

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics



Master's Thesis

**Poland and Czech Republic farm structure –
comparative study**

Jan Knotek

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CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

DIPLOMA THESIS ASSIGNMENT

Bc. Jan Knotek

Economics and Management
European Agrarian Diplomacy

Thesis title

Poland and Czech Republic farm structure – comparative study

Objectives of thesis

The main objective of the Diploma Thesis is to analyze and compare farm structure development in Poland and the Czech Republic. To describe changes agriculture in both countries undergone during the communist regimes, later return to the free market and to assess impacts of the accession to the European Union. Ultimate goal is to discuss and describe impact of both differences and similarities in the historical development on current state of farm structure, agricultural production, organic production etc. Latest trends will also be discussed.

Methodology

The theoretical part will be elaborated as a literature review based on both primary and secondary sources. The practical part will be based mainly on data from governmental agricultural agencies in both countries regarding farms type, physical and economical size and specialisation.

The proposed extent of the thesis

70 – 90 pages

Keywords

Poland, Czech Republic, farm structure, farm size, historical development

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-

Expected date of thesis defence

2020/21 SS – FEM

The Diploma Thesis Supervisor

Ing. Pavel Kotyza, Ph.D.

Supervising department

Department of Economics

Electronic approval: 26. 2. 2022

prof. Ing. Miroslav Svatoš, CSc.

Head of department

Electronic approval: 28. 2. 2022

doc. Ing. Tomáš Šubr, Ph.D.

Dean

Declaration

I declare that I have worked on my master's thesis titled " Poland and Czech Republic farm structure - comparative study" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the master's thesis, I declare that the thesis does not break any copyrights.

In Prague on 31.3.2023

Acknowledgement

I would like to thank to my supervisor Ing. Pavel Kotyza, Ph.D. for his advice and support in the process of creation of this Thesis.

Poland and Czech Republic farm structure - comparative study

Abstract

This diploma thesis in the theoretical part describes and assess development of agriculture in the Poland and the Czech Republic since the beginning of 20th century with emphasis of the impacts of the historical events, such as land reforms, collectivisation, or restitution on the farm structure.

In the practical part of the master thesis is then conducted comparative study of farm structure based on processing of datasets of individual agricultural holdings subsidies obtained from Czech and Polish state agencies for administration of the EU and national financial support for agricultural holdings. Differences in financial support in both countries will also be assessed.

Latest trends in farm structure, financial support and related commitments stated in national Strategic plans for the new period of Common Agricultural Policy in 2023-2027 are also discussed.

Keywords: Poland, Czech Republic, farm structure, farm size, historical development

Struktura farem v Polsku a České republice – komparativní studie

Abstrakt

V této diplomové práci se v teoretické části popisuje vývoj zemědělství v Polsku a České republice od začátku dvacátého století s důrazem na dopady historických událostí jako byly pozemkové reformy, kolektivizace nebo restituce na velikostní strukturu farem.

V praktické části této práce je provedena srovnávací studie struktury farem založená na vyhodnocení souboru dat o dotacích pro jednotlivé zemědělské subjekty. Tyto data byly získány od české a polské zemědělské agentury pro správu a vyplácení zemědělských dotací. Také jsou zhodnoceny rozdíly ve finanční podpoře farem v obou zemích.

Dále jsou diskutovány poslední trendy a změny ve struktuře farem, finanční podpory zemědělství a další relevantní závazky učiněné v rámci národních Strategických plánů pro novou Společnou zemědělskou politiku na období 2023-2027.

Klíčová slova: Polsko, Česká republika, velikost farem, struktura farem, historický vývoj

Table of content

1	Introduction	11
2	Objectives and Methodology	14
2.1	Objectives	14
2.2	Methodology	14
3	Literature Review	16
3.1	Poland	16
3.1.1	Introduction to Polish agriculture	16
3.1.2	Agricultural reforms after 1918	17
3.1.3	The Second World War	19
3.2	Collectivization of agriculture in Poland	20
3.2.1	Transition	23
3.2.2	Accession to the European Union	27
3.3	Czech Republic	29
3.3.1	History of Czech agriculture	30
3.3.2	Czech agriculture after the Second World War	32
3.3.3	Communist era	33
3.3.4	Transition	35
4	Practical Part	41
4.1	Poland	41
4.2	Czech Republic	41
4.2.1	Standard output	42
4.3	Common Agricultural Policy	43
4.3.1	Distribution of the CAP	43
4.3.2	The CAP - Czech Republic	44
4.3.3	The CAP - Poland	46
4.3.4	Value of agricultural production	47
4.4	Farm Structure	48
4.4.1	Czech Republic	49
4.4.2	Poland	52
4.4.3	Organic farming	55
4.4.4	Price of agricultural land	57
4.4.5	Semi-subsistence farms	58
4.4.6	Latest trends	59
5	Results and Discussion	60
5.1	Farm Structure	60
5.2	Goals of the new CAP	61

5.2.1	Poland.....	61
5.2.2	Czech Republic.....	61
6	Conclusion	63
7	References.....	66

List of figures

Figure 1	Agriculture, forestry, and fishing, value added (% of GDP) - Poland, Czechia, European Union	11
Figure 2	Satellite photo of Czech-Polish border.....	12
Figure 3	The share of agricultural land managed by the state and co-operative sector in 1989.....	23
Figure 4	Employment in agriculture in 1989-2020	26
Figure 5	Total number of farms in the Czech Republic and Poland sorted to groups by their standard output in euro in 2020.	42
Figure 6	Distribution of direct payments - EU 2020	44
Figure 7	Distribution of direct payments - Czechia 2020.....	45
Figure 8	Distribution of direct payments - Poland 2020.....	46
Figure 9	Production value of agricultural products at constant price (2015 = 100) in billion euro.....	48
Figure 10	Czechia - average farm area in 2020 in hectares.	51
Figure 11	Total number of farms sorted according to their size in hectares.	52
Figure 12	Poland - average farm size in 2020 in hectares.....	53
Figure 13	Poland - average farm area in 2020 in hectares.	54
Figure 14	Development of share of utilised agriculture area used in organic farming in %.	57
Figure 15	Change in quarterly agricultural price indices; Q4 2022 compared with Q4 2021 in %	59
Figure 16	Share of farms sorted by their area in hectares.	60

List of tables

Table 1	Structure of land use and ownership in 1990-1997 (in percent of total agricultural land)	24
Table 2	Agricultural output (current prices in mil. zloty)	25
Table 3	Total number of agricultural holdings in 2016	28
Table 4	Change of total number of agricultural holdings in 2010-2016 period.....	28
Table 5	Total area of agricultural land in the Visegrad Group countries in comparison to the country area.....	29
Table 6	Number of applications and amount paid in CZK/EUR for each programme.	50

1 Introduction

Poland and the Czech Republic (Czechoslovakia) experienced similar historical development in the 20th and 21st century.

Both countries emerged as sovereign state after the First World War. For more than 40 years after the Second World War were with most of the Central and Eastern Europe under the totalitarian influence of the Soviet Union and its communist ideology.

After the end of communist regime in 1989 both countries transformed from centrally planned economy to the market driven one, both states started an integration in global economy and in 2004 joined the European Union, its common market and Common Agriculture Policy, which had extensive impact on the whole economy and agriculture and food production sector especially.

In this Thesis I would like to focus on differences in the described similar historical experience and their impacts on the agriculture and farm structure in Poland and the Czech Republic. These two neighbouring Central European countries share many characteristics of their agricultural sector, such as similar climate, higher than EU average in the share of agricultural land of total state area (EU 41 %, Poland 47.2%, Czechia 45.6%), above average share of agriculture in GDP (see Figure 1) or relatively similar production focus. However, vastly different is structure of agricultural holdings. In 2020 was average size of a farm 11 hectares in Poland and 120 in the Czech Republic while the EU average is 17 hectares (Eurostat, 2022).

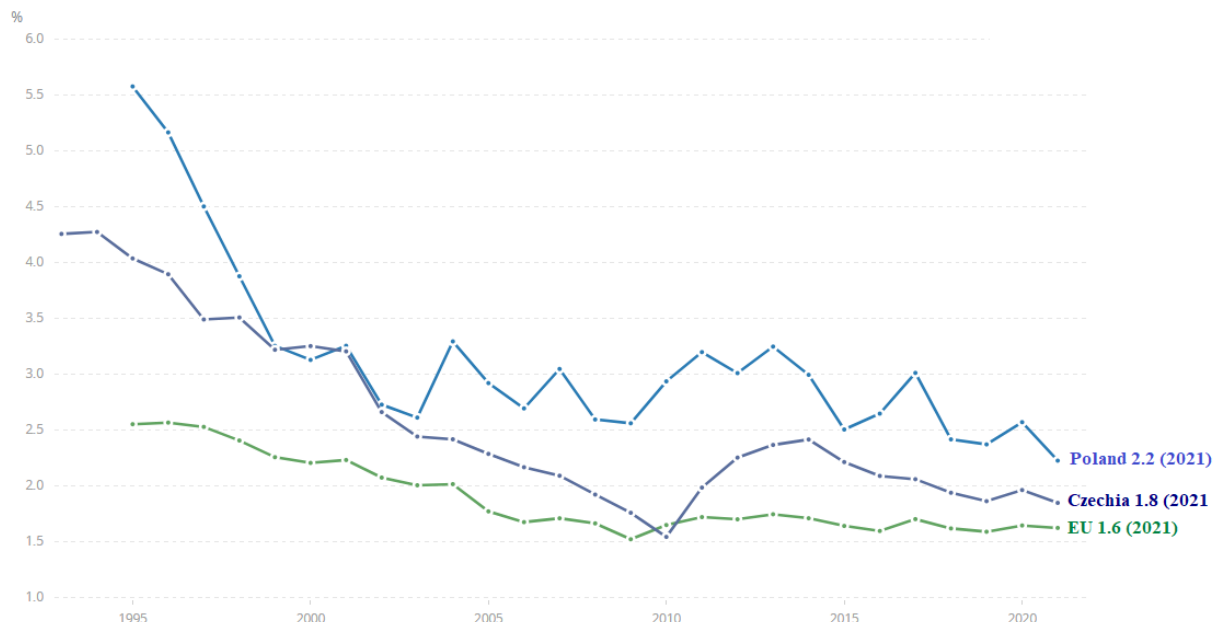


Figure 1 Agriculture, forestry, and fishing, value added (% of GDP) - Poland, Czechia, European Union

Source: The World Bank, 2023

Poland was the first country from the Eastern Bloc to start economic reforms in transition towards a market-oriented economy. Nevertheless, compared to the Czechoslovakia or East Germany, Polish agriculture sector had vastly different starting conditions, caused mainly by the fact that Polish communists were not successful in the process of collectivisation in the 1950s as they were in the two above-mentioned neighbouring countries. Therefore, in Poland was kept a tradition of small family farms and most of agriculture sector stayed in private hands. In 1989, 75% of arable land was cultivated by private farmers, while rest belonged to agricultural cooperatives or state farms. The average farm size was about 6.5 ha, but more than 30% of the farms were less than 2 ha. Effects of this 70 years old difference in historical development on the farm structure and agriculture in general are perceivable to this day as can be illustrated by several indicators such as share of workforce employed in agriculture, share of family-owned farms, average size of farms and even so easily as by looking on satellite images.



Figure 2 Satellite photo of Czech-Polish border
Source: Author, based on Google Maps, 2022

After the fall of communism in the Czechoslovakia 1989, most of the Czech agriculture land taken in collectivisation process has been returned to its original owners or their heirs. The cooperatives and state farms have been transformed to capitalist style businesses. Unlike Poland, where process of privatisation was marginal due to low share of state-owned land (24% in 1990), in Czechia state and collective farms controlled overwhelming majority of agricultural land.

Outcome of restitution is that Czech agricultural land is owned by approximately 3 million small-scale landholders: with average area only 1.28 ha per one owner (Ministry of

Agriculture of the Czech Republic, 2021). This fragmentation of land ownership is one the reasons, why owners rarely directly cultivate their land. Second reason is because due to the collectivisation in 1950s most of the heirs of previous owners have no personal connection and ability or interest to cultivate their land. Therefore, they usually rent it out to the big enterprises. Czech Republic has one the highest share of the largest farms in the European Union, with farms over 100 hectares accounting for 17.2 % of all farms, but they cultivate more than 84% of the total utilised agricultural areas (UAA) of the country. In Poland farms over 100 hectares create only 0.01% share of farms, while they cultivate 23% of UAA. Significant majority of agricultural holdings in Poland are small farms up to 10 hectares with 73.6% share (Eurostat, 2022).

Mainly in central, southern, and eastern Poland they cultivate more than 90% of the agricultural land. Most large farms and state farms could be found in the western and northern parts of Poland, on territory which Poland acquired from Germany after the Second World War. Since the private land ownership was predominantly preserved in Poland, there was much less incentive for major land reforms after the 1989 and the minor reforms, which were implemented did not lead to significant changes in the ownership structure (Grešlová et al., 2019).

2 Objectives and Methodology

2.1 Objectives

The main objective of this Diploma Thesis is to analyse and compare farm structure in Poland and the Czech Republic. To describe changes that agriculture in both countries undergone during the 20th and 21st century, such as land reforms after the First World War, collectivisation during communist regime, to assess impacts of the process of transition from central-planned to market-oriented economy in 1990s and to assess the development after the accession of both countries to the European Union and its Common Agricultural Policy in 2004.

Ultimate goal is to discuss and describe impact of both differences and similarities in the historical development on current state of farm structure, agricultural production, organic production etc. Latest trends and commitments stated in national Strategic plans for the new Common Agricultural Policy 2023-2027 will also be discussed.

In addition, objective of the thesis is to answer four research questions.

The following questions concerning Poland and the Czech Republic are addressed:

Q1: How did the historical events since the beginning of 20th century impacted agricultural sector?

Q2: What is the present state of farm structure?

Q3: What is the current state and future of smaller and organic farms?

Q4: What are the latest trends and probable future development in agriculture?

2.2 Methodology

The theoretical part will be elaborated as a literature review based on both primary and secondary sources. Predominantly:

1. Academic articles from science journals, such as *Agricultural Economics*, *Land Use Policy* or *Social History*.
2. Reports from both national statistical offices (Główny Urząd Statystyczny and Český statistický úřad) and multinational such as Eurostat or the Faostat.
3. Governmental reports such as from Ministry of Agriculture of the Czech Republic, Ministry of Agriculture and Rural Development of the Republic of Poland or European Commission.

The practical part will be based on data from the government's agricultural paying agencies, which are responsible for the administration and distribution of financial support to individual agricultural holdings from both national and European Union sources. In the

Czech Republic it is State Agricultural Intervention Fund (Státní zemědělský intervenční fond – SZIF). In case of Poland, it is the Agency for Restructuring and Modernisation of Agriculture (Agencja Restrukturyzacji i Modernizacji Rolnictwa – ARiMR).

Data was obtained through the use of freedom of access to information. Obtained files consist of information collected from applications from agricultural holdings for financial support. Data are from the latest available year of 2020. In case of Poland file consist of 1,290,257 applications, therefore it was necessary to split the dataset into two separate files, because MS Excel allows to display only 1,048,576 rows.

In case of the Czech Republic file contains 30227 applicants.

Data will be used to determine indicators such as average size of agricultural holdings, spatial distribution of farms and average farm size in the regions of the countries, total and average amount of payments, share of subsidies on the GDP etc.

Limitation of the usage of the obtained data is in different extent of information provided. Czech agency provides detailed data for each application such as natural/legal person, date of birth, district of registration, cultivated area and amount of payment granted in specific programmes under both national and European Union funding.

On the other hand, Polish data only contains of age of applicant, area of the farm, total amount of support received and voivodship, where the farm is registered.

3 Literature Review

3.1 Poland

3.1.1 Introduction to Polish agriculture

Poland is a country situated in Central Europe, with majority of its territory on the lowland plains. That is why two fundamental categories dominate in the land use structure: agricultural land and forest areas.

Poland is one of the leading agricultural and animal producers in Europe. Agriculture plays fundamentally important role in Polish economy, even the name of the country itself is derived from “polians” which means the dwellers on the field. (Chloupková, 2002) Poland is taking advantage of its lowland landscape with an average elevation of 113 m above sea level and mild climate with 47% of the total area of the state (about 15 mil. ha) being used for agriculture. However, quality of agriculture soil is not high, with significant share of low-yield sandy or alkaline soils. The most fertile chernozem soils are covering only 1% of the area. Significant fraction of agriculture area is endangered by wind and water erosion (FAO, 2021).

In the 20th century, Poland as well as most of the region of Central Europe experienced political and economic instability, two world wars and both nazi and communist oppressive regimes. These events had fundamental impact on agriculture which resulted in significant transformations in land use, ownership forms, and management practices. Since the fall of communist regime Poland has undergone dynamic social and economic changes, including the transformation of land structure and ownership. The process of land ownership change has involved privatisation, land restitution, and farm restructuring. However, the shock of transition to a market economy after 1990, wasn't so painful as in other former Soviet bloc countries. The country experienced a severe economic downturn started by a deflation of Soviet-era pricing and frictional unemployment (Poznanski, 2012), but Poland had advantage that its economy and particularly agriculture sector avoided many communist regulations typical for Soviet Union, German Democratic Republic, or Czechoslovakia. Therefore, Polish economy already in 1995 had rebounded. Anders (2015) state that reason of Polish success after the fall of communism when many other countries had major transition problems was the unique component of Poland's economy under Soviet influence: agriculture. Poland was able to avoid many communist regulations. The most important of these exceptions was the continued existence of the private farms in its agricultural system. Private ownership of land not only strengthened the Poland's agricultural system, but also contributed to the rather smooth transition from the socialist centrally planned economy to a market-based economy.

In the 19th and 20th centuries, natural conditions favourable for agriculture, population growth, and low economic development led to a significant increase in the area of agricultural land in Poland, mostly at the expense of forests. This excessive deforestation led to a landscape change, from diverse natural vegetation to monocultures. Today, agricultural land remains the dominant form of land use in Poland, concentrated mostly in

uplands with favourable natural conditions. Over 80% of such areas in the country are under agricultural management.

