July), the Hungarian government has now made it easier for workers from fifteen countries to take up employment in Hungary through qualified labour hiring agencies. As a result, companies operating in Hungary can fill labour shortages with workers from Vietnam, Mongolia, the Philippines, Montenegro, Belarus, Russia, Indonesia, Kazakhstan, Northern Macedonia and Bosnia and Herzegovina.

Table 15 shows the number of workers coming from abroad by sending country.

Table 15: Areas of employment of foreign labour

	Blue collar workers	Sending countries
1.	9	Ukraine
2.	2	India
3.	1	The Philippines
4.	1	Croatia

Source: Authors' own editing

The responses of the surveyed organisations also reflect the data presented earlier, according to which most of the foreign workers employed in agriculture in Hungary come from Ukraine, and the share of Indian and Filipino workers in the sector is also increasing.

5.2. AREAS AND EXPERIENCES

Some agricultural sectors in the EU, such as the fruit and vegetable sectors, are very labour-intensive, which means that harvesting and packaging crops require a large number of farm workers for a short period of time. Similar to the US, EU agriculture is becoming more concentrated, with fewer and larger farms producing more and more, which increases the need for seasonal workers (European Parliament, 2021). According to Martin (2016), an increasing rate of seasonal workers are migrants from inside or outside the EU. According to a study by the European Parliament based on Eurostat data, Germany and the UK employ the highest proportion of seasonal workers from the EU. Germany employs 300,000 seasonal workers a year, mainly from Poland and Romania. At the same time, Spain receives seasonal workers from Morocco under a bilateral agreement, while France receives seasonal workers from Tunisia and Morocco under bilateral agreements. It is also due to the increasing number of foreign seasonal workers that the closures due to the COVID-19 epidemic led to severe labour shortages in European agriculture in 2020 (European Parliament, 2021).

According to Górny and Kaczmarczyk (2018), the employment of Ukrainian workers in Poland has become an essential and dominant feature of agriculture. This is particularly true for the labour-intensive and strictly seasonal fruit production, in which foreign workers account for up to 80-90 percent of the labour force in the high season. This has fundamentally changed the agriculture in Poland where family members had traditionally worked in the fields.

In Italy, migrant labour has become indispensable in many agricultural sectors. This applies not only to fruit and vegetable farms of seasonal production, but also to the dairy sector, which requires more skilled labour. The main reasons for this are the low attractiveness of agricultural work for Italian workers and the decline in family employment, i.e., the ageing of landowners and the lack of young farmers to replace them. In 2017, one third of the Italian agricultural workforce was made up by foreign workers. Employing foreign workers leads to lower labour costs and thus results in higher competitiveness (Antonioli *et al.,* 2023).

The EU perspective therefore shows that foreign labour in agriculture in Europe is moving northwards from southern (Mediterranean) countries and westwards from central and eastern European countries. At the same time, workers emigrating from the southern and eastern EU Member States have been mainly replaced in agriculture in these countries by workers from outside the EU: from the North African region and Eastern Europe (e.g., Ukraine).

According to the Survey of the Hungarian National Association of Workforce Hiring Agencies (MMOSZ) made in 2022, recruitment of the workforce in Hungary is getting more difficult that year, since internal migration of the workforce within the country has almost completely stopped. Employers are mainly looking for labour in Hungary, but according to their experience, that there aren't enough domestic workers in jobs high in demand

and of skills shortages or they do not apply for the jobs advertised. In addition, the demographic deficit is also contributing to the restructuring of the labour market. By employing foreign workers, however, production organisations can ensure their survival, thereby maintaining stability and preserving jobs.

According to the survey, foreign workers, especially guest workers from neighbouring countries, have a good work ethic, perseverance, diligence, and a good understanding of our culture (HR Portal, 2022).

Interviews with companies published in Trade Magazine (2022) also confirm the positive experience of hiring foreign workers, as workers from countries such as Mongolia, Kazakhstan, the Philippines and Indonesia have been found to be motivated, enthusiastic, punctual and reliable. Moreover, they speak English or Russian languages. According to the article, the advantages of hiring workers from emerging countries include the availability of a large number of workers and the fact that they can be employed in unskilled and skilled jobs. These organisations reported lower staff turnover and that they are conscientious, motivated and reliable workers.

Table 16 shows respondents' ratings on a Likert scale of 1 to 5 of their experience of employing foreign workers.

Table 16: Experiences of employment of foreigners

	Not at all typical (1)	Rather untypical (2)	Typical and untypical at the same time is (3)	Rather typical (4)	Fully typical (5)	Total
It is cheaper to employ them	10	4	4	3	0	21
They are hard-working	4	8	3	1	5	21
They quickly learned how to work here	4	3	5	5	4	21
They are reliable and honest in the work they do	4	1	5	9	2	21
They must be strictly controlled	6	3	7	3	2	21
Others	7	0	2	0	0	9

Source: Authors' own editing

Foreign labour is mainly used for jobs requiring easy-to-learn work processes. Based on the answers of the responding organisations, it can be concluded that, although, the employment of foreign workers does not mean lower costs for the organisations, foreign employees are reliable, honest and no strict control is needed in their employment. Organisations are therefore keen to employ them to ensure stability and quality production, although these workers are mainly recruited for easy-to-learn jobs.

