

Polish Agriculture after 1990

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Introduction

The change of socio-political system in Poland at the beginning of the 1990s initiated a series of transformations in Polish agriculture. The privatization of a significant portion of state-owned agricultural farms (known as PGR) led to the emergence of a group of farms with the potential for unrestricted development, both free from the constraints of the centrally controlled system and without the limitations characteristic of individual farms due to their small-scale operations.

In the first decade following the systemic transition, the operating conditions of Polish agriculture were quite challenging, mirroring the economic situation. A substantial change occurred in this regard after Poland's accession to the European Union in 2004. The integration of Polish agriculture into the Common Agricultural Policy and access to the unified European market created new possibilities for structural changes within this sector of the economy. Poland, once a net food importer, transformed into a country with a positive balance in international trade of agri-food products.

The objective of this study is to present the changes in resources, production, and efficiency within Polish agriculture over the past three decades.

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8.1. Changes in Resources in Polish Agriculture

When discussing the evolution of agriculture in Poland since 1990, it is imperative to elucidate the most consequential alterations concerning the engaged resources. Regrettably, owing to modifications within the national accounting system occurring from 1995 onward, macroeconomic data for the years 1990-1994 as well as subsequent years are not amenable to comparison. In such instances, data for the years 1995-2021 have been presented.

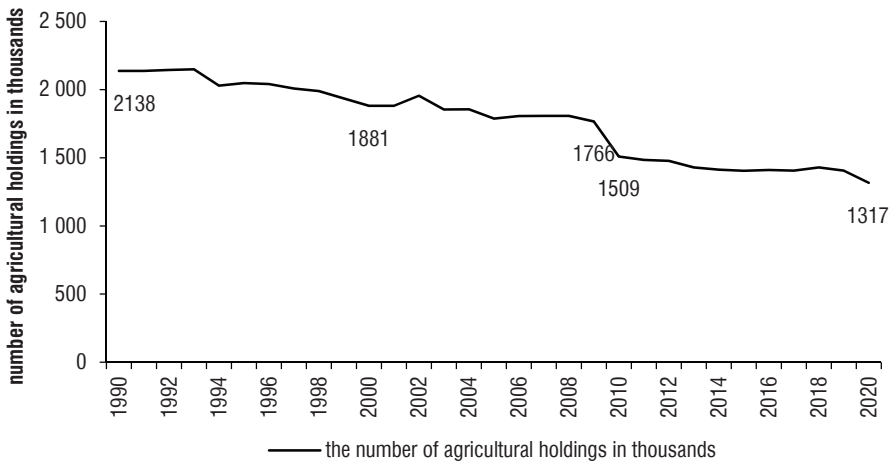
In the context of agriculture in Poland, according to data from the Central Statistical Office (GUS), approximately 1.1 million individuals were employed in the sector in the year 2021. This accounted for 7.2% of the total workforce. However, due to the presence of three distinct employment definitions within the realm of agriculture between 1995 and 2021, data from individual periods lack comparability. During the years 2002-2019, an approximate 2.3 million individuals were recorded as being employed in agriculture, and this figure exhibited constancy. The current level of employment, in alignment with the methodology utilized in the Survey on Economic Activity of the Population (BAEL – the Polish equivalent of the European survey on the labour force – Labour Force Survey), appears to accurately capture employment. The proportion of those employed in agriculture remains notably elevated, surpassing the sector's contribution to the Gross Domestic Product (GDP), thereby signifying that labour productivity within agriculture significantly lags behind other economic sectors (Grontkowska et al., 2015).

Arable lands in Poland encompassed 15 million hectares in the year 2021. While their expanse did not undergo substantial alteration, it is noteworthy that in 2010, this figure was recorded at 15.5 million hectares. Arable soils constitute approximately 74% of the agricultural land, with the remaining portion designated for meadows and pastures.