The main issues concerning farm structure in the transformation after the 1989 was privatisation, the restitution of land and farm restructuring. During the same period, agricultural lands were slightly, but steadily decreasing. This phenomenon was clearly perceptible in the suburban areas and areas unfavourable for agriculture (Bański, 2010).

In the areas of central, eastern, and northern Poland are produced mainly rye, mixed cereals and maize. Orchards and berry fruit plantations are concentrated in the central regions of country: Mazowieckie, Lubelskie, Wielkopolskie and Łódzkie voivodships, and in the region of Sandomierz. The intensive cultivation of cereals (mainly wheat), sugarbeet and rapeseed is typical for the south-east and west of the Poland and in Żuławy and Warmia districts (GUS, 2022).

Central Poland has an equally high concentration of agricultural land, although the quality of productive agricultural space is not as favourable as in the uplands. The high share of agricultural land in this region is associated with non-natural factors such as a high proportion of the rural population, limited industrialisation, and historical conditions dating back to the partitioning of Poland among Prussia, Russia, and Austria.

Arable land is concentrated in areas with good soil conditions, and crop production plays a significant role in Polish agriculture. However, the share of crop production in all agricultural land exceeds 90% in some areas, which can lead to soil erosion, steppification, and a deterioration in water relations. Orchards are mainly located in the Vistula valley, which is a significant fraction of the total orchard area in the country.

3.1.2 Agricultural reforms after 1918

After more than a century of Polish Partition, when was former Polish state divided between the Austrian, the Prussian, and the Russian empires, Poland re-emerged as a sovereign state at the end of the First World War in 1918 after and the collapse of the Russian Empire and Treaty of Versailles allowed for the resurrection of Polish national sovereignty and foundation of Second Polish Republic.

However, state of agriculture was fundamentally different in the three parts of former Partition. For the Austrian part there was in last decades before First World War typically complete stagnation of agriculture, with progressive exploitation of the peasants in the feudal economy. The fragmentation of farms, huge overcrowding in the countryside, misery and poverty contributed to the resistance of the peasants in Galicia. Prussian part was the most advanced. Introduction of agricultural reforms in 19th century resulted in an increase in food production and an expansion of the commercial nature of farms. Agriculture in the Prussian partition was one of the most developed in Europe due to among other reforms to the earliest abolition of serfdom in 18070. On the contrary, in the Russian part was serfdom officially abolished in 1864 and even then, was the implementation in reality rather slow, which meant that the land was still in the hands of the masters, causing stagnation of the development of agriculture. The agrarian crisis at the

turn of the 19th and 20th centuries and years of crop failure also contributed to this unfavourable situation. This caused massive wave of emigration to the west of Europe and to both Americas (Sitek, 2020; Adamkiewicz, 2019).

Political power in many new nation-states was often in the hands of representatives of the peasantry, while the large landowners were typically representatives of the nations that had previously held power before 1918. This was the case, for example, in Czechoslovakia where Germans owned the large land estates in the Czech lands, and Hungarians in Slovakia. In Lithuania and partly in Latvia, Poles held a strong position among the great landowners, while in Latvia and Estonia, it was Germans. This multinational situation facilitated quick decisions, allowing for changes in the structure of land ownership and the removal of real or perceived political opponents all at once. The land was taken from the previous owners and distributed among citizens and compensation for former owners was paid only in some cases (Zawistowski, 2019).

Newly re-established Poland in 1918 had an agricultural-based economy where 65.6% of the population were involved in agriculture sector. Due to the rural nature of the Polish state, most of its inhabitants were engaged in agriculture. In 1921, it was a source of income for about 63% of citizens; a decade later, it decreased to only 60%. In 1921, 17% of the population was employed in industry and mining, and in 1931 - 19%. Combined with information from census which shows that in 1921, 75.4% of them lived in the countryside, in 1931 - 72.6%, and in 1938 the estimates were 70% we can clearly state that in the first decade of independent Poland, was the process of urbanisation a phenomenon of rather low dynamics (Adamkiewicz, 2019).

Bański (2010) agrees with other above-mentioned authors that long era of partition of Poland caused essential spatial differentiation of agriculture. Regarding crop structure he states that fundamental were cereals, mainly rye. The most important among other crops were potatoes (2.7 million hectares) and forage crops (1.9 million hectares), as well as sugar beets, flax, hemp, and edible legumes. Cattle were by far the most important livestock, but pigs were gaining on significance. Despite the overall unfavourable economic situation, the Second Polish Republic achieved a significant agriculture development in the interwar period. Most of the farms were small, with an area of up to 5 hectares. In 1921, there were over 2 million of them out of a total of about 3.2 million agricultural farms, but they only had 15% of the total area of farmland. The subsequent years were characterized by a further systematic increase in the number of small farms.

Despite the mostly rural society, only 52% of agricultural land was owned by peasants, and 65% of farms had an area of less than 5 ha. Large area of the country was occupied by the estates of landowners, church, states, and local governments. The need for land reform was already highlighted in the manifesto of the Provisional People's Government of the Polish Republic, formed in November 1918 under the presidency of Ignacy Daszyński. Over the following months, different political parties put forward their demands on this issue. The Left called for a radical reform, including the division of land owned by the state and church, nationalization of forests, and determining the upper limit of farm areas. On the

other hand, the Right, whose support came from large landowners, only proposed the division of state property owned by foreigners, those obtained from invaders, and poorly managed estates. In particular, there was a fear of general division in the eastern territories of the Republic of Poland, where local landowners were mostly Poles, and peasants were predominantly Belarusians or Ukrainians. Thus, an agricultural reform would have weakened the Polish and strengthened national minorities in this region (Zawistowski, 2019).

From 1919 to Second World War family farming prospered even despite the global crisis in the 1930s and the war. It was a time of agricultural reforms. First fundamental reform was announced in a parliamentary resolution in 1919 and became law on July 15, 1920, during the Bolshevik offensive against Poland. However, due to the contradictions between its principles and the Constitution passed in 1921, the reform was never implemented in practice. Another agricultural act was passed in 1926 and further amended and extended in 1933. Outcomes were significant, by the outbreak of World War II, nearly 2.6 million hectares of agricultural land had been redistributed to peasants with little or no land, however nearly one-third of farmland remained in large estates. Despite the essentially dual form of agriculture during this period, the agricultural model inspired by Denmark began to spread, particularly in the Wielkopolska region, where peasant commodity farms created a cooperative-associative farming infrastructure (Halamska, 2016).

3.1.3 The Second World War

Poland was one the hardest affected countries in the World War II. The destruction of war resulted in the abandonment of cultivation on about 7.5 million ha of agricultural land. Compared to the pre-war state, only about 30% of the cattle population remained, 25% of pigs, 25% sheep and 50% horses (Bański, 2010).

During the Second World War, the topic of land reform reappeared. The Polish government-in-exile promised that after the end of the occupation, the problem would be finally fully resolved. However, they neglected it later and communist powers took advantage of this mistake. In July 1944, Polish Committee of National Liberation – the Polish communists quasi-government established by the Soviets made public a manifesto, where was announced a quick implementation of land reform. Reform was meant to be a tool to gain the support of Poles – most of them still lived in the countryside (Zawistowski, 2019).

According to Halamska (2016) was the reform very radical. It was officially implemented on 6 September 1944, when 9,707 farms, together of a total area of 3.5 million hectares, were parcelled out or nationalised. However, only 1.2 million hectares of confiscated land were redistributed to the smallholders in the 1944 - 1948, while the rest was put to the administration to the National Land Fund. In the former Prussian part, north and west of the country further 5 million hectares of land were parcelled out. This agricultural reform successfully fulfilled its political intentions. Land gentry as class, which was naturally most resisting to the communists' ideas was eliminated and large commodity farms as

well. However, its effect on the wellbeing of small farmers were marginal. Average size of smallholder's farm was increased only to 5.4 hectares in 1950 compared to 5 in last pre-war year of 1938.

Zawistowski (2019) points out that the radical reform was issued illegitimately - the internationally recognized government – both under domestic and international law – was the Polish government-in-exile in Great Britain. Despite this, the decision to reform was implemented. The land that belonged to the Germans, traitors and collaborators was completely confiscated. All farms with area over 50 ha or 100 ha in the western (former German) regions. were also intended to be parcelled. Confiscated was not only agriculture land but whole property of affected owners: farm equipment or even family houses. Moreover, banished owners could not settle in the same district where their former estate was located, and financial compensation was minimal. On the contrary, smallholders received confiscated land for very low price and payments were spread over several years. Reform regarded forests as well, which were nationalised in December 1944. Radicality of the reform requested use of force to be realised. Therefore, communist powers supported creation of “parcelling brigades.” In the following months, almost all of the properties located in the former German lands were taken over.

Despite the certain resistance of the rural population and the activities of the anti-communist underground organisations, an enormous change in the agrarian structure of the country took place in the few years after the reform. Redistribution of land and other property ensured to gain sufficient support for the Polish Workers' Party in the countryside to secure their power over the country. However, the reform created by the communist government lead partially to the reconstruction of the agricultural economy as well as to the start of the collectivisation process and creation of state collective farms. Exactly according to directions from the Soviet Union (Leszkowicz, 2020).

Bański (2010) summarize that in total, in the period 1945–1949, more than 6.1 million hectares of land, of which about 814,000 for the creation of farms 5.6 million ha were allocated, while the rest of the land was supplied to the existing small peasant farms. The results of the reform varied regionally. In the south, where there were few large estates, parcelling did not cause any significant changes in the average size of farms. In the eastern and central area were nationalised lands redistributed to agricultural workers and small farms. In the West were created new farms, which were given to the old one's agricultural workers or people displaced from other parts of the country.

3.2 Collectivization of agriculture in Poland

Idea of collectivisation of agricultural sector was firstly presented in Soviet Russia at the 15th Congress of the All-Union Communist Party in December 1927, and in the following years of 1929 and 1930 was forced by means of mass terror. The program of "eliminating the kulaks as a class", (kulaks were called the better situated peasants, the rural elite). This led to destruction of millions of the more successful farmers – in order to scare and force others to join collective farms. The communist government was planning to use evicted

peasants as a cheap labour force that would enable the planned industrialization and then would build heavy and armaments industries at a frantic pace.

This state forced massive reorganisation of rural economy based on smallholders and peasants by the Soviet state into large collectives was strongly opposed by small peasant farmers, who resisted to give up their land, livestock and other property as well as surrender their independence to a far-off national government, which reminded them of previous feudal system.

As part of the "kulak operation," at least 1,050 million people had been repressed in Soviet Union by 1931. In the spring of that year, Stalin intensified the pressure, leading to a second phase of the operation against the "kulaks." By September 1931, approximately 1.2 million people had been repressed, with 787,000 of them deported. The collectivization process caused a severe famine, particularly in Ukraine: so called Holodomor stemmed from decisions made by the Stalinist government, aimed at breaking peasants resistance to collectivisation efforts (National Institute of Remembrance, 2021).

Poles experienced collectivisation even before communist government taken power after the Second World War. About 1.5 million Poles lived in the Soviet Union as a consequence of the Treaty of Riga (1921) after the end the Soviet-Polish war. Mainly in the Soviet Ukrainian and Belarusian republics. Poles resisted collectivisation efforts more than other inhabitants of USSR and therefore were subject of extreme terror. When in 1944 the decree of the Polish Committee of National Liberation, controlled by the Polish communists, whose were controlled by the USSR, introduced agricultural reform in the areas liberated from German occupation, the situation in Polish villages began to change radically. The communists practically abolished the landowning class (gentry) and put an end to the unsuccessful attempt made in the Second Polish Republic. Smallholders and landless peasants and rural workers received their own land (on average about 5 hectares, slightly more in the western and northern lands). Despite the emerging resistance of the rural population (often resulting from the activities of the anti-communist underground), a gigantic change in the agricultural structure of the country was made within a few post-war years. The agricultural reform allowed the Polish Workers' Party to increase its support in the countryside, but the vision of collectivization modelled on that carried out by Stalin in the USSR before the war still terrified the peasants (Leszkowicz, 2020).

Markiewicz (2005) states that the decision to collectivise agriculture came from Moscow in 1948. Decision originated at the Bucharest meeting of Cominform on June 20, 1948 (co-ordination body of Marxist-Leninist communist parties in Europe) A resolution on the collectivisation of agriculture in the countries in the Soviet sphere of influence was adopted there, which was intended to unify economic policy in the eastern bloc. Polish communist leader Władysław Gomułka opposed the idea, which resulted in him being accused of "right-wing-nationalist deviation" and being removed from the post of secretary general of the Polish Workers' Party. This pressure from USSR led to fundamental shift in the agricultural policy of the Polish Workers' Party. Polish communists, who had so far officially dissociated themselves from the ideas of collectivisation, recognized land cooperatives as one of the main directions of the state's internal policy. The first cooperatives were formed a year later, and the collectivisation movement reached its

highest point in 1952-1953. In 1953 alone, the number of cooperatives in the country increased from 4,890 to 8,060. The number of cooperatives in the "recovered territories" acquired from Germany after 1945 was higher than in the territories that had been part of the Polish state before 1939.

The smallholder's reluctance to join cooperatives resulted in persistence resistance that was suppressed by the authorities in several cases even with use of brutal force. The newly formed cooperatives operated poorly. Nevertheless, the death of Stalin in 1953 marked a significant shift of political climate in whole Soviet bloc, and the paradigm of mandatory collectivization was challenged and revised (except in Romania and Albania). While Bulgaria, East Germany, and Czechoslovakia reformed collective farming in the neo-Stalinist fashion for optimal efficiency, Poland and Yugoslavia abandoned the idea of Stalinist collectivization entirely. In 1956 due to the widespread social protests authorities were forced to change course. Consequently, most cooperatives dissolved, and there was less pressure on the authorities to create new ones (Kaliński, 1988; Wylegała, 2022).

Bański (2010) as well presents that although collectivization was successful in other countries of the Eastern Bloc, in Poland it met strong resistance from farmers. The socialized economy developed primarily in the western territories and in the north, where large tracts of land were left without a farmer after the war. Intensive collectivization lasted until 1956 and resulted in the creation of over 10,000 cooperative farms. In the socialized sector of agriculture, the largest role was played by State Agricultural Holdings, established in January 1949. They were established mainly on the site of the largest former German estates and in south-eastern Poland, from where the Ukrainian population was displaced. In 1950, state-owned farms had 2 million hectares, in 1960 - 2.4 million ha, in 1970 - over 3 million ha, while in 1988 – 4.3 million hectares. The size of single state farms was highly various: from several dozen to several thousand hectares. After 1989 were the State Farms gradually abolished, the last State Farms were liquidated in 1994.

Collectivization was not a uniform process throughout the country. In the former German territories this process was much more efficient than in the territories belonging to Poland before World War II. In the mid-1950, out of a total of 911 production cooperatives established throughout the country, 835 were established in the former German part of the country (Markiewicz, 2005). Major spatial differences of process of collectivisation were still obvious in 1989 as can be seen on Figure 3.

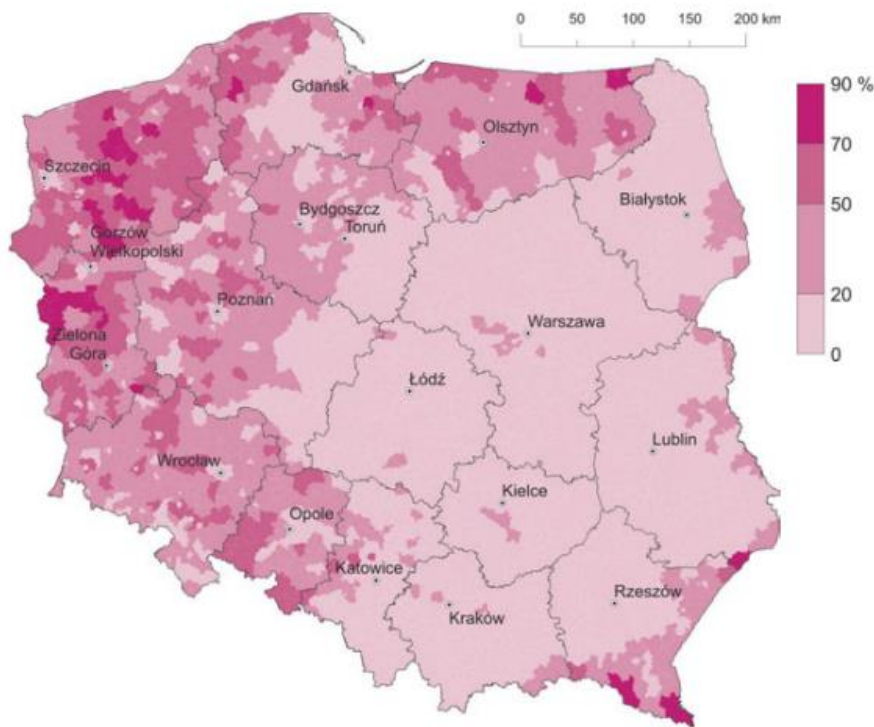


Figure 3 The share of agricultural land managed by the state and co-operative sector in 1989.

Source: Bański, 2010

Chloupková (2002) summarized that Poland has been an exception among the states of the eastern bloc, as most of its farmland has been private and individual farming in Poland was either restored in 1950s or resisted the communist attempts of collectivisation altogether. The agriculture was an exception in the country economy as it was the only sector with significant share of private enterprises. Therefore, the process of privatisation in 1990s was only a marginal issue in the agricultural sector.

However, there were several economic problems. Even though private ownership and enterprises were working in the sector, large share of small farms had negative impact on the efficiency as economies of scale were limited. In the communist era individual farms employed circa 80% of total farm labour force and produced over 75% of total agricultural output and more the 25% of the total work force were active in agricultural sector (as can be seen in Figure 3), which can be viewed as a paradox with the communist economic paradigm.

3.2.1 Transition

After the fall of communist regime Polish first post-communist government implemented one of the most ambitious and radical economic reform programs of former Soviet bloc countries. Government aimed at fast transformation a central planned economy and state ownership into market-oriented economy, this set of policies is known as the Balcerowicz Plan (named after Finance Minister Leszek Balcerowicz) or as the “shock therapy.” Aims

of the plan were several: reduce the rate of inflation (which was as high as 50% per month); stop of the price control; eliminate shortages of basic goods; make the Polish currency convertible into foreign currencies at market rates; limit the subsidization of state-controlled companies; and boost foreign trade by lifting most of the regulations. (Poznanski, 2012; Johnson and Loveman, 1995) The plan was criticized for being too aggressive and for creating enormous pressure on large state enterprises, their employees, and even whole communities. However, according to Poznanski (2012) and other authors the plan was rather successful in comparison with other transition countries.