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Source: https://content.wisestep.com/top-advantages-disadvantages-hiring-foreign-workers/

6. PROGRAMMES TO TACKLE LABOUR SHORTAGES AND RETAIN STAFF (KATA TÓTH, JÓZSEF POÓR AND BENCE SZELES)

'If you put the federal government in charge of the Sahara Desert, in 5 years there'd be a shortage of sand.'

Milton Friedman[9]

6.1. MEASURES TO RETAIN WORKERS

Hungary is currently experiencing a period of significant restructuring in the labour market. Unemployment rates have fallen to unprecedentedly low levels, while employment rates have been rising steadily. International labour migration and the structure of employment, such as the emergence of jobs of high demand and skill shortages, pose problems that are specific to the current situation. The highly skilled workforce is ageing and there is high staff turnover, making it increasingly difficult to replace competent and skilled workers with workers of the required skills. (Krajcsák, 2018) Different organisations are looking for employees for more jobs than there are employees available (Krajcsák & Kozák, 2018). An effective retention strategy includes measures across several human resource management activity areas, such as onboarding, mentoring and career management programmes, incentive management and meeting individual training needs. Thus, the integration of previously separate traditional HR functions becomes necessary in response to ever-changing contextual challenges. (Dajnoki & Héder, 2017).

Research on this topic indicates that organisational approaches to employee retention have changed considerably in the post-Covid period. Employers' flexible approach to employees, work-life balance, teleworking and working from home are seen by workers as essential and crucial advantages and benefits. (Nagy, 2021; Hays, 2022). There is also a growing demand for benefits that improve an employee's on-the-job experience. (Horváth & Kenesei, 2022).

Retention of the labour force in the agricultural sector is facing a number of challenges. Low wages and sometimes challenging working conditions are among the most common reasons why workers leave the sector (Gosztola, 2020). Due to the seasonal nature of the sector, a significant proportion of casual/temporary workers are employed, and it is now a challenge to retain these employees, which is a requirement in some tenders for subsidised investments. (Szilágyi, 2022).

The lack of access to training and education is also a major challenge for the retention of the labour force in the agricultural sector (Council of the European Union, 2023). In developed regions, one of the most significant problems is the lack of an adequately skilled labour force, which can be solved by improving access to education and training (EMEROP. 2006).

Limited career growth opportunities are also making it difficult to retain staff. Within the agribusiness sector, career growth opportunities may be more limited, leading to a decline in worker commitment (Mason, 2022). The vertical and horizontal development of career paths, job rotation, higher wages and a better work-life balance will improve the sector's ability to retain its workforce. (Council of the European Union 2023). Retaining workers within the agribusiness sector is particularly important as the number of workers in the sector continues to decline (Takarék Agrár24, 2020; GFK 2016).

[9] Milton Friedman (1912–2006) American economist and statistician who was awarded the Nobel Prize in Economics in 1976.

In our survey *(Table 17)*, 41% of respondents reported that they do not use any typical strategies to retain employees. The most common strategy mentioned by 22% of respondents was to provide a longer training period. Training opportunities and employee involvement in management decisions are also used by more than 10% of respondents, while mentoring programmes and job rotations are less common (10%).

Table 17: Typical measures taken to retain employees by survey respondents

Typical measures	Frequency	
	Frequency in numbers	Frequency in %
None	75	41%
Longer training period is provided	41	22%
Trainings are organised	29	16%
Involvement in management decisions	20	11%
Mentoring	16	9%
Job rotation	3	2%
Others	0	0%
Total	**184**	**100%**

Source: Authors' own editing

6.2. TOOLS TO RETAIN EMPLOYEES

In the international and national literature, several authors have examined the most effective tools for retaining staff. According to Csutorás (2022), the research of the following authors should be mentioned to identify the main factors of employee retention:

- Eight retention factors such as management, supportive work environment, social support, development and training opportunities, autonomy, compensation, adequate workload, and work-life balance have been identified by Christeen (2015).
- Rewarding and recognizing the work done, challenging tasks, opportunities for promotion and development, an inclusive workplace climate, good co-worker relations, work-life balance, good communication have been listed by Walker (2001).
- Job satisfaction, financial incentives, organisational commitment and organisational prestige are the reasons most often cited by Hausknecht et al. (2009) for retaining employees.

According to research conducted in Hungary in previous years, special training programmes and individual development plans are the most effective retention tools (Makkay-Chambers, 2016; Csedő-Poór, 2016). Another study found that in the manufacturing sector in Hungary, the most important retention factors are respect and appreciation, fair treatment, constructive workplace atmosphere, good management style and job stability (Gelencsér-Szigeti-Szabó-Szentgróti, 2020).