As the pivotal determinant of efficiency growth, an escalation in production scale within agriculture, understood either as farm area or economic size of agricultural enterprises, is recognized. Under circumstances of diminutive production scale, the attainment of productivity augmentation is typically impeded by economic and organisational constraints (Runowski, 2009b; Wicki, 2019). Small-scale enterprises additionally encounter multifarious barriers to the implementation of progress, encompassing economic, organisational, and societal dimensions (Runowski, 1997; Wicki, 2010). Figure 8.1 illustrates alterations in the number of agricultural households in Poland from 1990 to 2020. Analogously, a modification in the definition of

agricultural households transpired in this context, necessitating a bifurcation of evaluations before and after the year 2010.

Figure 8.1. Changes in the Number of Agricultural Holdings in Poland from 1990 to 2020



Note: In the year 2010, the definition of an agricultural holding was modified, excluding landowners not engaged in agricultural activities.

Source: own compilation based on data from the Central Statistical Office (GUS).

The number of agricultural holdings in Poland is steadily decreasing. In 2020, according to the General Agricultural Census 2020, there were 1 317 000 holdings, which is nearly 200 thousand (13%) fewer than in 2010. A similar trend was observed in earlier periods. In 1990, there were 2.14 million agricultural holdings in Poland, while by 2009, the number had reduced to only 1.76 million. This was accompanied by a process of production concentration in larger area-wise holdings, as well as regional specialisation processes. The concentration of production in larger holdings occurred even faster than the concentration of land (Filipiak, Wicki 2022). As a result, the average size of an agricultural holding in Poland increased from 10.2 hectares in 2010 to 11.3 hectares in 2020. Unfortunately, small holdings still dominate in Poland. The agrarian structure exhibits significant regional diversity, with the largest holdings located in the northern and western parts of the country (averaging above 20 hectares), and the smallest, around 5 hectares, in the southern and southeastern regions of Poland.

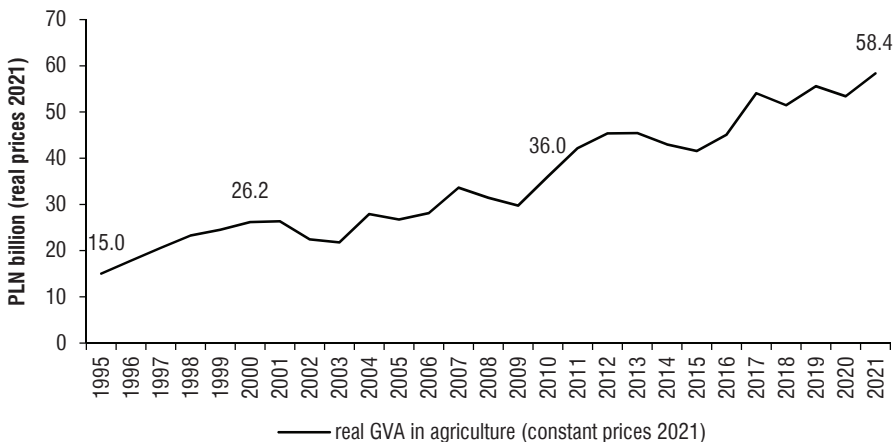
The observed changes in the size of labour and land resources in agriculture, as well as land concentration in farms, should foster modernization and

increased resource efficiency, leading to enhanced incomes in farms. Larger farms have exhibited both higher investment rates and profitability, which should contribute to further efficiency growth (Grontkowska 2005). Among the processes of modernization in agriculture that lead to increased operational efficiency, the expansion of farm size is identified as the most important and necessary factor (Świtlyk 1997, 2021; Zegar 2009). In Poland, a dual development of farms seems to be the reality: on one hand, towards farms with a residential character, and on the other hand, towards relatively large commercial agricultural farms (Józwiak 1997).