Poland unique preservation of private farms was key part in the successful transition according to several authors. For example, Csaki and Lerman (2001) state that during the 1980s, only 24% of land was cultivated by socialized farms (20% by state farms and 4% by cooperatives or collectives), in comparison to about 98% in the rest of Central European countries under Soviet influence. Therefore, Poland starting point in the implementation of free market economy was 76% of its agricultural land cultivated by family farms (see Table 1), and process of privatisation and restitution of land wasn't therefore by far that massive as in other countries in region during the transition. Privatisation in Poland on the land resources impacted predominantly land owned by the state, which was about 4.5 million ha - 24% of all agricultural land, which were transferred in 1990 to the Agricultural Property Agency, a government organization that was delegated to privatise the land to both legal and natural persons by selling or leasing out. However, the Agency mainly leased the state-owned land a therefore between 1990 and 1997 share of state owned land decreased only from 22% to 20% as can be seen in the Table 1.

	Owned land		Used land	
	1990	1997	1990	1997
Private sector	76	78	80	92
Individual farms	72	76	76	83
Cooperatives	4	2	4	2
Other private	--	--	0	7
State sector	24	22	20	8
Total	100	100	100	100

Table 1 Structure of land use and ownership in 1990-1997 (in percent of total agricultural land)

Source: Csaki and Lerman, 2001

According to Kryszk, Kurowska and Marks-Bielska (2022) the Agricultural Property Agency have taken over 4 million 740 thousand hectares of farmland from dissolved State Agricultural Farms, of which over 1.1 m ha is still currently leased to private farmers. The agricultural land presently managed by State Treasury Reserve agency are mainly intended to private farmers who aim to develop their family-owned farms, or even to starting farmers, provided they have appropriate qualification and intend to start and agricultural entrepreneurship. Attitude to land management of State Treasury Reserves has significantly changed in the last two decades. In the transition period was agency mainly

focused on leasing land out, but after the accession in 2004 mainly due to the rising demand for agricultural land from both farmers and non-farming enterprises state agency aims to protect and support development of family farms as well as to ensure proper cultivation of land in Poland, and to support environmental friendly practises and good agricultural practice by buying and later leasing land to increase state control of manner of land management. In 2017 was established new state agency National Support Centre for Agriculture (KOWR) which has the pre-emptive right to buy any agricultural property in the private market, which then would be added it to the State Treasury Reserve.

Grešlová et al. (2019) nonetheless states, that in the first decade of market-oriented economy, the agricultural production significantly decreased due to the overall economy problems. After year 2000 the production started to grow again and stabilised mainly as outcome of the accession to the EU in 2004. The integration to the global trade multiplied the trade volume ten times in Poland.

One of effects of the leasing of state land to private enterprises was noticeable increase of share of total economic output of private farms as can be seen in Table 2. Interesting is that gross output in 1999 per 1 hectare was overall 2751 mil. zloty and 2953 in case of private farms, which shows significantly higher effectivity of private farms.

Year	1990	1995	1998	1999
Gross output	8847.6	43347.4	54692.2	50705
Of which private farms	6856.5	38614.4	48980.5	45564.5
Private farms share	77%	89%	90%	90%

Table 2 Agricultural output (current prices in mil. zloty)

Source: Author based on Statistical Yearbook of Poland, 2000

Dries and Swinnen (2002) evaluated changes in the labour market in the agriculture after the fall of socialism. Share of employment in agriculture in last years of Soviet bloc varied significantly in different countries or regions, from around 10% in the countries (or former parts of the multinational states) with the highest income per capita, such as Slovenia and the Czech Republic, while Poland and Romania had more than 25%. Authors stated that adjustments during transition in agricultural employment have been fundamental, although with large differences among former Eastern bloc countries. During the first five years of transition employment in agriculture declined drastically in the Czech Republic (-46%), Slovakia (-50%) or Hungary (-56%), while in Poland it declined only by -15%. In countries like Lithuania or Romania share of workforce in agriculture even increased by 12%, respectively 14%.

Authors warned that the most impacted social group by the changes in the labour market in agriculture is generally lower skilled workforce and had higher impact on already

peripheral regions. They conclude that labour in most sectors of the economy was inefficiently distributed in the socialist economy and especially in agriculture sector. Therefore, outflow of labour from agriculture to other sectors is natural process leading to a more efficient allocation of labour in the economy.

Also, Sadowski, Małgorzata Wojcieszak-Zbierska and Beba (2021) agree that economic and institutional reforms in transition countries have significantly affected output and factor markets and therefore the labour market.

The reforms had major impact on society, including rural areas development in highly and medium developed countries, which have resulted in a gradual decline in the importance of agriculture over the last few decades. Technological progress in agricultural sector led to concentration of production, further specialization of farms, commercialization and rise of share of non-agricultural activities. Authors conclude that all these outcomes of transition reforms contributed to the demand reduction for labour in agriculture and to a shift to multifunctionality in rural areas as they are no longer focused only on food production.

Significant decrease in the employment in the agriculture in Poland can be also seen on the following graph in comparison to the employment in the whole EU.

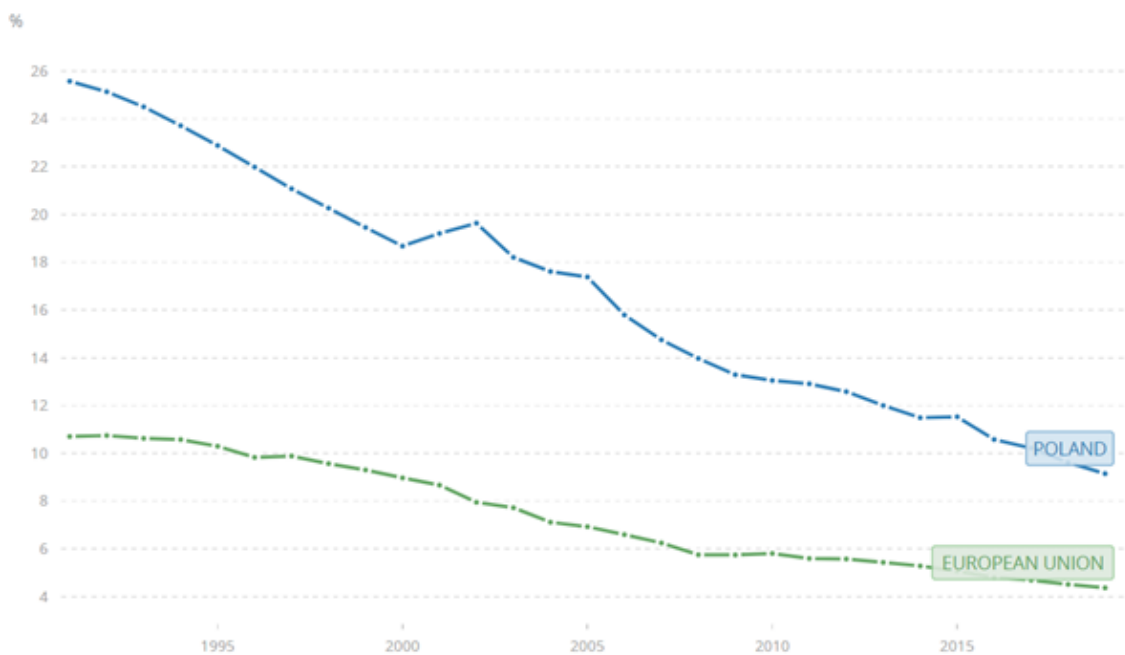


Figure 4 Employment in agriculture in 1989-2020
Source: The World Bank, 2022

About 84% of 18.4 million hectares of the utilised agricultural area in Poland belonged to private farmers in 1999. Average size of farm was 8.3 hectares UAA (private family farm 6.9 hectares UAA). The fragmentation of private farms is a main reason of high number of economically active population (23 persons per 100 hectares UAA) and of the low labour productivity in Polish agriculture. In 1999 the gross value added in agriculture accounted for 1002 US dollars per person and 2156 US dollars per average

farm. The low productivity of labour and small scale of production on majority of farms slows down the modernisation and intensification of Polish agriculture. (Pawlak, 2001)

Example of reasons why these specifics such as low productivity and small farm sizes occur is shown by Colleran (2014) in the study from Beskid Wyspowy, less favoured region in the south of Malopolska. Shortage of arable land and a long history of partible inheritance in this region, stretching back at least to the 18th century, has reduced plot sizes dramatically and made farming a relatively difficult enterprise. As far back as 1899, over 80% of peasant farmers in this region of Poland owned less than 5 acres of land. In the study area, holdings tended to be scattered across numerous strips of land, often far away from the farmhouse, making efficient farming difficult. The communities in the study were situated in an isolated area with poor soil and long, hard winters. Plot sizes remained small; average total land ownership in the studied sample was 2.33 hectares and there was large inequality in plot sizes. Colleran also states that reduction of state subsidies following the end of socialism also led to a sharp decrease in the use of fertilisers and pesticides, limiting the productivity and efficiency of farms.

Typical for this period after the 1989 is the process of creating duality in Polish agriculture. Process in which some family farms strongly reacted to the new market driven economy and became larger and modernised - professional - 1/3 of the total farms and other 2/3 of family farms remained small, extensive and producing mainly for own consumption (Halamska, 2016).

3.2.2 Accession to the European Union

According to Chloupkova (2002) the biggest issues in agriculture sector before the accession to the European Union was the lack of reforms to change the small-scale farming structure that was responsible for limited competition in the sector. Connected to this was an overabundance of labour due to the high number of part time farmers and state support of small-scale farming. That was the reason why the general performance of the sector was lower.

The most important change in both political and agricultural means of this century has been the accession to the European Union in 2004 of eight former communist states and their integration to the Common Agricultural Policy (CAP) . The CAP as a largely uniform policy trying to cater for the needs of the very varied agricultural industry in 27 states across both Eastern and Western Europe is itself undergoing a radical transformation as politicians attempt to shift the main focus of its activities from production subsidies to a more broadly conceived sustainable rural development strategy (Blacksell, 2010).

According to Bożek, Nowak and Ziolo (2020) total number of farms in 2010-2016 period in the European Union changed drastically. Number of agricultural holdings in 2016 can be seen in following table.

Country	Total number of holdings (thousands)	Area of holdings in agricultural land (AL; %)			
		up to 5 ha	5–20 ha	20–50 ha	≥ 50 ha
EU (26)	10 467.8	65.6	20.4	7.1	6.9
Poland	1 410.7	54.3	36.1	7.2	2.4
Czech Republic	26.5	18.7	36.4	17.9	27.0

Table 3 Total number of agricultural holdings in 2016.

Source: Bożek, Nowak and Ziolo, 2020

The total number of holdings in the entire EU decreased by 13% since 2010, in total numbers 1 455.8 thousand. Highest reduction was in the category of smallest farms up to 5 hectares, of which ceased their operation 1 455.8 thousand (17%). In other groups of larger farms were changes marginal, so in Table 3 changes in absolute terms are presented only for the smallest holdings. Exception in this trend was only the Czech Republic and Slovakia, where it increased slightly, by 3.6 thousand (16%) and 1.2 thousand (5%). The biggest changes took place in countries where holdings are the most fragmented: in Poland total number of holdings decreased by 96.3 thousand. Similarly, to the rest of the EU (with Czechia and Slovakia exception) it was due to the decline in the up to 5 ha category. See following table.

Country	Total number of holdings		Area of holdings in agricultural land (AL)				
	2016–2010 (thousands)	2010 = 1	up to 5 ha	up to 5 ha	5–20 ha	20–50 ha	≥ 50 ha
			2016–2010 (thousands)*	2010 = 1			
EU (26)	-1 547.2	0.87	-1 455.8	0.83	0.96	0.96	1.01
Poland	-96.3	0.94	-64.5	0.92	0.92	1.06	1.30
Czech Republic	3.6	1.16	1.5	1.42	1.19	1.08	1.05

Table 4 Change of total number of agricultural holdings in 2010-2016 period

Source: Bożek, Nowak and Ziolo, 2020

Sadowski, Wojcieszak-Zbierska and Zmysłona (2021) examines the development of Polish organic farming. They state that number of organic farms started to significantly develop in Poland only after accession to the European Union, mainly thanks to beneficial financial support. He states that without the financial support to organic production, it would be unprofitable. Nevertheless, Poland is still in terms of organic farming highly below EU average. In 2018 only 3.4 % of total agricultural land was cultivated as organic agriculture. While the EU average was 7.7% and in the Czech Republic in was 18.8%. Reasons for such a low share authors see in the fact that yields are much lower on organic farms. Between 2016 and 2018, on organic farms, in case of wheat productivity per hectare was

only slightly more than half of the yields obtained by conventional entities, in 2007-2009 period it was about 60%.

In case of livestock is situation similar, on organic farms the stocking density in 2007-2009 and 2016-2018 periods is only on 40% level of conventional farms. Reasons behind this data authors see in the extensive form of agriculture used on organic farms and the lack of economic incentive for intensification due to the state financial support. In terms of production value in 2007-2009 animal production accounted for over 80% of that obtained in conventional entities, but in 2017 it was as low as 56%. This shows the impact of subsidies on the producers but also the relatively small market for organic products, where it is difficult to generate added value resulting from higher quality of agricultural products.

Stacherzak, Hájek and Heldak (2019) evaluated changes in land use in Visegrad group after the EU accession. They stated that both in Poland and the Czech Republic was reported a decrease in the area of utilised agricultural land in 2005-2013 period as can be seen in the following table.

Country	Area of utilised agricultural land in holdings in the years [ha]				Country area [km2]* As for 2012 eurostat	Share of the agricultural land in the total area of the country in 2005:2013 [%]
	2005	2007	2010	2013		
Czech Republic	3 557 790	3 518 070	3 483 500	3 491 470	78 865	45:44
Hungary	4 266 550	4 228 580	4 686 340	4 656 520	93 024	46:50
Poland	14 754 880	15 477 190	14 447 290	14 409 870	312 679	47:46
Slovakia	1 879 490	1 936 620	1 895 500	1 901 610	49 036	38:39

Table 5 Total area of agricultural land in the Visegrad Group countries in comparison to the country area

Source: Stacherzak, Hájek and Heldak, 2019

Authors state that, in Poland, the changes were influenced by the agricultural policy of the European Union, restricting access to the financial support to the owners of the agricultural land who don't directly cultivate it. Authors conclude that shown data demonstrate that with the membership in the European Union, the interest in unused agricultural land increased, not only as a result of fear of losing direct subsidies, but also due to the profits brought by land used for agricultural production.

3.3 Czech Republic

Historically agriculture in the area of current Czech state has undergone several fundamental changes, not just through process of industrialisation, like in many Western European countries, but also in response to a number of serious political shifts. Most important were the land reform after the foundation of independent Czechoslovak Republic, collectivisation after the communist coup in 1948, the transition from the centrally planned system of large-scale agricultural production to market driven economy.

3.3.1 History of Czech agriculture

Throughout its history, Czech agriculture has experienced significant changes, distinct from those resulting solely from industrialization, which have been witnessed in other countries. Instead, these changes have largely been responses to various political shifts. One such shift occurred during the transition from a capitalist mode of production to a centrally planned system of large-scale agricultural production (Kušková, 2013).

I will explore the evolution of Czech agriculture during the capitalist era of the interwar Czechoslovak Republic, the period of centrally planned economy under the communist regime, the collapse of that regime, and the subsequent transition to a market economy. Additionally, I will examine how each era's transition was influenced by significant historical developments, as well as the integration of the Czech Republic into the European Union.

According to Grešlová et al. (2011) Czech agriculture from the beginning of the 20th century to 2010 can be divided into the following stages:

1. Before the 1. World War

For the era of the decades of Austro-Hungarian empire is typical the beginning of the concentration of capital in the agricultural sector and therefore rise of effectivity and output. This trend was accompanied by a decrease in the number and share of workforce in agricultural, which had represented almost the entire population at the beginning of the 19th century, but had decreased to only 37% of the population before the First World War.

Overall, the period between 1900 and 1914 marked a significant shift in the structure of agriculture, as the country began a transition from a predominantly agricultural society to a more industrialized and urbanized one. This is especially true for the area of present Czech Republic as it was one the most industrialised region of the empire. (Beranová, Kubačák, 2010).

Prior to World War I, the Czech lands, comprising of Bohemia, Moravia, and parts of Silesia, had very strong agricultural sector. They accounted for 25% of all agricultural land in Cisleithania, the western half of the Austro-Hungarian Empire. The region was renowned for its fertile soil and favourable climate, which facilitated the cultivation of a variety of crops. In fact, it produced over 66% of the empire's wheat, nearly 50% of its rye, more than 50% of its barley, one-third of its potato harvest, and over 75% of its sugar beet crop. This agricultural prowess contributed to the Czech lands' economic and political influence within the empire (Kubačák, 1995).

2. 1918-1937

During the period of the First Czechoslovak Republic (1918-1938), capitalism continued to dominate in the agricultural sector, with the trends of intensification that had emerged in the previous period continuing to shape agriculture and whole economy. The government also introduced significant reforms, including the Land Reform Act, which aimed to address the issue of land inequality by confiscating all agricultural holdings in excess of 150 hectares and other land over 250 hectares, and dividing it among farmers. As a result of these reforms, small farms under 20 hectares continued to dominate the agricultural sector, accounting for 64% of all farms, while larger farms over 50 hectares, which represented only 1% of all farms, occupied one-fifth of all agricultural land.

The implementation of Land Reform in Czechoslovakia played a crucial role in improving the efficiency of agricultural production, which indirectly led to the modernization of Czech agriculture and accelerated industrialization.

During the first half of this period, there was a rise in agricultural production in response to falling prices. However, the second half of the period was marked by global economic crisis, leading to a decrease in agricultural production, which later only stagnated until the outbreak of the Second World War (Širůček et al., 2007).

In response to declining prices in the 1920s, Czech agriculture shifted its focus towards specialized crops that could be successful in foreign markets. This redirection of attention towards high-value crops helped to sustain the industry during the economic crisis and set the stage for future growth (Kubačák, 1995).