Retaining and motivating people in the agricultural sector is key to the success of the sector. However, low wages and difficult working conditions make it difficult to recruit and retain staff (Eur-Lex. 2012). Increasing the wages and improving the working conditions can be important measures to retain staff. As the agricultural sector is labour-intensive but wages have traditionally been very low, the increase in the minimum wages and the introduction of guaranteed minimum wages are required, which will substantially influence the cost of wages

in the sector. The average monthly gross earnings of full-time employees in this sector were 344,436 HUF in October 2021, the 2nd lowest in the private sector (Bazsik, Bujdosó & Koncz, 2022).

Access to training and education is also important for the retention of workers in the agricultural sector (Eur-Lex 2023), along with career opportunities (Vincze 2023). Retention of employees is also closely related to financial and non-financial incentives, career management, talent management, performance management, leadership approach and style (Csutorás, 2016).

Several researchers have found that employee satisfaction, i.e., job satisfaction and commitment to work, has a major impact on employee retention, as job satisfaction leads to innovative, creative and value-creating behaviour of employees in order to achieve organisational goals (Csíkszentmihályi, 1997; Gyökér – Krajcsák, 2009)

In the current survey, we also analysed the measures respondents have taken or are taking to retain their employees. Flexible working hours are at the top of the list of retention tools, listed in *Table 18*. Changing of the pay system is the second most common and widespread measure. The increasingly popular organisational wellbeing ranked ninth. It is worth drawing the attention of the organisations/employers to the important role of measuring employee satisfaction and engagement to influence organisational wellbeing. However, more than 50% of respondents do not wish to address this issue.

Table 18: Typical measures to retain employees

Programmes	Distribution of data (%)					Total %
	It has already been introduced	We plan to introduce it	We don't plan to introduce it	It can't be introduced	I have limited knowledge about it	
Flexible working hours	54.1	10.4	18.5	14.8	2.2	100
Change of the pay system	41.7	26.5	23.5	3.8	4.5	100
Others	41.7	26.6	23.5	3.8	4.5	100
Company car	37.1	4.5	35.6	18.9	3.8	100
Performance assessment system	36.2	26.2	26.9	6.9	3.8	100
Trainings	28.5	16.9	36.2	10	8.5	100
Long-term incentives	24	24	38	10	3	100
Dual training programme	22.5	14.7	37.2	18.6	7	100
Individual training and development	22.2	19.8	41.3	9.5	7.1	100
Wellbeing	16.4	13.3	38.3	10.2	21.9	100
Atypical employment	15.7	7.9	46.5	19.7	10.2	100
Measurement of employee satisfaction and commitment	14.5	15.3	51.9	8.4	9.89	100
Employee brand building	14	10.9	47.3	10.9	17.1	100
Career management	13.2	13.2	46.5	14	13.2	100

Source: Authors' own editing

6.3. EFFICIENCY OF THE TOOLS

The authors examining the issue mentioned argue that effective retention is a complex task that requires the alignment of the employer and the employee (Szabó-Szentgróti & Gelencsér, 2020; FitPuli, 2021). This alignment can be maintained by continuous monitoring, stakeholder consultation and complex remuneration packages (Kovács, 2020).

Our research found *(Table 19)* that flexibility, workplace atmosphere and the personality of the manager ranked in the top three most important factors for employee retention.

Table 19: Typical tools to retain employees

	Distribution of data (%)					Total (%)
	Not at all typical (1)	Rather untypical (2)	Typical and untypical at the same time is (3)	Rather typical (4)	Fully typical (5)	
Flexibility	0.7	3	17	60	19.3	100
Workplace atmosphere	0	1.4	10.1	57.6	30.9	100
Personality of the manager	0	3.6	16.1	51.1	29.2	100
Stability	1.4	2.2	8	47.1	41.3	100
Feedback	3.6	8.8	40.9	40.9	5.8	100
Predictable career path	5.9	11.9	37.8	34.8	9.6	100
Development and training opportunities	5.8	9.5	40	33.6	10.9	100
Job interview. first impression	9.6	17.8	46.7	20.7	5.2	100
Others	35.7	3.6	21.4	17.9	21.4	100

Source: Authors' own editing

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Source: https://thefarmermagazine.com.au/resolving-the-labour-shortage-in-ag/

7. CHALLENGES OF ROBOTISATION IN AGRICULTURAL ORGANISATIONS

(GÁBOR SZABÓ-SZENTGRÓTI, KATALIN SZABÓ AND ZSOLT SÁNDOR KŐMÜVES)