8.2. Changes of Value Added in Polish Agriculture

From an economic standpoint, the significance of agriculture in the economy can be measured by the magnitude of generated value added and the share of agriculture in the creation of value added in the economy. In the years 1995-2021, gross value added (GVA) in agriculture increased both in nominal and real terms. In 2021, this amounted to 58.4 billion PLN, compared to 36.0 billion PLN in 2010 (Figure 8.2). A growth of 35% in real terms was achieved,

Figure 8.2. Gross Value Added in Agriculture in Poland in the Years 1995-2021, Real Prices from the Year 2021

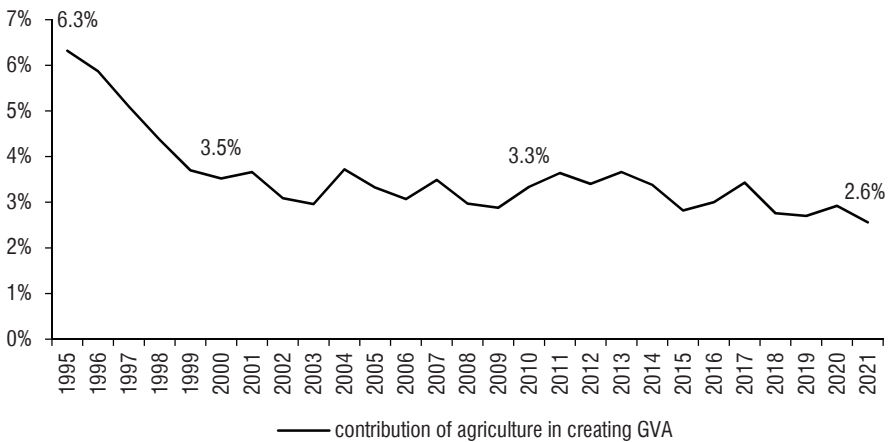


Source: own elaboration based on data from the Central Statistical Office (GUS).

indicating a consistent enhancement in efficiency of management. The average annual real growth of GVA in agriculture from 1995 to 2021 was 4.6%.

The pace of growth in value added within the agricultural sector, despite its notable dynamism, remained lower than that observed across the entire economy, as well as within the agribusiness sector as a whole. Figure 8.3 depicts alterations in the proportion of agriculture's contribution to the creation of gross value added within the economy. This share decreased from approximately 6% in 1995 to 3% in the early 20th century. Subsequent to the year 2010, a further gradual decline ensued, and the agricultural share stood at 2.6-2.8%.

Figure 8.3. Agriculture's Contribution to Gross Value Added Formation in Poland in the Years 1995-2021

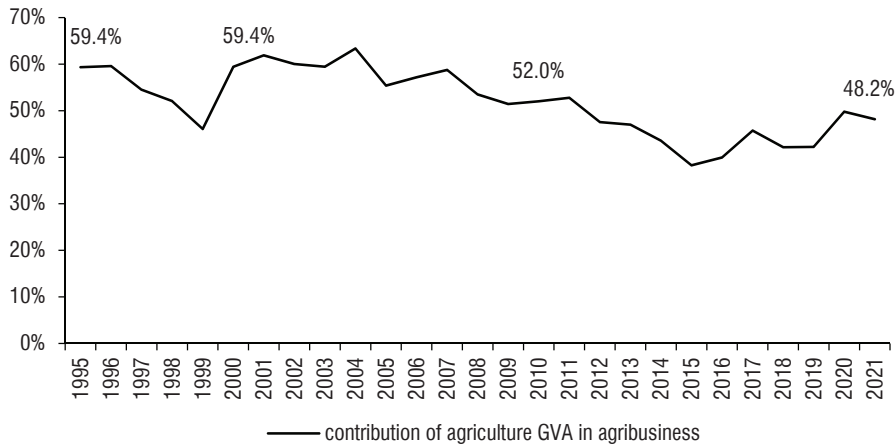


Source: own elaboration based on data from the Central Statistical Office (GUS).