According to Pimentel et al. (1990) and Kubačák (1995) during this period was Czech agriculture specialized in crops that were demanding on energy and the environment, such as sugar beet, hops, and barley. Despite this intensification, the total area of agricultural land remained roughly unchanged, with arable land share growing at the expense of grassland and pastures. Per hectare yields increased due to the use of modern, high-yielding cultivars, better land management, and the use of artificial fertilizers. While per hectare yields were relatively high, they grew mainly as a result of investment in work rather than the use of fertilizers, unlike in the period of building up socialism after the Second World War.

There is no data available on energy consumption in agriculture during this period, but it was certainly lower than in the 1960s, and human and animal labour still predominated despite advancing mechanization.

Compared to for example the 1980s, agricultural production during the interwar period was smaller in volume.

To summarize, before and during the interwar period, Czech agriculture saw an increase in agricultural production, intensification and foreign trade which allowed for a wider range of crops to be produced based on world demand. Considering livestock production, there was an increase in the number of livestock, except for cattle, which remained stagnant. The

advanced and expanded animal production structure persisted until the post-war era (Beranová and Kubačák, 2010).

3.3.2 Czech agriculture after the Second World War

According to Čapka et al. (2005) and other authors were post-World War II political, economic, and social changes in Czechoslovakia fundamental, and the country was divided into two parts. In April 1945, the president named the government of the National Parliament, which changed the political influence of rural owners through the Košice Government Programme. The Agrarian Party, which had been significant political force since the creation of Czechoslovakia, was prohibited.

The key moment of the post-war agricultural politics was the presidential decree, with Decree No. 12 being designated as the first phase of the second land reform. This decree allowed for previously confiscated farms to be given back to farmers who were forced out of their homes during the war. Additionally, Act No. 5/1945 invalidated some proprietary acts from the war period and allowed for the national administration of the property of Germans, Hungarians, traitors, collaborators, and some organizations and establishments. Act No. 12/1945 allowed for the confiscation and accelerated division of agricultural property of Germans, Hungarians, traitors, and enemies of the Czech and Slovak nation, including agricultural land, ponds, forests, buildings, agricultural objects, resources, livestock etc.

The second phase of the post-war land reform in Czechoslovakia from 1945 to 1947 aimed at revising and further regulating the first land reform that took place between 1919 and 1935. This phase mainly focused on the confiscation of church and private estates, with the maximum land area being limited to 50 hectares. This phase marked the final end of the feudal owned estates in the country. The Act No. 142/1947 served as the basis for this second phase of the land reform (Homoláč and Tomšík, 2016).

The third phase of the post-war land reform was initiated by the Act No. 46/1948, which was based on the principle that "the land belongs to those who work on it". This phase set a maximum limit of land ownership by one independent farmer to 50 hectares and expropriated all land that was on lease or belonging to legal entities. The purpose of this reform was to redistribute the land to smaller farmers and to eliminate the large estates that were still in existence. This reform affected a total of 432,905 hectares of land in Czechoslovakia (Kabrhel, 1980).

The following post-war period in Czechoslovakia saw a shift towards a centrally planned economy, which heavily invested in the agro-industrial model based on large collectivized and state farms. The emphasis was on increasing agricultural output, which was seen as the overriding priority. This led to a significant change in the relationship between agriculture and nature, with traditional farming practices giving way to large-scale industrial agriculture, which relied heavily on synthetic fertilizers and pesticides (Zellei et al., 2005).

3.3.3 Communist era

The Czechoslovak Socialist Republic was a period of socialism marked by a totalitarian regime that implemented a range of policies to reorganize Czech agriculture. The government's approach included nationalization and collectivization, land consolidation, and massive industrialization.

During this period, large farms over thousands of hectares dominated Czech agriculture. The state-owned farms were organized into large, collective units known as "cooperatives," where farmers worked together to produce crops and livestock for the state. The government controlled every aspect of agricultural production, from the types of crops grown to the prices of products.

The collectivization process was often met with resistance from farmers, who were forced to give up their land and join cooperatives. Many farmers resisted by hiding of livestock and other property, but they were forced to join the cooperatives or even to by abandon their farms and leave to work in plants. In several cases was used even brutal force.

Despite the government's efforts to modernize Czech agriculture, the system was plagued by inefficiencies and poor performance. The focus on large-scale, centralized production often led to overproduction and waste. Moreover, the environmental impact of industrial agriculture was also a concern during this period, as the heavy use of chemicals and fertilizers caused soil degradation and pollution.

During this period, the focus was on achieving high levels of production and the implementation of industrial methods in agriculture. This was achieved through the introduction of modern machinery and large-scale use of chemical fertilizers and pesticides. The collectivization process led to a significant increase in labour productivity and a significant improvement in the level of agricultural production. However, it also resulted in the loss of the traditional knowledge of farming and a disregard for the environment. Environmental issues were largely ignored in the drive to maximize production. The lack of individual initiative and motivation, as well as the bureaucratic structure of the collectives, often led to inefficiencies and low-quality produce (Kubačák, 1995). According to Lipsky (1994) was the average size of a field in Czechoslovakia was around 0,25 ha in 1950 and 34 ha in 1980.

The Council for Mutual Economic Assistance (CMEA) was a trade organization among communist countries, led by the Soviet Union, during the Cold War. The Czech lands (Czechoslovakia) were a member state of CMEA and became strongly integrated within its system of division of labour. This meant that Czechoslovakia focused on producing certain goods and services for other member states in exchange for goods and services produced by those countries. This trade system was supposed to promote economic cooperation and development among communist countries. However, it also meant that the Czech lands were heavily dependent on the Soviet Union for energy supply and subsidies, which

affected their agricultural production and energy use patterns (Kuskova et al. 2008; Bideleuc and Jeffries, 2007).

Bicik et al. (2001) mention the term 'socialist industrialization' which refers to the economic policy pursued by the socialist countries in the mid-20th century, which aimed to rapidly industrialize their economies through state ownership and central planning. However, this process often led to inefficiencies and waste of resources, as was the case in Czechoslovakia. Despite massive financial and material support, production did not grow as much as expected, and the country became dependent on imports of fodder from the Soviet Union. The use of energy and fertilizers was also wasteful, reflecting the lack of incentives to use resources efficiently in a centrally planned economy.

According to Kubačák (1995) the forced collectivization and amalgamation of small, independent farms into larger, state-owned units often led to management issues, as the newly formed units struggled to adapt to the new system and integrate their operations effectively. This was particularly true in cases where the units combined different types of agriculture or were located in different regions with varying soil and climatic conditions. As a result, many of these units were poorly managed and failed to operate efficiently, leading to a decline in agricultural productivity.

Kuskova et al. (2008) mentioned that during the period of 1960-1975, efforts were made to further implement socialist methods of management in agriculture with the aim of achieving self-sufficiency in food production and accelerating growth. This involved the intensification and mechanization of agricultural production, as well as the application of scientific findings such as the development of cultivars and artificial insemination of cattle. However, the production growth in Eastern Europe, particularly in the Czech Republic, lagged behind that of Western Europe. It wasn't until the late 1960s that production levels reached those of the pre-war period. Furthermore, the prioritization of industrial advancement in Czechoslovakia led to a decrease in agricultural land, despite the doubling of yields through the use of artificial fertilizers. Energy use in agriculture grew at a faster rate than production, leading to a decrease in energy efficiency. Additionally, Czech agriculture heavily relied on the import of cereals for fodder, which resulted in pollution from heavy fertilizer use and erosion caused by plot amalgamation. These consequences highlight the negative impacts of the policy of massive industrialization of Czech agriculture at any cost.

The socialist agriculture in the former Czechoslovakia was highly centralized, with state and cooperative farms occupying almost all arable land. This led to problems such as erosion due to the consolidation of land and large-scale livestock farming in concentrated facilities. Despite increases in crop and cattle yields, the agricultural production did not match that of developed countries. The focus was on exporting traditional products, such as beer, malt, and sugar, with limited success. However, there were some successful sectors, such as rapeseed, and poultry breeding. Even though Czechoslovakia was already self-sufficient in basic agricultural products, the state continued to stimulate farmers to produce more and more in all regions. This was mainly for the purpose of exporting to East

European countries, particularly to the Soviet Union. However, Czechoslovakia was losing its position in traditional export commodities such as hop, malt, beer, sugar, and sugar exports had practically ceased. The focus on increasing production for export, rather than ensuring sustainability and self-sufficiency, would have significant consequences in the post-1989 era (Götz, 1994).

The final stage of socialist agriculture in Czechoslovakia was characterized by a focus on maximizing production, but this approach was not sustainable in the long run. The biophysical limits of the heavily subsidized system were reached, and after the Velvet Revolution, a new approach to agriculture was needed to address the challenges of a market-oriented economy.

To summarize, following the Second World War significant changes took place during the communist rule when the Czechoslovak Republic became a socialist state under Soviet Union dominance. After the war, around 2-3 million German-speaking inhabitants were expelled from the Czechoslovak border regions, resulting in a substantial loss of agricultural workforce, and even cultivated land in those areas which was subsequently converted into forests. This fastened the process of so called "forest transition", because since the late 19th century, forest land has been on the rise in the present Czech Republic area. This phenomenon is occurring in many developed countries and involves a reversal from decreasing forest area to increasing forest cover (Mather, 1992; Rudel et al., 2005).

3.3.4 Transition

According to Grešlová et al. (2011) was the period following the end the Czechoslovak Socialist Republic characterized by a sharp transition from socialism to capitalism, with the fundamental political changes of the process of establishing of Czech and Slovak Federative Republic (1990-1992) and later of the Czech Republic in 1993.

After the Velvet Revolution in 1989, Czechoslovakia transitioned to a market-oriented economy, and the agricultural sector was no exception. The decrease in state subsidies and process of privatisation of the land stolen by communists, which started in 1991, led to a decline in agricultural production, as many farms struggled to adapt to the new economic conditions and they were not able to compete in the free market environment (Grešlová et al., 2011). Overall, the government's focus on industrialization was replaced by a focus on specialization and niche markets, with an emphasis on high-value crops.

However, despite the privatisation process the Czech Republic experienced shift towards even larger farms, with 5% of the largest farms occupying almost 75% of the land. Despite restitution of land to millions of small owners, Czech farms cultivated only about 12-13% of land, and the remaining millions of owners usually sold or leased their land to large farms. Era of collective farms led to the situation where most of the former rural families lost their interest in cultivating land.

According to Hudečková and Lošťák (1995) were the agricultural reforms in the 1990s in post-communist countries such as the Czech Republic mainly focused on the transition from the collective farming system to a market-oriented system, as well as the restitution of land to its original owners. These processes involved significant changes in property rights, ownership structures, and production practices, and resulted in significant social and economic costs for farmers, rural communities, and the state. While sustainability and environmental concerns were not the primary focus of these reforms, they did become increasingly important in later years as the negative impacts of intensive agriculture and industrial farming practices became more apparent.

Overall, the transition period was a difficult time for agriculture in most of the post-socialist countries. The decrease in subsidies and change in economic framework impacted all types of farms, including large-scale corporate farms and family farms. Corporate farms, which were heavily reliant on chemical and technological inputs, suffered from a decrease in financial support, which affected their economic outcomes. Family farms, on the other hand, faced a host of other problems, such as limited access to finances, volatile price markets, and difficult restitution processes (Swain, 2007). It's also worth noting that members of cooperatives were not required to pay taxes, social, or health insurance, which put them at an advantage compared to individual farmers who had to pay these fees (Bański and Bednarek, 2008).

To summarize the main aspects of the era after the fall of communist regime: The large-scale form of farming was predominantly preserved in Czechia (and Slovakia as well) agriculture even after privatization of agricultural cooperatives. Significant changes occurred in the form of shift in employment structure in rural areas and focus on profitability led to partial abandonment of intensive production in less favourable areas resulting in either complete resignation from land cultivation or shift to extensive form of farming. Farming activities were concentrated in more fertile areas, while less intensive forms of land use are adopted in agriculturally marginal areas (Stacherzak, Hájek and Heldak, 2019).

According to Doucha and Divila (2008) and Doucha and Foltýn (2006) can be Czech agricultural policy since the Velvet revolution divided into the following five phases:

1. Shock therapy 1990-1992

The shock therapy implemented in the Czech Republic from 1990-1992 aimed to rapidly transition the economy from a centrally planned socialist system to a market-oriented capitalist system. As part of this transition, price liberalization was implemented, which included the abolition of subsidies for food consumers, such as the negative turnover tax that had been applied in the previous regime.

Restitution and property transformation laws, including the Land Law and the Transformation Law for original coops, were also accepted and put into effect during this period. These laws aimed to address property ownership issues and transfer ownership from the state to private individuals or entities.

Despite the radical changes in economic policy, the government continued to provide support for restructuring and farm income, similar to the support provided by the previous regime. This support included direct subsidies and market price supports.

2. Liberal policy 1993-1994

This policy was characterized by significant cuts in direct income support for farms. Additionally, investment support for restructuring changed from direct subsidies to interest-free loans, which meant that farmers were required to repay the loans in the future. This change aimed to increase the efficiency of the agricultural sector and to promote competitiveness by encouraging farmers to invest in their farms, and to rely less on government support. However, this policy shift also led to a decline in the number of small farms and an increase in concentration of capital in the agricultural sector.

3. Restructuring 1995-1997

During this period, the Czech Republic continued to support the restructuring and stabilization of the newly emerging farm structure. About 41% of the total budgetary support was allocated for this purpose. Additionally, a new support instrument was introduced to maintain grassland in "less favoured areas" (LFA) with aim both to support farmers and to preserve the landscape. The government provided support for the environment and diversification purposes, which was mainly focused on LFA payments. There was also newly emerging support for non-food use of agricultural production, primarily for biofuels. Moreover, the government implemented administrative barriers for imports of cereals, oilseeds, and other products to protect domestic consumers.

4. Preparation for EU accession 1998-2003

The period of 1998-2003 in Czech agriculture was characterized by a gradual adjustment to the European Common Agricultural Policy (CAP) and the future EU accession. This period was a start of growing level of support for agriculture, with a nominal increase of over 60% compared to the previous period.

There was also an increasing emphasis on environmental payments, which accounted for 31% of all support. The implementation of payments for LFA areas and the continuing high level of support for non-food use, particularly for biofuels, were the main instruments for supporting environmental and multifunctional aspects of agriculture.

In terms of trade, there was a decrease in actual tariff protection due to the implementation of new trade agreements with the EU such as the "double-profit" and "double-zero" agreements, but the level of protection remained higher than in the EU.

5. Since EU accession 2004

In the period of 2004-2005, there was a significant increase in the total budgetary support in the Czech Republic, which grew by 68% compared to the previous period. Most of this support was income support, accounting for more than 55% of the total budgetary support.

Membership in the EU and becoming part of the CAP came with inflow of financial subsidies in many forms, mainly: direct de-coupled support; direct coupled support, common organization of the markets and rural development provisions. (Kotyza et al., 2019). Support was provided in the form of direct payments, which consisted of both cultivated area based Single Area Payment Scheme (SAPS) payments and national complementary direct payments (known as TOP-UP payments). However, due to a high share of coupled TOP-UP payments, all direct payments functioned as coupled support in this period.

In the first year in the EU were direct payments from the EU's CAP 57 euro per hectare and from national TOP-UP 46 euro per hectare: together 103 euro per hectare. Payments from the CAP quickly increased to 236 euro in 2013, but then due to the implementation of the new Multiannual Financial Framework for 2014-2020 were lowered to 218 euro (2014), 130 euro (2015-2017) and 132 euro in 2018 (Kotyza et al., 2019).

Direct payments were conditioned by "good farming practices," but with low enforcement effects. There was also an increase in support for environment and multifunctionality, with a significant share of payments going towards LFA payments and a growing share of other support (biodiversity, rural development). However, budgetary support for biofuel crops decreased sharply due to EU regulations in this sector. Despite weak payment conditions and other factors, LFA payments and some other environmental support types functioned in reality as additional direct payments.

During this period, the Czech Republic entered the EU single market with "zero" protection on it. However, compared to the pre-accession period, the country had a higher average level of protection against the rest of the world.

According to Doucha and Divila (2018) the Czech agricultural policy should carefully consider the distribution of direct payments and related legislation to promote sustainable and efficient agriculture under EU conditions. While the use of the direct payments system may be necessary, it is important to enable new entrants to receive payments while acknowledging the potential of negative effects such as higher leakage of payments from land-users to landowners and faster land price increases.

The policy should prioritize the restructuring of the agriculture sector instead of maintaining the current structure, which requires a more efficient land market with reduced transaction costs. The policy should aim to remove barriers to the land market and avoid creating new impediments and bottlenecks that could hinder the restructuring process. This will help the Czech agricultural industry become more competitive and sustainable within the EU environment.

Joining the EU in 2004 brought about significant changes to the Czech agriculture industry, particularly in terms of the implementation of the Common Agricultural Policy rules. While some of these changes have provided significant competitive advantages, others have had negative impacts.

Authors state that the large-scale production has enabled economies of scale and reduced dependence on subsidies, making large farms more competitive within the Single Market. However, the opportunities from economies of scale are still not fully utilized. Small farms have also proved their economic viability, but generally it is for them more challenging to achieve sufficient competitiveness.

The Czech accession to the EU has brought new opportunities and threats. The CAP and its support system have improved economic results and increased stability of farmers' income. However, the CAP has been criticized for not taking into account the different conditions and needs of each member state, which can put farmers in some countries at a disadvantage. Czech farmers also face increased competition. Věžník et al. (2013) describe it similarly in their article - the Czech Republic's accession to the EU in 2004 had a significant impact on its agriculture sector. The country had to adjust to new regulations, standards, and competition in the common EU market, while also facing the challenges of a globalizing world market. The EU's CAP provided support and funding for the sector, but also required compliance with environmental, health, and safety standards. In order to remain competitive, Czech agriculture had to modernize and increase efficiency, while also focusing on quality and added value to differentiate its products in the global market. According to Tomšík (2010) is important to - despite of above-mentioned problems follow two strategies to become more competitive within the European Single Market. Maintaining low production costs is important for profitability and competitiveness, and the Czech agriculture has an advantage in this area due to the large-scale production and utilization of economies of scale. However, to further improve competitiveness, increasing the added value of agricultural production by focusing on product quality and production based on tradition can help to differentiate products and appeal to consumers who value quality and authenticity.