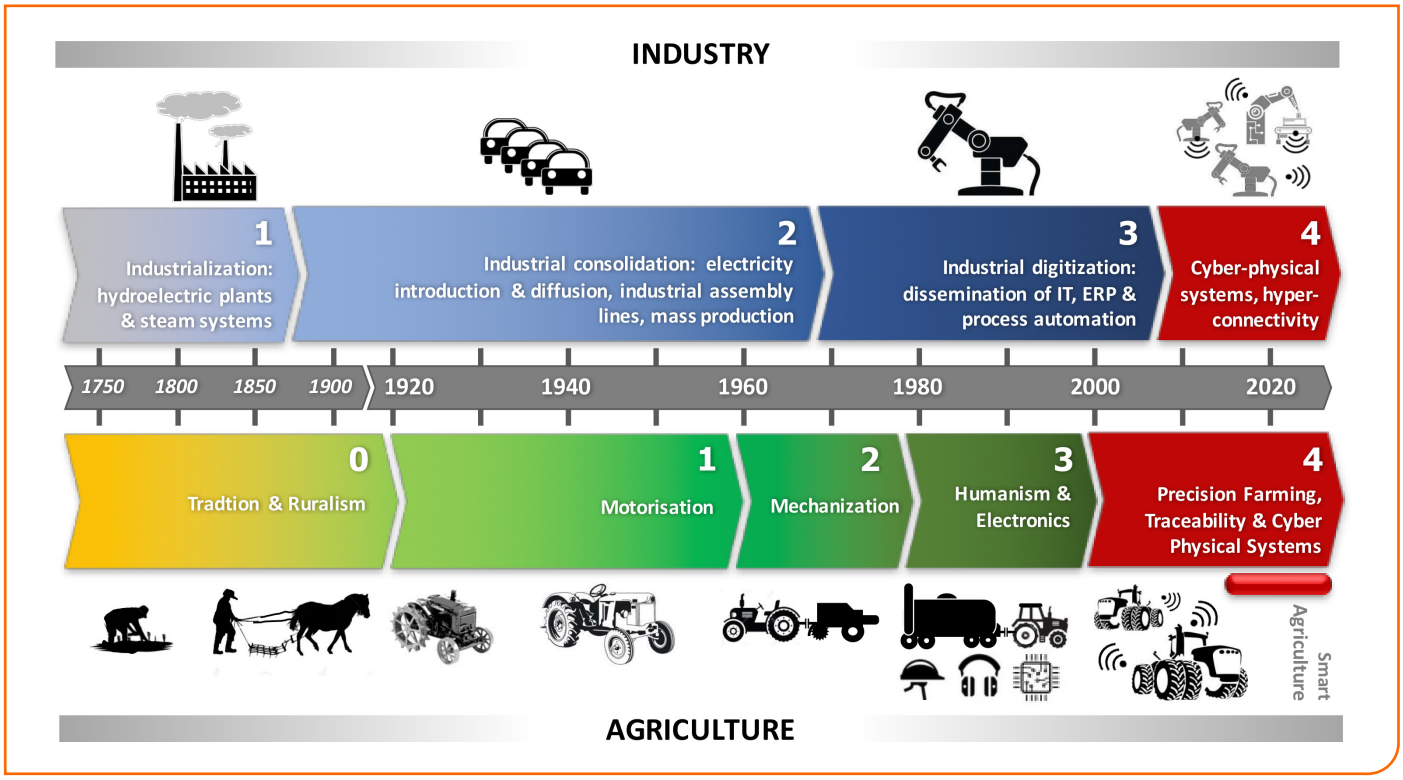
'We have no idea what the labour market will look like in 2050. There is a general consensus that machine learning and robotics will change almost every work process – from yoghurt production to yoga teaching.'

Yuval Noah Harari[10]

7.1. CHARACTERISTICS

The digitalisation of agriculture is being shaped by a number of global market, consumer and HR trends, while agricultural production has to cope with the rise of industry and alternative energy production systems (Sparrow & Howard, 2021). *Figure 4* illustrates the technological evolution of agriculture. The strategic importance of food production was already clearly highlighted during the pandemic period, yet agricultural land is still dominated by energy crops and solar parks. The UN Food and Agriculture Organization reports that by 2050, farmers worldwide will have to increase food production by more than 70 percent (Alexandratos & Bruinsma, 2012), while the proportion of arable land in Hungary has also decreased over the past decade (KSH, 2020). The answer to these challenges lies in improving the efficiency of agricultural production, which could be helped by robotic solutions.

Figure 4: The technical evolution of agricultural production



Source: Mazzetto, Raimondo & Sacco, 2020

[10] Yuval Noah Harari (1976) Israeli-born publicist and historian

There are already several schemes for robotisation in different areas of agriculture and several successful pilot projects have been launched. Research and development activity has been concentrated on milking robots and fruit harvesters. Robotisation is closely interrelated with Artificial Intelligence (AI), Information and Communications Technology (ICT) and Sensor Technology (ST) (Bártfai *et al.,* 2018). In addition to production processes, there is also potential for digital solutions in the area of business processes, but according to the latest agricultural census, Hungarian agricultural entrepreneurs mostly used digital solutions for banking and e-government (KSH, 2020).