The decline in the significance of agriculture within the economy has occurred in tandem with the country's economic development. A widely recognized trend is also the diminishing role of agriculture in relation to food processing as economic development progresses. Changes in this realm are presented in Figure 8.4. Between 1995 and 2021, the share of agriculture in the gross value added (GVA) within the agribusiness sector decreased. Until 2007, this share was approximately 60%, while from 2015 to 2019, it diminished to only 40%. Over the entire specified period, the rate of decline in the agricultural GVA's share within the agribusiness GVA was -1.29% annually, and from 2000 to 2021, it reached as low as -1.9% per year. These shifts should

be acknowledged positively within the context of the overall increase in value added within agriculture. This underscores that the Polish agri-food sector offers more processed products, characterised by higher consumer utility, and are also more easily marketable domestically and internationally.

Figure 8.4. Agriculture's Contribution to Gross Value Added (GVA) Formation within Agribusiness in Poland in the Years 1995-2021



Source: own elaboration based on data from the Central Statistical Office (GUS).

The labour productivity in agriculture was significantly lower than the average observed for the entire economy. The assessment here is complicated due to changes in the methodology of calculating employment in the agricultural sector introduced by the Central Statistical Office (GUS). However, regardless of the counting methodology, labour productivity in agriculture grew more slowly than the economy-wide average during the examined period. Considering the years 2002-2019, it can be observed that labour productivity in agriculture decreased from a level of around 25% of the national economy's average to only 15%. After 2020, accounting for changes in employment inclusion, labour productivity in agriculture constituted approximately 30% of the productivity in the economy. This situation arises from the fragmentation of agriculture, small-scale production, and an excess of workforce in farms.

Scaling up production is a necessary condition for modernising agriculture and increasing income per worker (Woś 2000). In countries aiming for rapid agricultural production growth, where large-scale farms dominate,

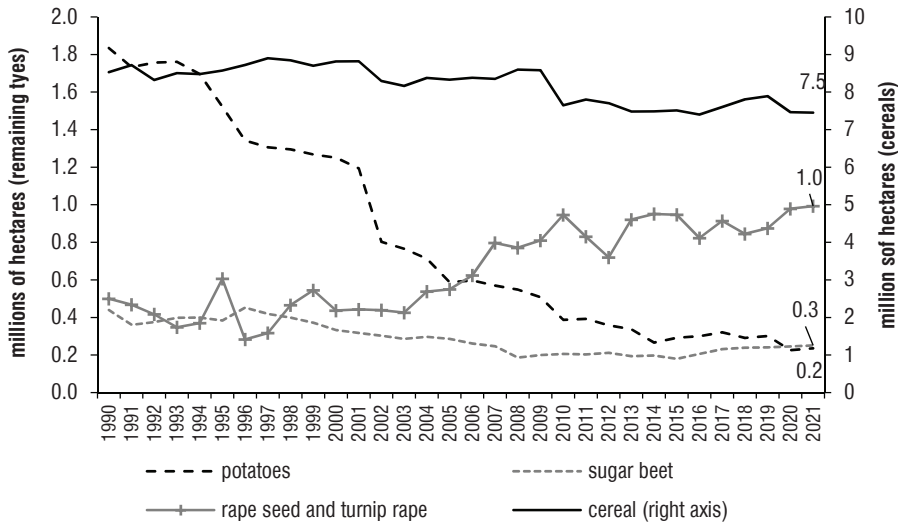
developmental processes in agriculture can be achieved within a relatively short time frame (Wicki et al. 2017), as the barrier is not the integration of the household with the farm and the resulting dependence of farm development on the family's development cycle and intergenerational exchange. Furthermore, common agricultural policy programs tend to favour the development of the strongest farms. In smaller farms, subsidies are directed toward current maintenance and only marginally contribute to their development (Giannakis, Bruggeman 2018; Kusz 2018; Wicki, Bereźnicka 2021). Additionally, such support may be a cause for the persistence of the smallest farms, despite their overall operational inefficiency (Zawojcka et al. 2016), especially when subsidies are calculated based on agricultural land area. There are valid arguments that the introduction of subsidies under the common agricultural policy significantly impeded structural changes in agriculture in Poland, primarily land concentration (Hornowski, Parzonko 2023).