Svatoš and Smutka (2009) mentioned that profits in Czech agriculture increased after joining the EU due to the increase in funding, which helped to maintain agricultural profitability. However, as I mentioned before, the total volume of agricultural output decreased significantly, and the country lost food self-sufficiency, which is viewed very negatively in wide society and is often used as political tool. This was partly due to increased competition from other EU member states, which led to a decline in the competitiveness of Czech agriculture. Another factor that has affected the development of agriculture in the Czech Republic is the import of cheap agricultural products from abroad, which has put pressure on local producers. This has made it difficult for many Czech farmers to compete with imported products, especially in the case of basic commodities like grain or pork. The decrease in employment in agriculture and related sectors and low salaries in agriculture have had a significant impact on rural development in the Czech Republic, as well as in other countries in the region such as Poland. The shift towards larger-scale production and consolidation of farms has led to fewer jobs in agriculture, particularly in rural areas. This has resulted in a decline in the population of rural areas as people have migrated to urban areas in search of better job opportunities and higher salaries.

According to Věžník et al. (2013) is essential to support and promote a sustainable and diversified approach to ensure the preservation of agriculture and rural development. This can involve investing in infrastructure such as roads, electricity, water supply, and broadband, which can help to create new jobs and opportunities in rural areas. It is also important to support the preservation of farmland, water sources, landscape, and biodiversity through sustainable farming practices and environmental regulations. This will help to maintain a healthy and productive environment for future generations. Finally, encouraging young people to get involved in agriculture and rural development can help to revitalize rural communities and promote economic growth.

Also, according to Baun et al. (2009) the CAP has had both positive and negative impacts on Czech agriculture and rural areas. While the increase in public subsidies has stabilized the financial situation of farmers, it has not translated into significant improvements in the economic and social well-being of agricultural employees. The CAP has also not adequately addressed the growing disparity between agricultural and non-agricultural wages.

On the positive side, the CAP has stimulated the formation of social capital through the proliferation and reinvigoration of agricultural interest groups, which could lead to more cooperative norms and behaviour. This could potentially have long-term positive effects on the development of the agricultural sector and rural areas.

4 Practical Part

In the first part of the practical part I will summarize the basic comparison of Poland and Czech Republic agriculture to gain a perspective in which will be later presented more specific indicators originating from my research.

4.1 Poland

The agricultural and food producing sectors in Poland are of great importance for national economy, society, and rural development. The total share of agriculture, forestry and fisheries in gross value added is twice as high as the EU average with 2.2% share. For Polish agriculture is typical high diversity of farm structure with high share of small and semi-subsistence farms. In Poland, rural areas and agricultural areas occupy 85%, respectively 52% of the country's area. The main sectors of agriculture production are dairy, cereals, pigs, poultry, and horticulture.

Poland has second highest (after Romania) total number of farms in the EU: 1,302,330, which is 14.4% of all EU farms. With population of 37.7 million, that means there is about one farm per 29 inhabitants.

For agriculture is used 50.4% of country total area while 34.5% is used for forestry (data for 2018 from Eurostat (2021)).

Utilised agricultural area is 14,784,120 hectares, which is 48.1% of country total area (based on data from Eurostat (2022) for year 2020).

4.2 Czech Republic

Czechia's agricultural production is predominantly focused on crop production, with the focus on cultivation of cereals and oil seeds, but also potatoes, sugar beet, hops, fruit and vegetables and grapevines. Approximately 78% of the Czech population live in rural areas. Livestock production is focused on cattle, pigs, poultry, sheep, and goats.

For agriculture production is used 49.1% (including farm buildings etc.) of country total area, while 36.2% is used for forestry (Eurostat (2021) data for year 2018).

Compared to Poland Czechia has slightly higher share of forest areas, while agricultural land has slightly lower share.

Czech Republic has 28,910 farms, which is 0.32% of all EU farms.

With population of 10.7 million, that means there is about one farm per 372 inhabitants.

There are 3,523 thousand hectares of agricultural land of which utilised agricultural area is 3,492 thousand hectares, which is 45.2% of country total area.

Permanent grassland is on 28.1% of total agricultural area which is 990 thousand hectares and arable land with 70.7% (2,490 thousand hectares).

(Based on data from Eurostat (2022) for year 2020)

4.2.1 Standard output

Interesting indicator concerning Farm Structure provided by Eurostat is Standard Output (SO). It is the average monetary value of the agricultural output at farm-gate price, in euro per hectare or per head of livestock, therefore it excludes direct payments received by farm and includes the production costs. The standard output is used to classify agricultural holdings by type of farming and by economic size.

The sum of all the SO in a farm is used as a measure of overall economic size of a farm. On the next figure is shown total number of farms classified to groups by their standard output in euro. For simplification I excluded farms with zero output in 2020 as they have extremely marginal shares.

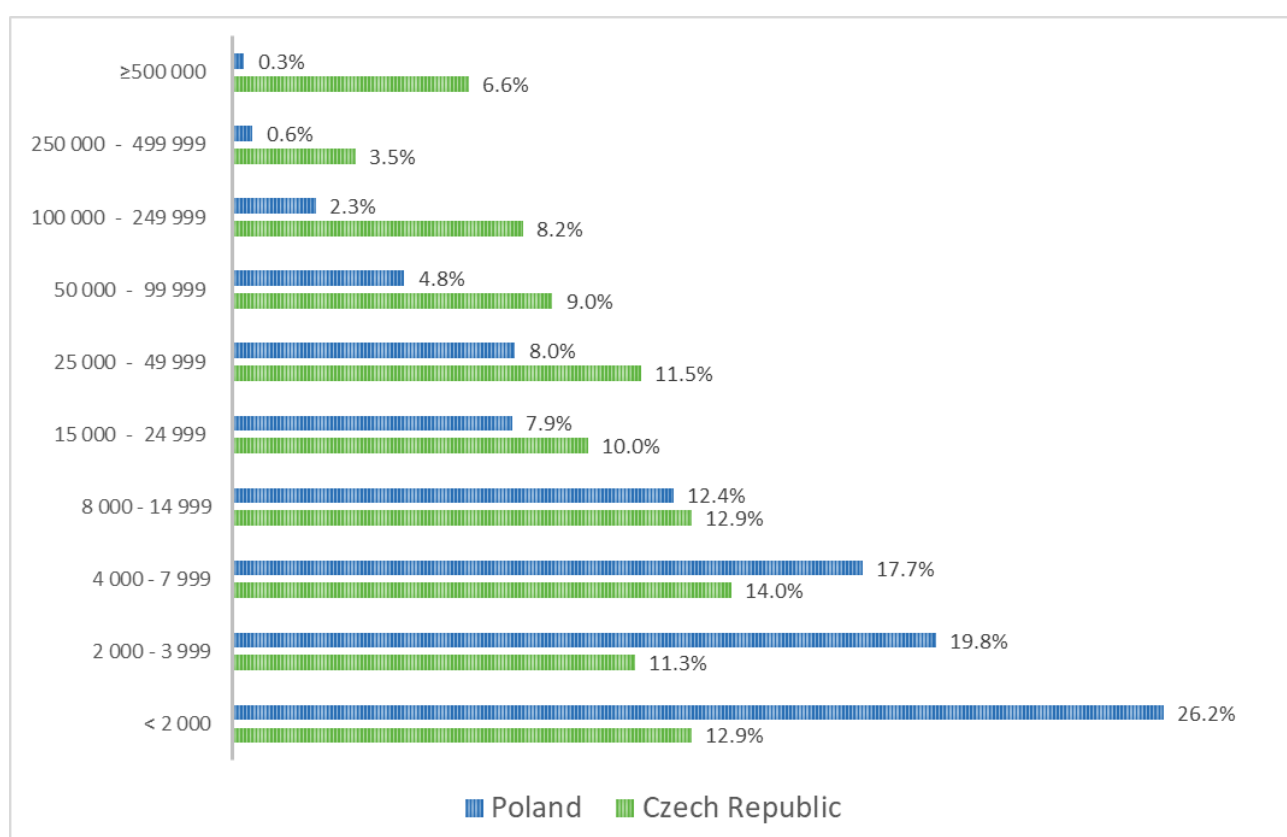


Figure 5 Total number of farms in the Czech Republic and Poland sorted to groups by their standard output in euro in 2020.

Source: Author based on Eurostat, 2022

We can see significant difference in the farm structure according to their economic size. Poland has by far highest share of smallest farm with standard output less than 2000 euro with over quart of all farms being in this group, while only about 13% of Czech farms are in this smallest group. Considering the second extreme of largest farms with standard output over 100 000 euro, there are 18.3% of such farms in Czechia, while in Poland it is only 3.2%.

4.3 Common Agricultural Policy

The share of the European Union budget intended for spendings in agricultural sector has been steadily declining in last decades. Whereas the CAP represented 66% of the EU budget in the early 1980s, it decreased to 37.8% in the 2014-2020 period. Contemporary, in 2021-2027 period is the expenditure under the CAP planned to be 31% of total EU budget.

In year 2021 the EU budget was 168.5 billion euro in commitment appropriations. The CAP accounted for 33.1% of the 2021 budget (55.71 billion euro).

Total CAP spending intended for the 2021-2027 period are 386 602.8 million euro. Therefrom, in the First Pillar (Direct payments and agricultural market measures) 290 534 million, which accounts for 76.8% of the total CAP. In second pillar is allocated 87 998.3 million for Rural development measures and 8 070.5 million for Additional rural development measures under NGEU (temporary recovery instrument), together accounting for the rest 23.2%.

4.3.1 Distribution of the CAP

Total EU spending on the CAP in 2020 were 37,879.2 million euro, which is 24.79% of total EU budget in given year. CAP expenditures in the 2020 as percentage of total EU GDP was 0.38%.

Main parts of the CAP in terms of amount of the finances allocated are the Basic Payment Scheme with 40% share (€14812.4 mil. in 2020) and Single Area Payment Scheme with 11.8% (€4632.5 mil. in 2020). Both programs are direct payments schemes in Pillar I. SAPS is used in Bulgaria, Czechia, Estonia, Cyprus, Latvia, Lithuania, Hungary, Poland, Romania, and Slovakia. Usage of specific system in this member states is based already in the accession treaties of the countries. Main difference is that Basic Payment Scheme is based on payment entitlements allocated to farmers. The actual payment is made to active farmers based on the activation of the payment entitlements they hold and calculated in relation to the eligible land they declare. Individual EU countries have the right to set differences in the value of entitlements between farmers. Therefore, each farmer may get different amount of support per one hectare.

European Commission is making long-time effort to implement measures to lower the differences in the value of entitlements. This effort is called 'internal convergence'. Under the new CAP 2023-2027, countries using the BPS are obliged to continue to reduce these differences, to reach a level, where all direct payments have a value of at least 85% of the EU average in 2026.

The SAPS in comparison is simplified transitional scheme, where the amount of support is based on the eligible hectares declared by farmers and the level is the same for all hectares in the country (European Commission, 2023).

The two basic direct subsidies are supplemented by other income support payments meant for specific farming activities or specific types of farms/applicants, such as greening payments, the young farmers support and additional optional schemes that member states can individually choose to implement. Distribution of the CAP in specific programmes is shown on the following figure.

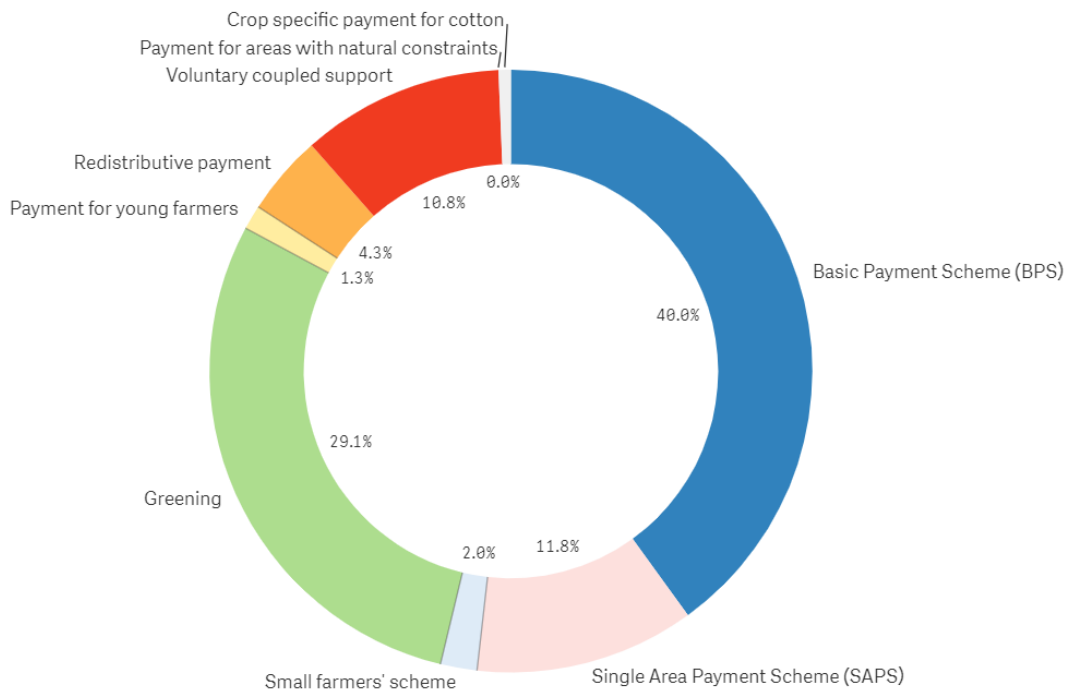


Figure 6 Distribution of direct payments - EU 2020.

Source: European Commission, 2023

In the new CAP for the 2023-27 period will be allocated €270 billion of EU funding.

4.3.2 The CAP - Czech Republic

In case of the Czech Republic, in 2020 was in the CAP allocated 956.5 million euro.

1. 852.3 million euro for direct payments.
2. 357.1 million euro in rural development.
3. 17.1 million euro for market expenditure.

Distribution of the CAP in specific programmes is shown on the following figure.

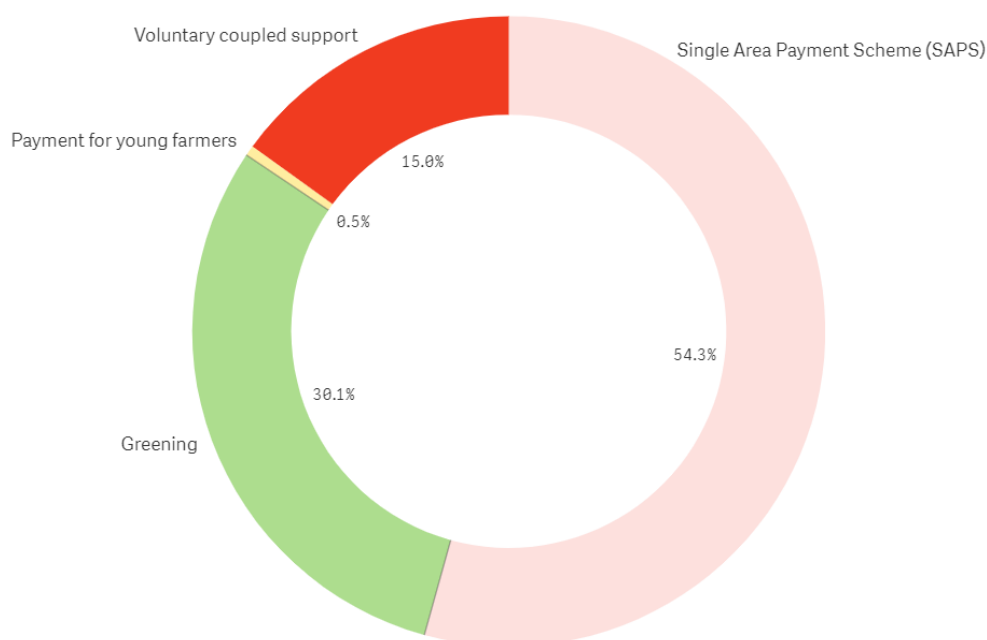


Figure 7 Distribution of direct payments - Czechia 2020.

Source: European Commission, 2023

Major part of the CAP was allocated in the direct SAPS payments with 455.9 million euro creating 54.3% share.

In November 2022 European Commission approved the Czech Strategic plan for the new CAP 2023-2027. In this period will be allocated in the CAP total 5.6 billion euro for Czechia.

New CAP implements several major changes in the support system. Such as new measure to support small and medium farms, where farms will receive a redistributive payment for their first 150 hectares. Czech government decided that 23% of total funds in direct payments will be used as this redistributive support. This decision led to wide criticism and even public demonstrations of big farming holdings and their representatives such as Agricultural Association of the Czech Republic. On the other hand, representative of smaller and family farms Association of Private Farming of the CR welcomed the decision. Concerning specific support, about 54% of Czech holdings will be entitled to additional support for problematic sectors such as the dairy and beef production sectors. The EU urged countries to increase focus in their Strategic plans on environmental issues such as protection of natural resources and biodiversity. In the Czech plan is this effort presented mainly in increasing the area of non-productive land. Farms over 10 hectares are newly obliged to use rotational or non-rotational fallow land and/or create landscape features such as 'buffer strips, individual or groups of trees, tree rows, field margins, patches, ditches, streams, small wetlands, terraces, stonewalls or small ponds. Further the Plan supports use of production methods limiting the usage of pesticides which should be applied on more than 40 thousand hectares of agricultural land. Organic farming is also subject of increased

support, which is projected to increase of area of organic farming from current 16% to 21% by end of the CAP period in 2027.

4.3.3 The CAP - Poland

In case of Poland, in 2020 was in the CAP allocated 4769.9 million euro.

1. 3319.7 million euro for direct payments.
2. 1419 million euro in rural development.
3. 31.2 million euro for market expenditure.

Distribution of the CAP in specific programmes is shown on the following figure.