The use of precision farming tools to support production tasks among farmers was extremely low, at 12% in 2020. The use of digitalisation tools is most widespread on farms with livestock for mass feeding, arable crops and mixed crops (KSH, 2020). In comparison, in Denmark the figure was 23% in 2018, with 57% of the total agricultural area already using precision tools (Lundo-Karsten, 2018).

The research results *(Table 20)* also confirmed that the potential of robotisation has not yet been exploited by Hungarian farmers.

Table 20: Which robotisation tools could be most effective in alleviating labour shortages?
(Please rank: 1-5 for the most economically efficient solution 1 = most efficient system, 5 – least efficient)

Statement	Country	Mean
The costs of robotisation are high and will only pay off in the long run.	Hungary	2.86
Robotic technology will become a workforce in the future.	Hungary	2.81
Robotisation can be a solution to staff turnover.	Hungary	2.78
Robotisation has the potential to replace monotonous work processes (e.g., human work on an assembly line).	Hungary	2.6
Robots and human labour can work together.	Hungary	2.58
Certain work processes can be carried out more reliably by using robots.	Hungary	2.49
The use of robots replaces human labour that is harmful to the human body.	Hungary	2.45

Source: Authors' own editing

Factors such as the low capitalisation of farmers, conservative ownership attitude and labour shortages may explain the lack of robotisation opportunities. The average of the results suggests that this technology is popular among farmers and partly explains our hypothesis. Farmers consider (mean score: 2.86) that the relatively high costs of investing in robotisation will only be paid back in the long run. They also see the technology as a solution, as it can be an alternative to dealing with labour shortages caused by staff turnover (2.78). In this context, robot-human cooperation (2.81) is also envisaged. The results draw attention to the optimistic view of technology. Respondents are confident in the technology under study, as they believe that the use of robots can replace the use of pre-processing work that is harmful to humans (2.45) and that the quality of work processes increases with the use of robots (2.49).

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8. RESPONDENTS – DEMOGRAPHICS (MIKLÓS DÚS AND GÁBOR HOLLÓSY-VADÁSZ)

'If someone irritates you, you are only irritated by your own response. Therefore, if someone seems to provoke you, remember that it is only your judgement of the case that provokes you.'

Epicteus[11]

8.1. GENDER OF RESPONDENTS

Similarly, in our research Recovery – Reopening – Growth (Poór, *et al.,* 2022), we also present demographic data on the study sample here. As shown in *Table 21,* 64.3% males and 35.7% females participated in the study.

Table 21: Distribution of respondents by gender (N,%) (Question:21-1)

Gender		Total
Male	N	92
	%	64.3%
Female	N	51
	%	35.7%
N/A	N	1
	%	0.7%
Total	N	144
	%	100%

Source: Authors' own editing

Compared to the data in *Table 22,* we can conclude that women are over-represented in our sample compared to men in terms of employment data. The proportion of women in our sample is 35.4%, while the proportion of women in agricultural employment has ranged between 26% and 27% in recent years.

[11] Epicteus (+135), Greek stoic philospoher

Table 22: Number of persons employed in agriculture by gender (2008–2020) / thousand persons

Year	Agriculture		
	total	male	female
2008	168.1	127.3	40.8
2009	174.9	129.6	45.3
2010	172.8	131.6	41.3
2011	184.6	137.8	46.8
2012	192.7	143.4	49.3
2013	184.6	137.7	46.9
2014	189.6	140.5	49.1
2015	203.2	153.8	49.4
2016	217.0	161.5	55.5
2017	220.0	164.5	55.5
2018	214.9	160.9	53.9
2019	210.7	154.1	56.6
2020	211.3	155.3	56.0

Source: Authors' own editing based on https://www.ksh.hu/docs/hun/xstadat/xstadat_hosszu/h_qlf017.html

8.2. AGE OF RESPONDENTS

Table 23 shows that more than half of the sample (52.8%) is aged 40-59. The lowest proportion of respondents (9%) were aged 18-29.

Table 23: Age of respondents (N,%)

Age		Total
18-29	N	13
	%	9%
30-39	N	22
	%	15.3%
40-59	N	76
	%	52.8%
60 and above	N	33
	%	22.9%
Total	N	144
	%	100%

Source: Authors' own editing

The data are substantially in line with the trends seen in the EU *(Table 24).* The vast majority of agricultural workers are in the 40-64 age group compared to the total employed population. It is reasonable to say that the profession is currently moving towards ageing. This is confirmed by *Figure 5,* which also shows that farm managers are predominantly over 54 years old for both genders.