8.3. Changes in Production Volume and Efficiency in Polish Agriculture Plant Production

The principal factor in agricultural production is land. The cultivated area encompassed approximately 10.5 million hectares and underwent minimal fluctuations over the last decade, although the composition of crops exhibited significant alterations. The most prominent trend was the reduction in potato cultivation area from around 1.8 million hectares in 1990 to below 0.3 million hectares in 2021. Similarly, the area allocated to sugar beet cultivation was halved, primarily in response to the sugar market reform within the European Union. In contrast, the cultivation area of rapeseed expanded, particularly after 2005, following the introduction of subsidies for its use in biofuel production and the heightened mandatory incorporation of biofuels in the transportation sector. The cultivation area for cereals remained stable at approximately 7.5 million hectares, constituting roughly 75% of the proportional share within the cropping structure (Figure 8.5).

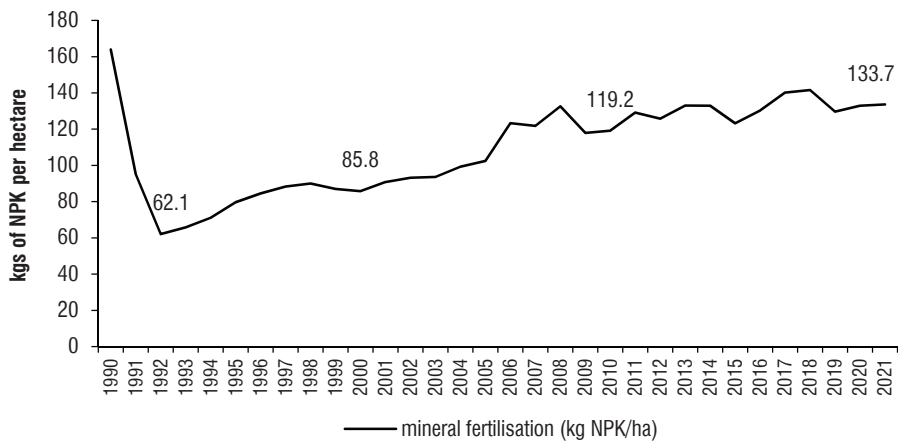
In cereal production, the proportion of cultivated area dedicated to triticale and barley increased, while the share allocated to rye and oats decreased. This trend corresponded with the overarching tendency to augment the production of commodity cereals while curbing the output of forage cereals.

Figure 8.5. Cultivated Area of Primary Agricultural Crops in Poland from 1990 to 2021



Source: own elaboration based on data from the Central Statistical Office (GUS).

Figure 8.6. Level of Mineral Fertilization in kg NPK per Hectare of Agricultural Land in Poland from 1990 to 2021



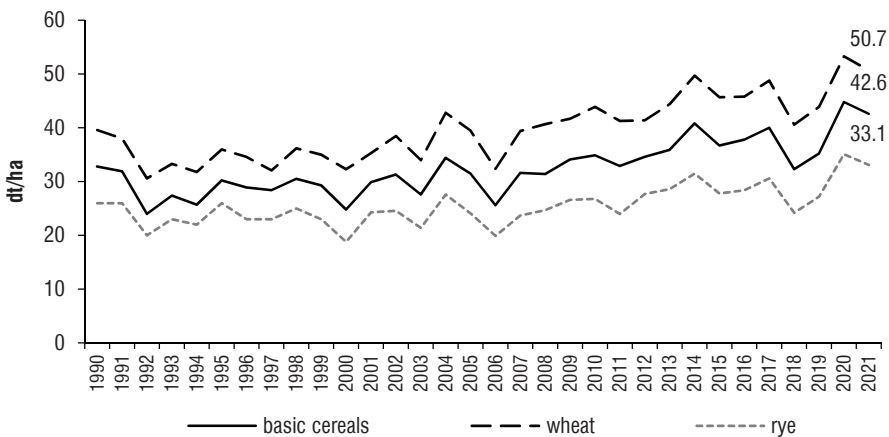
Source: own elaboration based on data from the Central Statistical Office (GUS).