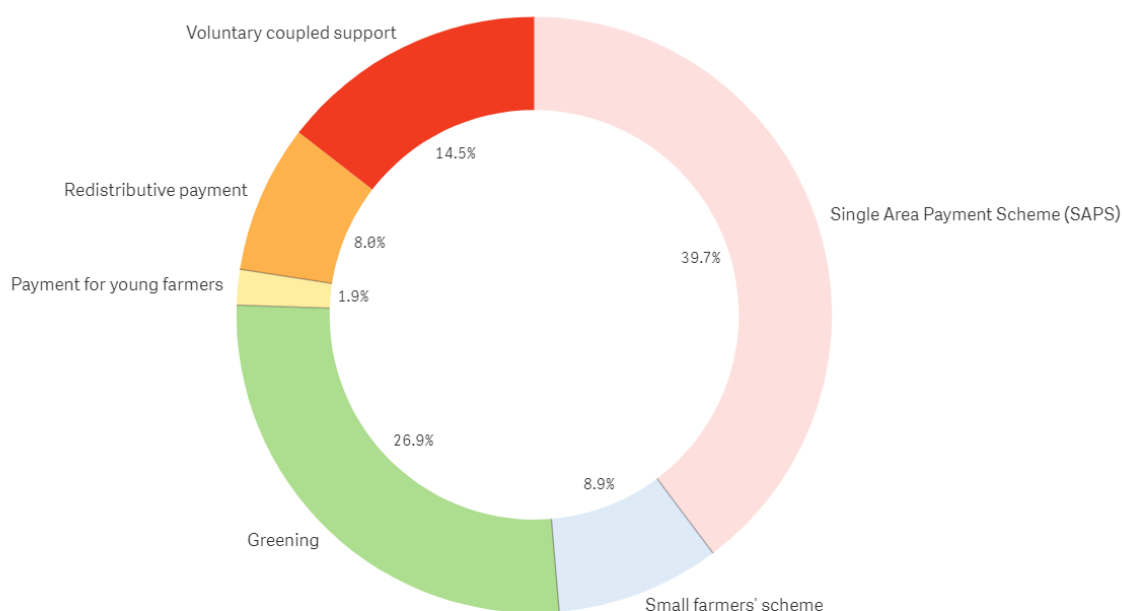


Figure 8 Distribution of direct payments - Poland 2020.

Source: European Commission, 2023

Poland has in comparison with the Czech Republic significantly lower share of SAPS as it has only 39.7% share of direct payments.

Second difference is that Poland used two programmes targeting small sized farms. They substituted part of the SAPS programme with the Small farmer's scheme, which is a simplified income support scheme granting a one-off payment to farmers who choose to participate. In this case, this payment replaces all other forms of income support payment. The maximum level of the payment is decided at national level, with maximal amount of €1,250.

The other programme is Redistributive payments, which is designed to increase financial support of smaller farmers by increasing amount of subsidies paid for first hectares. EU

countries are allowed to allocate as much as 30% of their national funds under the CAP to the redistributive payment, meaning that all hectares below the threshold receive additional support. Each country can set the threshold individually.

For the new CAP 2023-2027 is for Poland planned allocation of approximately 22 billion euro of the EU funds and another 2 billion in National funding. Direct payments under Pillar I will account for 17.3 billion euro, of which 47.36% will be Basic income support and 25% for ecological schemes. Estimated rate of Basic income per one hectare will be approximately 118 euro. Widely discussed cap on payments reducing support for the biggest farms will not be implemented in Poland.

For Rural development will be reserved from the EU more than 4.7 billion euro of which more than 2 billion are accounted for Environmental and climate objectives. Under rural development are plans such as reduction of the use of pesticides and antibiotics and improvement of animal welfare conditions on the farms (additional space, prohibition of early weaning etc.).

In sectoral support Polish Strategic plan put emphasis on support to threatened livestock sector, followed by production of protein crops, sugar beet, starch potatoes, tomatoes, strawberries, hops, flax, and fibre hemp.

Poland will also increase redistributive payments for the area of first 30 hectares of each farm. This should help small farmers, as it will lead to higher income per one hectare for smaller farms. Poland will allocate 2 billion euro to this purpose, which is 12% of Polish direct payment fund in the 2023-2027 CAP.

To follow the EU aim for the “Greener CAP” Poland will support 2 300 investment projects of energy production such agricultural biogas plants or solar power. There is also emphasis on support of projects aiming to improve the energy efficiency of farms. Biodiversity measures in the Plan are represented by “eco-scheme” under which farms will be subsidized for sowing a mixture of at least two species of honey plants on agriculture land. Poland has set the goal to have 30 000 hectares of such area each year. Basic conditions are that these areas must not be used for agricultural production until 31 August of each year and must not be treated with plant protection products.

Across the EU shares of main CAP areas of expenditures significantly vary, however the Czech Republic and Poland have very similar distribution. The Czech Republic direct payments share was 69%, rural development 29% and market expenditure 1%; Poland respective shares were 70%, 30% and 1%.

4.3.4 Value of agricultural production

The total value of agricultural production in the European Union in 2020 was an estimated 411.8 billion euro, of which more than half (52.8%) was from crops, including 14.0% from vegetables and horticultural plants and 11.2% from cereals. Another 38.6% share was created from animals and animal products, from which 13.1% was from dairy and 9.6% from pigs production. The remaining 8.6% was from agricultural services and other inseparable non-agricultural activities.

Latest available data for 2021 shows that total value added by EU’s agricultural industry increased significantly to 449.5 billion. Share of crops further increased to 55.3 % share of value added in 2021 to the detriment of animal production with 36.3%.

Poland had total output of agricultural production in basic prices 26.4 billion euro in 2020 and 27.9 in 2021. For 2022 is estimated major increase to 38 billion euro mainly due to the global agricultural product prices surge.

Czech Republic total output in 2020 was 5.6 billion euro, in 2021 6.5 billion and estimate for 2022 is 7.6 billion.

To perceive development of agricultural output is more relevant to use as indicator total output in production values at constant prices (2015 = 100). See the development of this indicator on following figure.

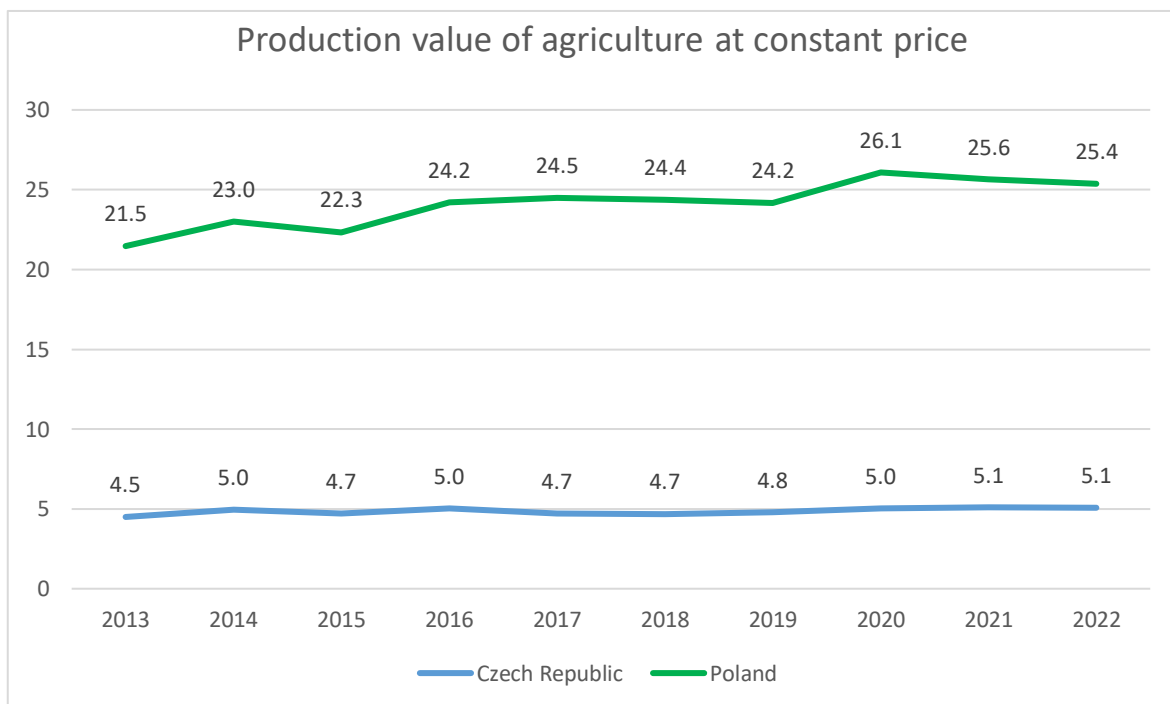


Figure 9 Production value of agricultural products at constant price (2015 = 100) in billion euro.

Source: Author based on Eurostat, 2023

4.4 Farm Structure

This part of the Thesis is based on data from the agricultural agencies designated by the government to perform the role of an accredited paying agency. Agencies are responsible for the administration and distribution of financial support to agricultural holdings from both national and European Union funding. In the Czech Republic it is State Agricultural Intervention Fund (Státní zemědělský intervenční fond – SZIF). In Poland it is the Agency for Restructuring and Modernisation of Agriculture (Agencja Restrukturyzacji i Modernizacji Rolnictwa – ARiMR). These datasets have several differences in comparison

to the Eurostat data for the same year, therefore for clarity I will only use data from national agencies in this section.

Data was obtained through the use of freedom of access to information.

4.4.1 Czech Republic

SZIF provided detailed data concerning information about all individual Single applications with data for following categories for each:

1. Legal/natural person, NUTS4 – District, Date of birth, ID of holding.
2. Direct payments programmes: SAPS, Greening, and Young farmer
3. Voluntary coupled support: Sugar beet, Vegetable species with very high labour intensity, Vegetable species with high labour intensity, Milk and milk products, Veal meat type, Protein crops, Hops, Ware potato, Sheep meat and Goat meat, Starch potato, Fruit species with very high labour intensity, Fruit species with high labour,
4. Financial compensation from the unallocated resources in previous period

All payment amounts in the file are in CZK and as an exchange rate I will use the rate stated in the file as: *“CZK - EUR Exchange rate for agri subsidy purposes - 25.411”*

Firstly, I summarized total values for whole country:

Total number of listed agricultural holdings is 30,227, of which natural persons were 25,688 (84.98%) and legal persons were 4,539 (15.02%).

Total number of agricultural holdings which applied for and received SAPS direct payment was 30,155. The remaining 72 holdings received only coupled support of financial compensation.

Total area for the SAPS was 3,539,107 hectares, with average area per one holding of 117.4 hectares.

In following table is summarised number of applications for each subsidy programme and amount paid in the particular programme.

	Applications	Amount CZK	Amount EUR
SAPS	30172	CZK 12,382,656,768	€ 487,295,139
Greening	30155	CZK 6,887,292,938	€ 271,035,888
Young Farmer	3985	CZK 123,753,248	€ 4,870,066
Sugar beet	879	CZK 444,876,891	€ 17,507,256
Vegetable species with very high labour intensity	317	CZK 84,317,251	€ 3,318,140
Vegetable species with high labour intensity	117	CZK 13,487,609	€ 530,778
Milk and milk products	1784	CZK 1,383,924,516	€ 54,461,631
Veal meat type	6487	CZK 666,928,653	€ 26,245,667
Protein crops	6491	CZK 459,381,426	€ 18,078,054
Hops	123	CZK 84,196,122	€ 3,313,373
Ware potato	745	CZK 49,198,814	€ 1,936,123
Sheep meat and Goat meat	2550	CZK 73,955,894	€ 2,910,389
Starch potato	273	CZK 82,739,613	€ 3,256,055
Fruit species with very high labour intensity	310	CZK 69,502,275	€ 2,735,126
Fruit species with high labour intensity	316	CZK 26,930,406	€ 1,059,793
Financial compensation	19117	CZK 314,915,727	€ 12,392,890
Total		CZK 23,148,058,151	€ 910,946,368

Table 6 Number of applications and amount paid in CZK/EUR for each programme.

Source: Author based on SZIF, 2022

Average payment per agricultural holding was CZK 767,635 (~€ 30,208).

In second step I aggregated NUTS 4 regions to NUTS 3 districts (kraje) to be able to compare results to Polish data, where data are available only for voivodships and to increase clarity as well.

On the following map can be seen average area of a farm by NUTS 3 regions.

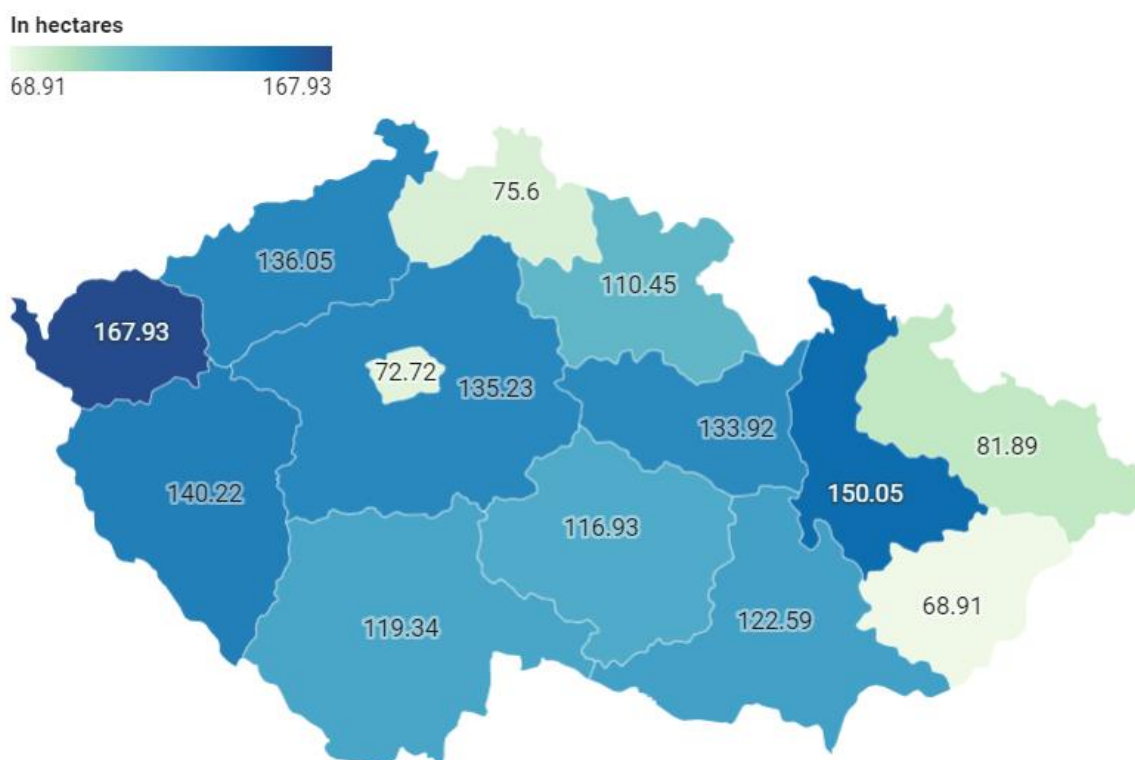


Figure 10 Czechia - average farm area in 2020 in hectares.

Source: Author based on SZIF, 2020

Significant differences are perceivable, Zlínský region has average farm area only 68.91 hectare. One of the reasons is that part of the region is Moravian Wallachia. Historically peripheral hilly area, where was due to the limited accessibility and fertility significantly lower pressure on collectivisation and therefore was in the region to limited extent preserved private agriculture. Second lowest average area is in Prague, where the main reason is logically high share of urbanised area and therefore limited space for agriculture. On the other hand, highest average areas are in the regions of former Sudetenland, where was high share of German population until after the end of World War two, when they were forcefully evicted, and their land confiscated. Therefore, in the regions was high share of state-owned land and creation of state and collective farms were very easy and even logical way to maintain agricultural production in these underpopulated areas.

Another interesting indicator is average amount of the basic payments per hectare. Average payment in SAPS were 3498.8 CZK and in Greening it was 1947.7 per hectare.

Further I sorted farms area according to the area in the SAPS programme, as it is the most widely used programme with 99.8% of listed holdings applied in this programme. This specific settings of sorting to the area groups I selected, as it is used by Eurostat with one

change, that I added 100-199,9 hectares group to better describe Czech specific situation with high share of largest farms.

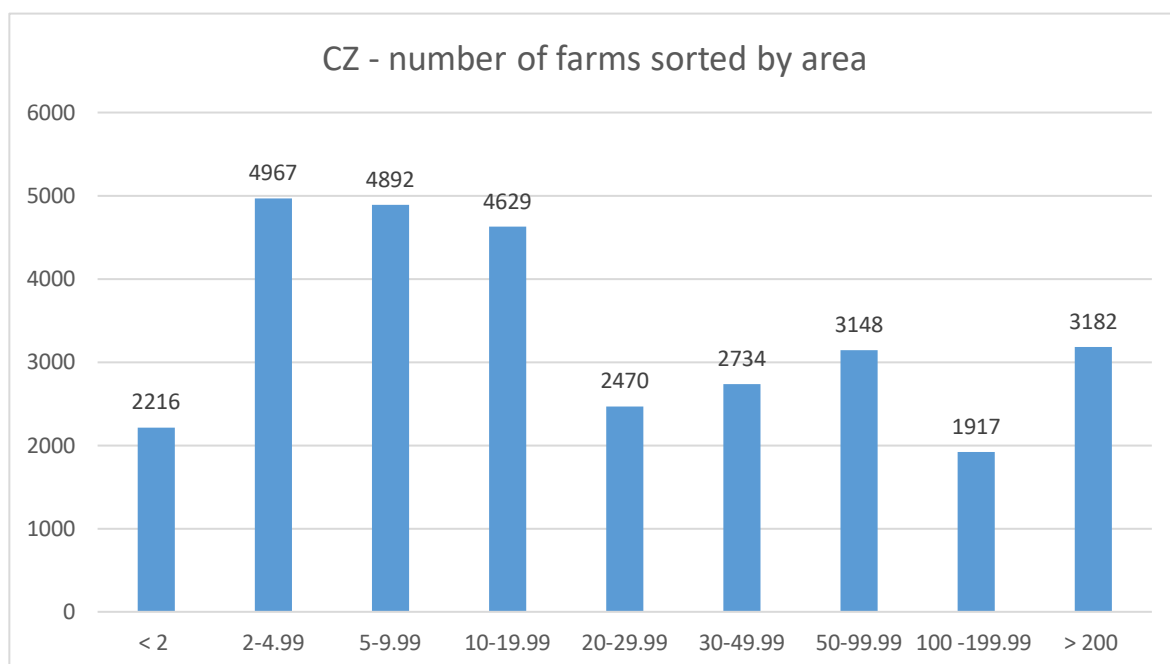


Figure 11 Total number of farms sorted according to their size in hectares.