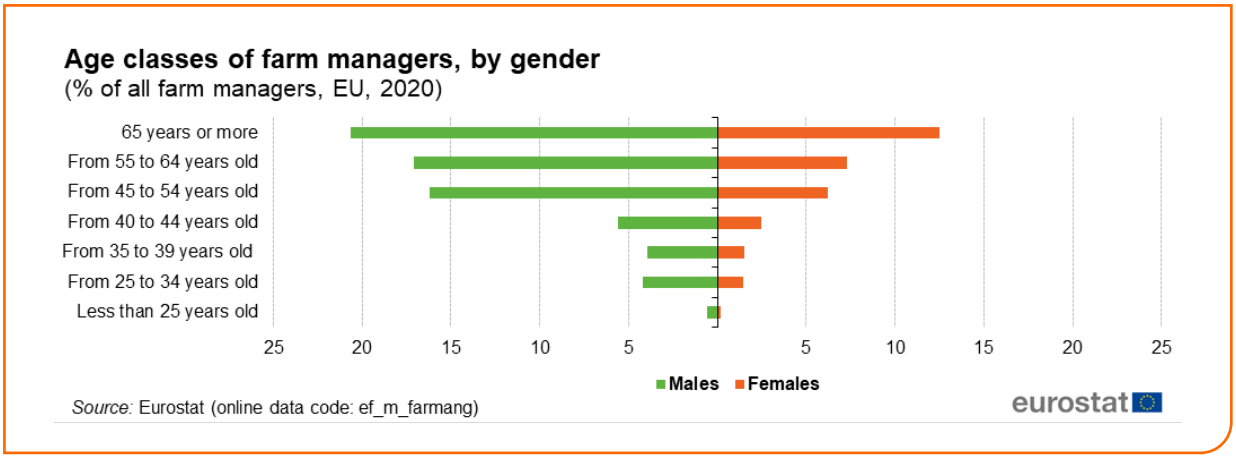
Table 24: Distribution of the working age population by age group in total and in agriculture, 2016 (LFS) (%)

	Total			Agriculture		
	15-39	40-64	65 and over	15-39	40-64	65 and over
EU-28	42.4	55.2	2.4	31.8	59.2	9.0
Belgium	44.1	54.9	1.0	26.9	64.6	:u
Bulgaria	40.2	57.8	2.1	35.3	60.7	:u
Czech Republic	41.8	55.8	2.4	32.7	63.8	3.5
Denmark	44.0	52.8	3.2	44.7	43.2	12.2
Germany	40.2	57.2	2.7	29.5	62.1	8.4
Estonia	42.4	52.6	5.0	29.9	64.4	:u
Ireland	46.3	50.4	3.3	22.2	56.1	21.7
Greece	40.3	57.9	1.7	24.8	68.4	6.8
Spain	40.6	58.5	0.9	36.9	61.3	1.8
France	42.6	56.1	1.3	30.3	66.0	3.7
Croatia	46.2	52.3	1.5	23.5	62.3	14.2
Italy	35.0	62.7	2.3	32.5	60.6	6.9
Cyprus	49.0	48.4	2.5	32.2	52.1	15.7
Latvia	42.7	53.8	3.5	26.5	67.9	5.6
Lithuania	41.4	55.4	3.2	25.7	66.5	:u
Luxembourg	48.3	51.3	0.4	50.0	45.8	:u
Hungary	43.0	56.0	1.0	35.0	62.9	:u
Malta	53.8	44.5	1.7	:u	73.7	:u
Netherlands	45.5	52.1	2.4	35.6	59.5	4.9
Austria	46.0	52.2	1.8	25.3	61.0	13.8
Poland	48.2	49.9	1.8	32.7	64.1	3.2
Portugal	39.5	55.4	5.1	13.9	44.5	41.6
Romania	44.0	52.7	3.3	35.3	51.1	13.6
Slovenia	44.6	54.1	1.4	25.8	57.0	17.5
Slovakia	46.5	52.7	0.8	36.0	62.1	:u
Finland	43.3	53.9	2.8	29.6	57.9	12.5
Sweden	43.7	52.8	3.5	32.4	52.4	15.2
United Kingdom	46.0	50.2	3.8	31.2	50.2	18.6
Iceland	46.5	47.8	5.7	21.2	66.7	:u
Norway	44.8	51.6	3.5	36.9	50.5	12.6
Switzerland	44.6	51.4	3.9	30.5	55.2	14.4
Former Yugoslav Republic of Macedonia	45.8	52.9	1.3	29.5	64.2	6.3
Turkey	57.5	39.8	2.7	36.5	53.5	10.0

u: low reliability.

Source: Eurostat (lfsa_egan2) and (lfsa_egan22d)

Figure 5: Classes of farm managers by gender and age



*Source:*https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Farmers_and_the_agricultural_labour_force_-_statistics

8.3. TYPE OF EMPLOYMENT

Table 25 shows that more than a third of the respondents (36.1%) were owners, with senior managers accounting for 29.9%. The lowest proportion of respondents (2.1%) were lower-level managers.

Table 25: Type of employment of respondents (N,%)

Position		Total
employee	N	18
	%	12.5%
junior manager	N	3
	%	2.1%
middle manager	N	27
	%	18.8%
senior manager	N	43
	%	29.9%
owner	N	52
	%	36.1%
other	N	1
	%	0.7
Total	N	144
	%	100%

Source: Authors' own editing

8.4. HIGHEST LEVEL OF EDUCATION OF THE RESPONDENTS

Table 26 shows that almost three quarters of the study sample (71.5%) had a tertiary education. The proportion with secondary education was 21.5%. The lowest response rate (6.9%) was for those with a vocational qualification.

Table 26: ighest level of education of respondents (N,%)

Iskolai végzettség		Total
Primary school	N	0
	%	0%
Vocational school	N	10
	%	6.9%
Grammar school or technical secondary school with a school leaving certificate	N	31
	%	21.5%
Higher education	N	103
	%	71.5%
Other	N	0
	%	0
Total	N	144
		100%

Source: Authors' own editing

The data in *Tables 27* show that the proportion of respondents differs from the European average, with the highest proportion of people with secondary education. In our country, we are in a better position than the EU average, with a lower share of lower educated (40.7% / 26.3%), a higher share of secondary (50.2% / 62.6%) and tertiary (8.9% / 11.1%) in the sample.

Table 27: The highest level of education of the respondents 2016 (LFS) (%)

	Total			Agriculture		
	Low	Medium	High	Low	Medium	High
EU-28	17.9	48.0	33.9	40.7	50.2	8.9
Belgium	16.4	39.8	43.9	29.4	50.6	20.0
Bulgaria	10.3	57.2	32.4	42.9	49.8	7.3
Czech Republic	4.1	71.9	24.0	4.1	84.5	11.4
Denmark	20.3	42.3	34.4	36.4	44.8	10.4
Germany	12.4	58.5	28.9	13.0	63.5	23.5
Estonia	9.8	50.2	40.1	27.2	52.9	19.9
Ireland	14.3	37.1	45.4	44.2	41.3	13.0
Greece	23.4	41.5	35.1	64.2	31.2	4.5
Spain	34.0	23.9	42.1	72.5	16.8	10.6
France	15.5	44.6	39.6	24.1	58.8	17.1
Croatia	10.3	61.9	27.9	47.8	46.6	:u
Italy	31.5	47.2	21.3	61.0	34.7	4.2
Cyprus	16.8	37.3	45.8	61.5	30.4	:u
Latvia	7.6	55.1	37.1	18.3	70.7	11.0
Lithuania	3.5	52.2	44.3	10.9	76.0	13.1
Luxembourg	16.1	31.4	41.6	:u	65.7	:u
Hungary	12.0	61.8	26.2	26.3	62.6	11.1
Malta	42.2	32.2	25.5	90.2	:u	:u
Netherlands	21.4	41.7	35.7	33.7	51.4	13.9
Austria	13.1	52.9	34.0	24.2	55.7	20.0
Poland	5.3	61.1	33.6	15.6	77.9	6.5
Portugal	47.7	26.0	26.3	87.6	7.9	4.4
Romania	20.5	59.0	20.5	54.9	43.5	1.6
Slovenia	8.8	56.6	34.6	37.2	53.8	:u
Slovakia	4.3	72.0	23.6	:u	87.9	6.8
Finland	10.8	46.2	43.1	23.7	56.7	19.6
Sweden	12.9	46.3	40.6	24.2	58.2	17.2
United Kingdom	16.3	40.4	43.1	29.9	44.4	25.5
Iceland	26.4	38.1	35.5	41.8	47.1	:u
Norway	16.7	39.9	43.4	26.2	53.0	20.8
Switzerland	13.9	46.7	39.1	18.0	54.8	26.7
Former Yugoslav Republic of Macedonia	19.2	54.6	26.3	54.8	41.3	3.9
Turkey	57.4	20.3	22.4	90.1	7.7	2.2

Note: Due to non-response data for some countries may not sum up to 100%.
u: low reliability.

Source: https://ec.europa.eu/eurostat/statistics explained/index.php?title=Archive:Farmers_in_the_EU_-_statistics&oldid=357530

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Source: https://www.questionpro.com/blog/study-population/

APPENDIX 1 – LIST OF RESPONDING ORGANISATIONS (ZSOLT SÁNDOR KŐMÜVES)

In this section, we have listed the organisations that have agreed to have their names published.