Source: Author based on SZIF, 2022

Distribution of Czech farms into groups according to their size shows that there are three main groups of areas 2-4.99, 5-9.99 and 10-19.99 hectares. Together these farms create more than 48% of all farms which received SAPS direct payment. Significant is high amount of largest farms over 200 hectares, which have more than 10% share.

4.4.2 Poland

Dataset obtained from Polish agricultural paying agency ARiMR was less detailed. Agency provided total amount of 1,290,257 applications for subsidies, therefore, to be able to open and process the data in MS Excel (allows to display only 1,048,576 rows) I used a csv splitting tool to distribute the dataset into two excel files with data for 8 voivodships in each.

On the following map can be seen average area of a farm in each voivodship.

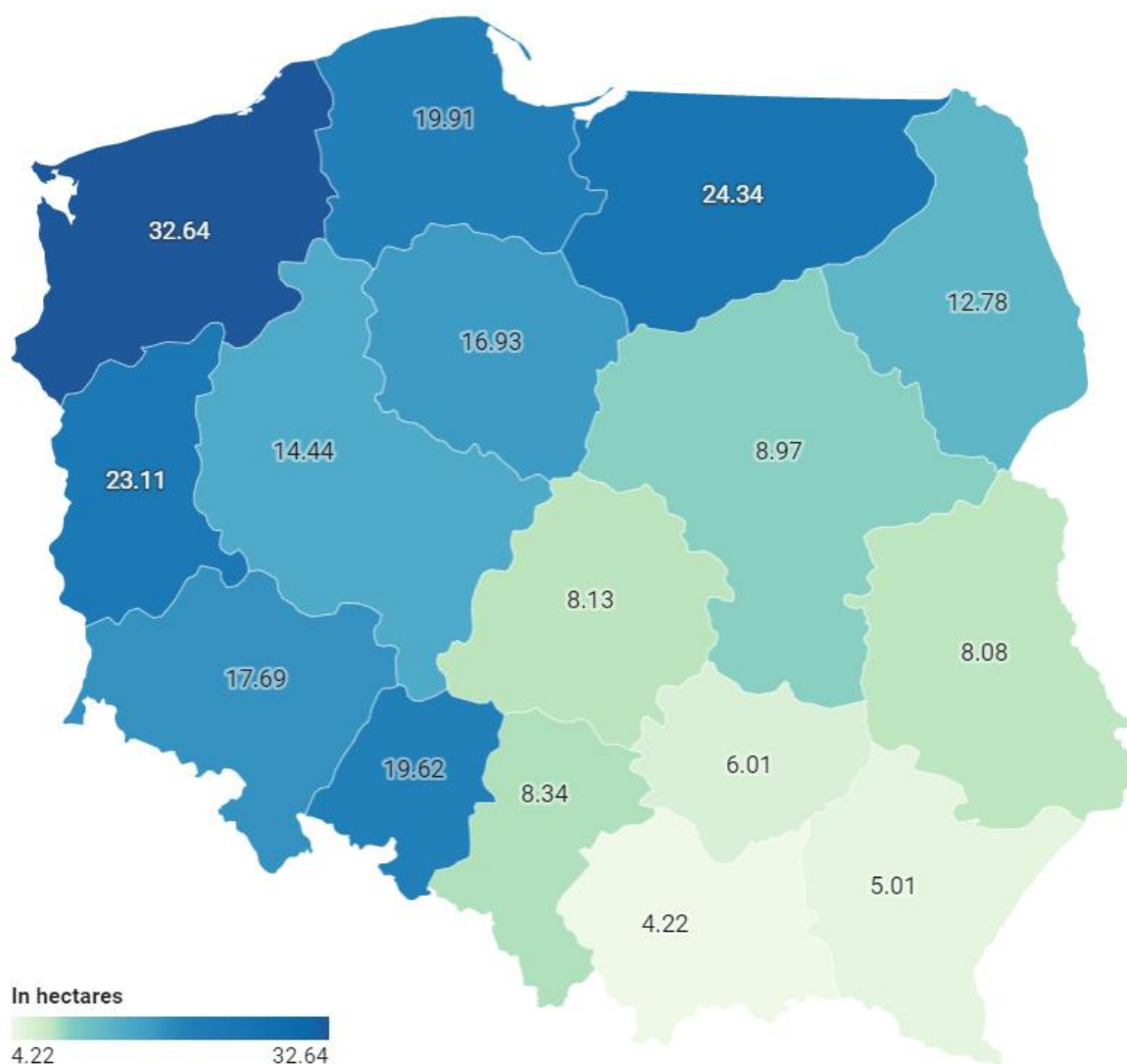


Figure 12 Poland - average farm size in 2020 in hectares.

Source: Author based on ARiMR, 2022

As mentioned in the Literature review regions in the former German territory are clearly visible on the map as the average farm size is much higher in the North-West area, where was after the Second World War created higher number of state farms due to the fact that most of the land was confiscated from Germans and therefore was state property.

Average area of Polish agricultural holding is 11.04 hectares.

I sorted the same data to the following graph. Red line is showing average farm size of whole country.

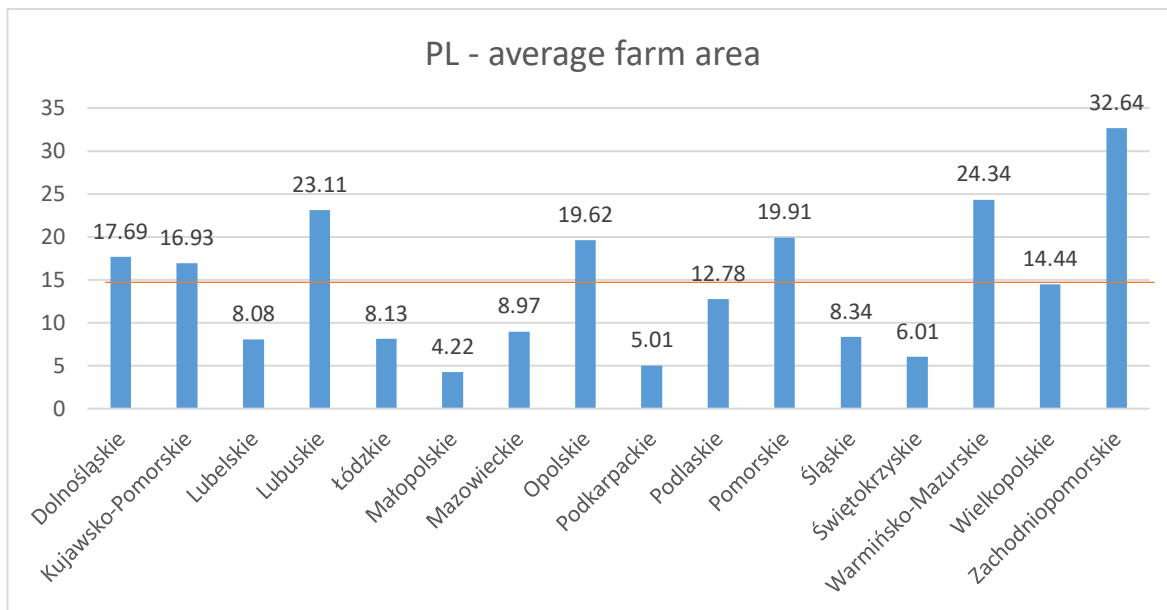


Figure 13 Poland - average farm area in 2020 in hectares.

Source: Author based on ARiMR, 2022

We can see that there are significant differences between the voivodships. In south-east and central area are average farms as small as 4.22 hectares in Małopolskie and only slightly higher in Podkarpackie voivodship with 5.01 hectares.

Average received payment per one agricultural holding was 11773 zloty (~€2516). Per one hectare was the average payment 1066 zloty (~€228).

In the following figure are farms sorted to groups according to their area.

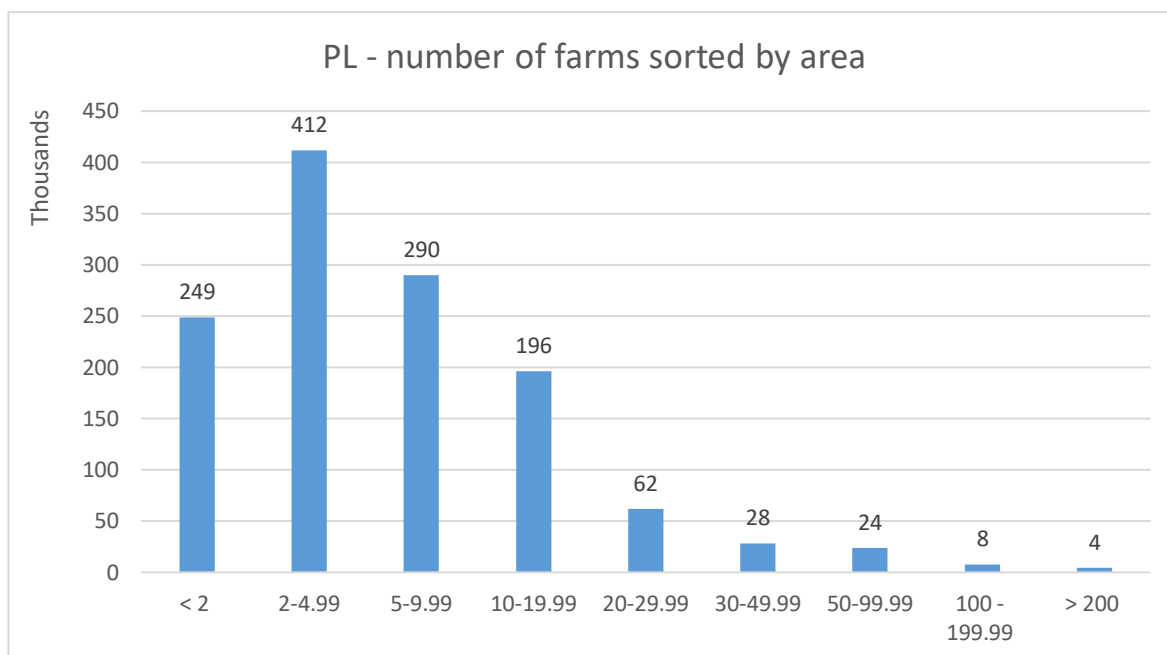


Figure 13 Total number of farms sorted according to their size in hectares.

Source: Author based on ARiMR, 2022

We can see that by far the most common Polish farm has area in equal or higher than 2 and less than 5 hectares. There are 421 thousand of such farms creating almost 32% of all Polish holdings. Characteristic for Poland farm structure is that smallest farms with less than 10 hectares creates 73.7%.

4.4.3 Organic farming

Organic products have raised on popularity in both countries both by consumers and producers since the accession to the EU. However, the successful trend was much stronger in the Czech Republic.

In the Czech Republic there are currently 4 665 farms cultivating total area of 543 252 ha, which is 15,3% of total agricultural area in 2020. (Ministry of Agriculture, 2022)

In Poland is situation different, despite the public support to organic production is the sector rather marginal. Organic farming started to gain certain popularity only after the accession to the European Union, mainly due to the financial support, but the share in the total number of agricultural holdings is only 3.52%. Polish ecological production is carried out mainly by larger farms, which is reflected in the average size of agricultural land per 1 holding using organic production methods, which is as high as 52 hectares.

In 2014, the total number of ecological farms and their utilised agricultural area ceased growing, and this unfavourable trend has persisted since then. It is contrary to the trend

expected under the new Common Agricultural Policy, which assumes that by 2030, organic farming methods will be used in 25% of UAA.

In relation to the creation and implementation of the Strategic plan for the new CAP Poland European Commission states the low organic farming areas are issue that threatens future of Polish agriculture. Therefore, Poland in the Plan has set a goal to achieve more than double its agricultural area under organic farming by 2030.

In general, putting more emphasis on the CAP Eco-schemes will support farmers to implement environmental and green practices to shift Polish agriculture to more sustainable way of food production.

In category “land in good condition” was 954,851 ha, which is 99.3% of total area of agricultural land of organic farms, compared to 98.7% share in case of all farms.

Agricultural land in good agricultural condition refers to agricultural land on which good cultivation practices, including crop rotation, are applied. These are lands that may qualify for subsidies and are maintained in accordance with the standards of the Act of February 5, 2015, on payments under direct support schemes. (GUS, 2023)

In the following figure can be seen share of total utilised agricultural area occupied by organic farming (existing organically farmed areas and areas in process of conversion). According to the Eurostat (2023) farming is recognised to be organic *“if it complies with Council Regulation (EC) No 834/2007, which has set up a comprehensive framework for the organic production of crops and livestock and for the labelling, processing and marketing of organic products, as well as for governing imports of organic products into the EU. The detailed rules for the implementation of this Regulation are laid down in Commission Regulation (EC) No 889/2008.”*

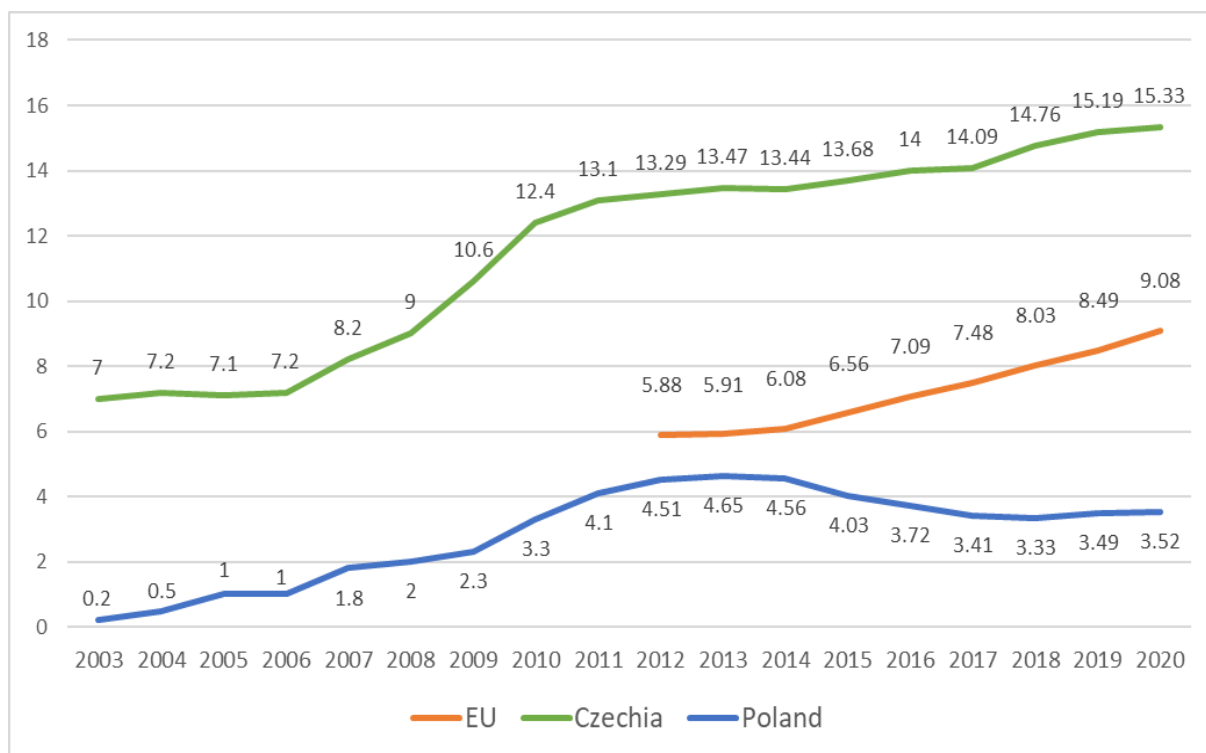


Figure 14 Development of share of utilised agriculture area used in organic farming in %.

Source: Author based on Eurostat, 2023

Figure shows that in the Czech Republic share of organic farming is steadily growing since 2006 with slowdown in period 2010-2017, however Czech Republic was always over average of the European Union and in 2020 is the country with 5th highest share in EU27. Compare to first Austria with 25% share.

Average data for the European Union are available only since 2012 and they were increasing each year since.

Situation in Poland is completely different. Poland is on 23rd place in the share of area used for organic farming with only 3.52% in 2020.

4.4.4 Price of agricultural land

Eurostat data shows only total price per agricultural land (arable and/or grassland), not specifying type of land further. Last available data from Eurostat are for 2021.

1. Rental prices

Average amount paid to rent one hectare of agricultural land in the EU were €261 in 2021. Highest average renting price was in 2021 in the Netherlands (836 euro/ ha) and in Denmark (547 euro/ ha) and Greece (459 euro/ ha), while the cheapest land you could rent was in Slovakia (62 euro/ha) and Croatia (74 euro/ha) and Malta and Latvia (both 83 euro/ha).

In Poland was the average rental prices 10. highest in the EU. They varied between 380 and 146 euro in different voivodships with national average of 268 euro.

Czechia in the 17th place has significantly lower prices. They varied between 157 and 118 euro, and average was 135 euro per hectare.

2. Land price

Considering the price to buy one hectare of agricultural land EU average was €16,525 per hectare.

By far the most expensive is one hectare in Netherlands - €77,583.

Poland is 10. most expensive with average price of €10937, while Czechia is 11. with €10592.

Polish agricultural governmental agency ARiMR made public the latest available data for Q2 2022. Price varies from 36 111 zloty (~€7706) in Łódzkie voivodship to 77 384 zloty (~€16514) in Wielkopolskie. Average price for whole country is 59 358 zloty (~€12667). Since Q2 2021 average price increased significantly by 24.9% from 47,510 zloty (~€10138).

This data shows interesting phenomenon, that Czech rental price is lower by almost 50% than Polish rental price, while price to buy land is in Czechia almost similar as it is on 97% of Polish prices.