Table Appendix 1: Name of responding organizatison

No.	Name of responding organizatison
1.	Abonett Kft
2.	Agrár Kft.
3.	Agrár Offa Kft
4.	Agrária MGZRT
5.	Agrárközösség Kft
6.	AGRO KELL kft
7.	Agro Naturtáp Kft.
8.	AGROBÁL KFT.
9.	Agro-Gép Kft
10.	Agrokov TM Kft
11.	Agro-Kurd Kft
12.	Agromilk Kft.
13.	Agróna Kft.
14.	Agroprodukt Zrt
15.	Agroszász kft
16.	Agrovir Kft
17.	Állami Ménesgazdaság Szilvásvárad
18.	Állampusztai Kft /Tésztaüzem/
19.	ALPHA - VET Kft
20.	Alpha-Vet Kft.
21.	ANAS Mg. Szövetkezet
22.	AXIÁL KFT
23.	Bagodi Mezőgép Kft
24.	Balaton-Ker-Tész Szövetkezet
25.	Békési Pig-Farm KFT.
26.	Belvárdgyulai Mg. Zrt.
27.	Berencse Kft.
28.	Bicsérdi Arany-Mező zrt tehenészet
29.	BI-SER HUSERT Kft
30.	Bold Agro Kft.
31.	Bonafarm Csoport

No.	Name of responding organizatison
32.	Böhönyei Szabadság Mg. Zrt.
33.	Bus Bence
34.	Buzafood '97 Kft.
35.	CEOLIN Kft.
36.	Claessens Kft.
37.	Csabatáj Zrt.
38.	Csicsó Pig Kft.
39.	D-E Agrár Kft.
40.	Déli Orom Kft.
41.	Dilaco Lighting Kft
42.	Dubor Kft
43.	Dudás Ker és Szolg Bt
44.	Duna Gyöngye 2000 Mg.Zrt
45.	Ellenberger Tamás
46.	Emődi Mezőgazdsági Zrt.
47.	Enyingi Agrár Zrt.
48.	EQUICONT Szolgáltató Bt
49.	Erdei Farm Bt.
50.	Farkas Zsolt E.V.
51.	Fino-Food Kft.
52.	Fiorács Kft
53.	Flóratéka Kertészet Kft.
54.	Füred Agrárház Szövetkezet
55.	Gaboszár KFT.
56.	Gátfalvi Gábor KFT
57.	Gazdabolt Nagytarcsa
58.	GIGA-MAN Kft.
59.	Gödrei mezőgazdasági Zrt.
60.	Gyenis Szövetkezet
61.	Hajdú Gabona zRt.
62.	Hajdúnánási Béke Mezőgazdasági Szövetkezet

No.	Name of responding organizatison
63.	Haladás Mg. Zrt.
64.	Hild-Tej kft
65.	Hubertus Agráripari Bt
66.	Jászapáti 2000. Mg. ZRt.
68.	KACSÓTA PAPP MŰVEK KFT
69.	Kapos Atlas Gépgyár Kft
70.	Kapostáj Zrt.
71.	Kelemen Apafia Kft
72.	Kelet -Földgép Kft
73.	Kempf Agro Bt.
74.	Kispál - Agrár KFT
75.	Kométa Zrt
76.	kovacs zoltan e v
77.	Kőnig Rudolf családi gazdálkodó
78.	Körmendi Agrár Kft.
79.	Leporex kft
80.	LLT Bt.
81.	Lovas Kft
82.	Magyar Ugar Kft.
83.	Makrom kft
84.	Master Good Kft
85.	Mezőfalvai Zrt.
86.	Mezőfalvai Zrt.
87.	Mezőgazdasági és Szolgáltató Szövetkezet
88.	MEZŐKERT Zrt.
89.	MG Produkt Kft.
90.	Nagy Renáta
91.	Naki mezőgazdasági Zrt.
92.	Nemzeti Ménesbirtok és Tangazdaság Zrt.
95.	Ovogo KFT.
96.	P&P Kereskedelmi és Szolgáltató Kft
97.	Palotabozsoki Zrt
98.	Pannónia Mg.Zrt Bonyhád
99.	Pély-Tiszatáj Agár Zrt.

No.	Name of responding organizatison
100.	Pere és Társa Kft
101.	Prophyl Kft.
102.	Rábapordányi Mezőgazdasági Zrt.
103.	Rácz Tibor
104.	RiCARdo Kft.
105.	Rijk Zwaan Budapest Kft.
106.	Rio-Alto Kft
107.	Ronic Kft
108.	S&K-LAP Kft.
109.	SAMA-Control KFT.
110.	Sásdi Agro Zrt.
111.	SimonJózsef Ev.
112.	Solum Zrt
113.	Sombereki Zrt.
114.	Szentistváni Mg. Zrt.
115.	Szőlészet borászat
116.	Tankó Ferenc E.V.
117.	Tarnamenti-2000 ZRt.
118.	Telivér farm Kft.
119.	Teveli Zrt.
120.	UBM Csoport
121.	Udvaros Agro Kft.
122.	Udvaros Építőipari Kft.
123.	Udvaros és Fiai Kft.
124.	Udvaros Vino Kft.
125.	Velox-Ker Kft.
126.	Vet Produkt Kft
127.	Virág-major Kft.
128.	Vitafort Zrt
129.	Viticoop Kft.
130.	V-Trade Kft
131.	Weisz Miklós
133.	Zselic farm kft
134.	Zselici Mezőgazdasági. Zrt.