4.4.5 Semi-subsistence farms

From Czech perspective it is unexpected, but more than three quarters of farm holdings in the European Union are rather small – below 10 hectares. Davidova et al. (2013) defined in their study for the European Parliament’s Committee on Agriculture and Rural Development semi-subsistence farms (SSF) as agricultural holdings from which less than 50% of the agricultural output is sold, with the remainder being consumed within the farm household. For example, in 2010, there were 5.8 million SSFs in the EU-27. Nonetheless, is the importance of the SSFs often omitted, despite providing livelihood for millions of rural population. Number of SSFs and their importance is highly variable across the EU. 86% of such farms can be found in the new members states of 2004 and 2007 enlargements. By far highest share is in Romania with 61% of all farms. Significant share is also in Hungary and Poland with 8-9%. However, even in highly developed country as is Italy is 11% of SSFs. The study acknowledges value of SSFs in *“supporting social and economic welfare. In the context of high under- and un-employment, inadequate state pensions and cuts in public sector salaries, small-scale farming represents an important contribution to household budgets, increases food security at household level, and mitigates rural poverty.”*

Over the European Union, SSFs were almost half of all farms, and logically these farms accounted for most of the smallest holdings under area of 2 hectares of utilised agricultural area, or in economic terms under €2,000 of standard output. In the most developed western countries are SSFs marginal form of farming and even sometimes form of recreation or hobby activity. In Poland according to (Davidova, Bailey, 2013) share of subsistence

production in total farm household income was 23.5% and even 40.4% in case of poor households.

4.4.6 Latest trends

In latest news release on 29 March 2023 Eurostat made public the change in price of agricultural outputs and inputs in Q4 2022 compared to Q4 2021.

The average EU price of agricultural products as a whole (agricultural output) increased significantly by 26%. However, this represented a lower rate of increase compared with the previous quarter: 30% increase between Q3 2021 and Q3 2022. Highest increase in prices are recorded in case of eggs (64%), pigs (52%). On side of inputs were the most extremes increases noted in case of fertilisers and soil improvers (+55%), energy and lubricants (+41%) and animal feeding stuffs (+29%).

Changes of both agricultural inputs and outputs can be seen on following figure.

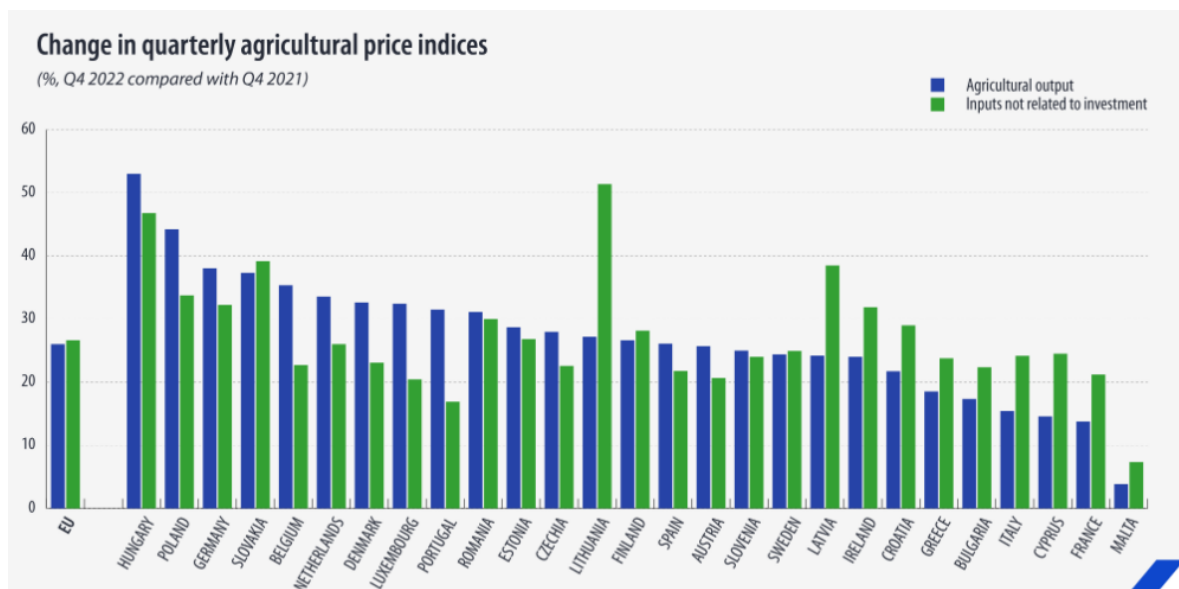


Figure 15 Change in quarterly agricultural price indices; Q4 2022 compared with Q4 2021 in %
Source: Eurostat, 2023

Second highest increase was accounted in Poland as prices of outputs increased by 44%. According to Eurostat is the main reason disturbance of global agricultural markets as an impact of Russian invasion on Ukraine in February 2022. Both Russia and Ukraine are major producers and exporters of many agricultural commodities, including cereals and oilseeds. Combined, in 2018-20 period, the two countries accounted for 28% of world wheat exports, 12% of sunflower seed and 14% for rapeseed. Even higher share of 43% is reported sunflower oil exports. On the side of agricultural inputs is the Russia together with Belarus, main exporters of fertilisers. (OECD, 2022) Therefore any disturbance in production or usual trading routes, which we experienced in last year had significant impact on trade agricultural market. Eurostat data indices fast increase of both inputs and outputs for agriculture in all quarters of 2022, with maximums in the second and third quarters. Nonetheless, during last quarter of 2022 had been noted a slight slowdown in the unfavourable trend.

5 Results and Discussion

5.1 Farm Structure

Based on processed data from the agricultural paying agencies we can state that Polish average farm is by far smaller than average Czech farm.

Average calculated farm area in Poland is 11.04 hectares; the Czech Republic has more than ten times higher average of 117.4 hectares.

Comparison of share of total agricultural holdings in both countries sorted to groups according to their area is in the following figure.

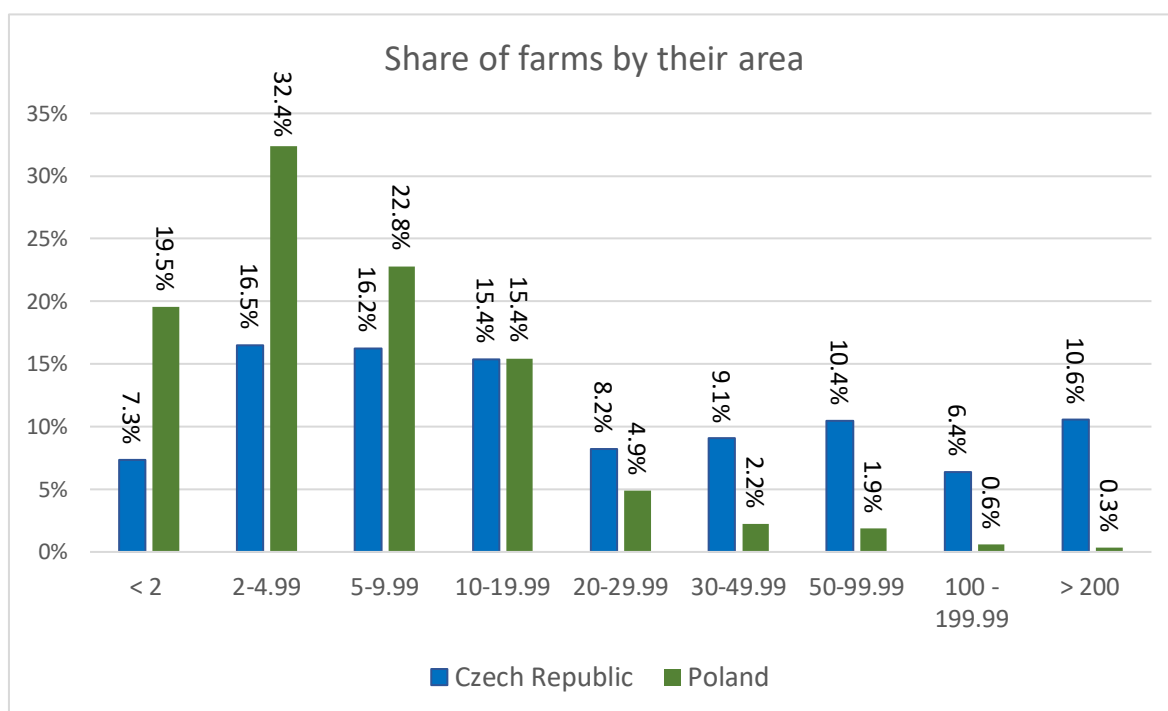


Figure 16 Share of farms sorted by their area in hectares.

Source: Author based on ARiMR, 2022 and SZIF, 2022

We can see, that in all smaller categories up to area of 10 hectares have Poland significantly higher share of farms. In the category of smallest farms up to 2 hectares, is the share almost three times higher. In the category of 10-19.99 hectares is the share same at 15.4% and in all larger categories has Czech Republic higher share. In the category of largest farms is the Czech share 35 times higher.

In terms of spatial differences across the regions/voivodships in both countries we can state that in the Poland is the differentiation much higher as the region with smallest average farm Małopolskie voivodship with 4.22 hectares per one farm has 7.7 smaller average farm than Zachodniopomorskie with 32.64 ha. In case of the Czech Republic is the difference

between Zlínský (68.91 ha) is less than 2.5 times lower than in Karlovarský district (167.93 ha).

5.2 Goals of the new CAP

European Union main goals in the new Common Agricultural Policy for 2023-2027 period are to ensure a fair income for farmers, to increase competitiveness of European agricultural sector, mainly to improve the position of farmers in the food chain and strong emphasis is put on green aspect, such as mitigation of climate change, sustainability of agriculture production and preservation of landscape and biodiversity.

In particular, the EU aims to increase support for smaller farms and allow higher flexibility for member countries to set measures according to their specifics.

Each EU country created in coordination with the European Commission a national CAP Strategic Plan, combining funding for income support, rural development, and market measures.

5.2.1 Poland

In the Polish Strategic plan is emphasized that the progress of Polish agriculture towards more sustainable production relies on improving small water resources related to increasing rainfall deficit, rather light soils threatened by erosion, low levels of wetland protection, low share of organic production area, decreasing biodiversity and the unsatisfactory status of natural habitats. As a measure in the effort to address this weakness there are under the CAP proposed eco-schemes with allocation of 25% of direct payments fund, which should provide strong incentive for farmers.

However, in the mentioned study of Sadowski, Wojcieszak-Zbierska and Zmyślona (2021) state a warning of fast increase of organic farming as the authors found out on Polish example, that organic farms achieved only 50-60% of the yields compared to conventional holdings.

5.2.2 Czech Republic

The Czech Strategic Plan has two fundamental objectives: sustainable competitiveness and resilience of farms and the protection of natural resources and the climate. Further in compliance with the basic new CAP general guidelines to distribute and target more effectively support for farmers in the Pillar I. Therefore, completely new measure is implemented: the redistribution of financial support to small- and medium-sized farms of up to 150 hectares. Twenty-three percent of total direct payments fund will be directed for these farms.

Strengthening the position of organic farming and improving the vitality and quality of life in rural areas through investments.

In the field of specific supports linked to productions of certain agricultural products approximately 618 million euro will be allocated in the new CAP period. This sector-specific financial support is expected to be for around 54% of all agricultural holdings. Compensation for cultivating area in least favourable condition will continue. Approximately 4 900 farms will receive support for farm restructuration and modernisation.

Major emphasis is put on environmental aspect of the agricultural policy. Such as improving water quality. For example, farmers will receive financial compensation if they restrict use of pesticides in 12-metre buffer strips around water courses.

Considering organic farming, the Czech Republic is currently with 15,6% in top 5 share of organic farming cultivation area. Nevertheless, new Strategic plan expect further grow and aims to reach 21.3% share of total agricultural land.

Part of the plan considering rural development has set as desirable goal to tackle depopulation and lack of employment opportunities in peripheral and rural regions. Proposed support measures aim to stabilise rural employment, slow down the drain of young people from rural areas by increasing standard of living. For example, about 1 700 young farmers may be able to benefit from financial support un the Young Farmer scheme.

6 Conclusion

To conclude I will summarize my results to answer research questions concerning agriculture in Poland and the Czech Republic stated in the Objectives of the Thesis.

Q1: How did the historical events since the beginning of 20th century impacted agricultural sector?

In the part of literature research, I described the development and major events which shaped the agriculture as a whole and had major impact on the farm structure as well. In both countries had been implemented Land reform after the First World War, which was designed as a tool to redistribute agricultural land of former landlords and feudal owners to peasants. In the Czechoslovakia was the reform more successful and farms over 150 hectares and land of owners with more than 5000 hectares were confiscated and parcelled out. In total was confiscated more than 4 million hectares of agricultural land and forests.

In the Poland was the situation in agriculture after reestablishment of the Republic of Poland after the First World War significantly different in each of the three areas of Partition. Unfavourable state of agriculture and war with Bolshevik Russia led to hunger epidemics in the Eastern regions. Land reform was necessary to gain support of landless peasants and to increase food security, but since majority of the landowners were Polish, any reform would affect them as well. Partial land reform was only implemented later after the Bolshevik war to persuade peasants in the East of the country to support Polish government. Nevertheless, the land reform was never completed. During the 1944 communist took advantage of this issue and despite the internationally recognised government in exile, implemented land reform to gain public support, where was major part of agricultural land in former German territory confiscated and partially distributed to small farmers.

In the Czechoslovakia were as well, after the Second World War confiscated more than 2.4 million of hectares mainly from Germans, Hungarians, and “traitors” and about 900 thousand hectares were distributed, while the rest remained in the hands of state. After the communist coup in February 1948 was one of their goals to strengthen control of the countryside and the agricultural sector, where they did not have as much support as in other parts of society and to gain control over the production and distribution of food. Therefore, in 1949 was under orders from Soviet Union implemented law which started the creation of collective farms. Collective farms were collective only theoretically, in fact they were directed by the state in the centrally planned state economy. Process of collectivisation was very brutal, communists in order to gain power actively targeted social class of middle- and higher-income farmers so called kulaks, which had natural respect in rural society and was often opposed to communist regime. Kulaks were target of hard oppression, they were forcefully evicted from their households and their property was confiscated. After dead of Stalin in 1953 was the collectivisation process slowed, nevertheless in 1960, it was declared de facto completed. The violent collectivization

irreversibly and barbarically disrupted the previous social and economic ties in the countryside and severely damaged agriculture as a sector of the national economy. In the early 1950s, agricultural production was well below the level it had been before World War II. Result of this process was that in the Czechoslovakia state and collective farms owned and cultivated overwhelming majority of agricultural land.

Polish communists as well as most of the countries in the Soviet influence started process of collectivisation in 1948, however in 1953 after the death of Stalin, the collectivisation was ceased and most of the farmers regained ownership of their farms. Only in the newly acquired North-western region was on confiscated land created more significant share of state farms.

After the fall of communist regime in 1989, began process of transition to market driven economy and fundamental reforms. In agricultural sector was the main process privatisation of collective and state farms and restitution of land to the previous owners or their heirs. This massive process is still not completely finished even after more than 30 years since the main restitution acts were implemented in 1991.

Nevertheless, restitution of land did not lead to major change in the farm structure. Lot of the cooperative and state farms was not abolished, but instead have been transformed to capitalist style businesses.

One of the reasons is the process of restitution itself, extreme fragmentation. Czech agricultural land is owned by approximately 3 million small-scale landholders; however, average area is only 1,28 ha per one owner. This situation limit possibility for small scale owners to cultivate their land by themselves. Therefore, the Czech Republic has extremely high share of 73% cultivated land been rented out.

In Poland, was the process of privatisation rather marginal thanks to low share of state-owned land in the end of communism era (only 24% in 1990).

Another major event for agriculture and farmers was accession to the European Union in 2004. Agriculture was fundamentally impacted by Common Agricultural Policy. Agricultural holdings are receiving major share of EU budget as financial support, but on the other hand due they have to face increased competition on the single market.

Q2: What is the present state of farm structure?

Evaluation of data of subsidies paid to agricultural holdings in 2020 had shown several interesting characteristics of farm structure. Despite limitation originating from the less detailed data for Poland, I was able to calculate several indicators:

1. In Poland there were 1,290,257 agricultural holdings, which received financial support. That is one farm per 29 inhabitants.
In the Czech Republic there are 30,155 of such holdings, that means there is one such farm per 357 inhabitants.

2. Average farm area, where Poland has 11.04 hectares and the Czech Republic more than ten times higher of 117.4 hectares.
3. Average amount of subsidy per holding, where Czech average is with €30,208 more almost 12 times higher than Polish average of circa €2516.
4. Spatial distribution of farms in particular districts of both countries shown in the maps and, therefore compare those results to historical events specific for those regions such as impact of the fact that both countries confiscated land of German owners after the Second World War. Typical for those regions is significantly higher average area of a farm.

Conclusion is that in the Czech Republic is both relatively and totally much fewer farming entities and they are significantly larger.

Q3: What is the current state and future of smaller and organic farms?

From the literature study I can state that both share, and total number of smaller farms is gradually decreasing, however in Poland farms of up to 10 hectares are still by far the most dominant, with share of 74% of total farms.

Situation of organic farming is fundamentally different in studied countries. Poland has only 3.5% share of UAA managed under organic cultivation practices and has one of the lowest shares in the EU. Czechia on the other hand is one of the countries with highest share with more than 15%. However, both countries have set goal in their Strategic plan to achieve substantial improvement and direct higher amount of support to organic farms.

Q4: What are the latest trends and probable future development in agriculture?

In both countries I have seen several trends related to agriculture, rural development, and farm structure. There are perceivable long-term trends such as decreasing of the share of workforce engaged in agriculture, decrease of acreage of agricultural land due to the expanding urban areas and increase in forest areas or increasing emphasis on sustainable agriculture and environmental protection. Although, these processes have major implications for rural society and even for whole country and its food security and economy, turbulences of latest years have created much appealing problems. Covid and Russian invasion in Ukraine had global impact on economy in general and agriculture is no exception. Disruptions in trading routes of both agricultural inputs such as fertilizers and outputs have created strong pressure on global prices, which in the end led to significant increase of agricultural products and subsequently on food prices and in the poorer regions of the World to unfavourable decrease in the food security.

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