Mineral fertilisers are the primary crop-yielding inputs. Immediately after the systemic transformation, the level of fertilisation decreased to 62 kg NPK/ha in 1992, and since then, it has been steadily increasing. In 2008,

the level of fertilisation reached 133 kg NPK/ha and has remained relatively stable since then (Figure 8.6). From 1992 to 2008, fertilisation constituted a key factor in yield growth, although yields increased at a much slower pace than the fertilisation level (Wicki 2011). Subsequently, other factors exerted a stronger influence on production growth, such as improved production technology, mechanisation advancements, and advancements in plant breeding (Pawlak 2010).

The period of systemic transformations in the 1990s was characterised by continuous progress in production efficiency within agriculture. Figure 8.7 illustrates changes in cereal yields. From 1990 to 2021, the average cereal yields increased from approximately 32 to over 40 dt per hectare. The rate of cereal yield growth during this period was 1.5% annually, and even 1.9% annually since 2000. Consistently higher yield levels were achieved for intensive cereal crops. Total wheat yields increased from around 40 to over 50 dt per hectare, with yield levels increasing at an average annual rate of 1.55%. Extensively cultivated cereals yielded at lower rates, for instance, rye yields increased from 26 to 33 dt per hectare, and the average growth rate was lower at 1.23% annually over the period 1990-2021.

Figure 8.7. Crop Yields of Grains in Poland from 1990 to 2021



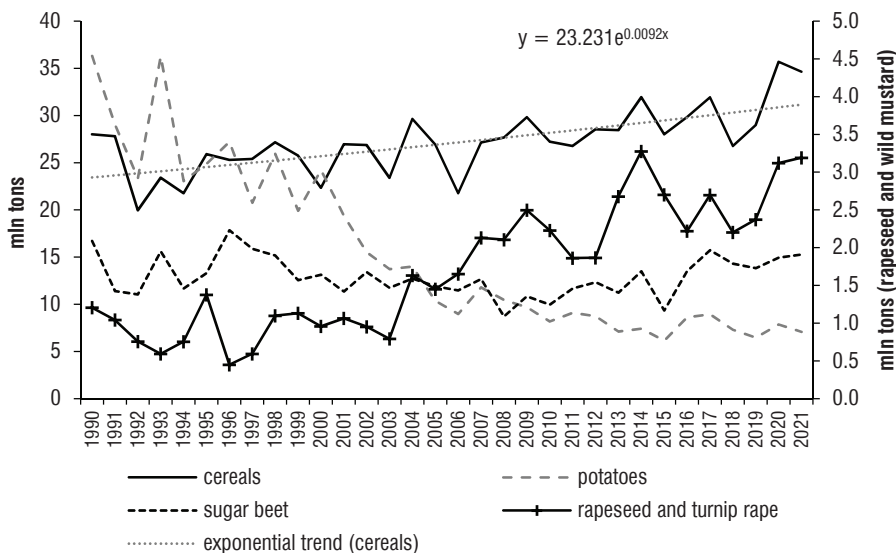
Source: own elaboration based on data from the Central Statistical Office (GUS).

Yields of potatoes from 1990 to 2021 increased by 50%, rising from approximately 200 to over 300 dt per hectare. The rate of yield growth was 2.2% annually. Similarly, sugar beet yields increased by over half, from 350

to 600 dt per hectare. In this case, the growth rate was 2.54% per year. For rapeseed, yield growth was observed from around 23 to 30 dt per hectare, with an annual growth rate of 1.7%. The presented information on changes in the yields of major crops provides a basis for asserting that productivity in crop production has significantly risen. This was attributed to two contrasting trends: the improvement of production technology and the withdrawal from production by weaker farms.

Derived from the cultivated area and unit yield, the harvests of agricultural products are determined. Notably, a significant decrease in yields was observed only in the case of potatoes, which resulted from a distinct reduction in cultivation area. For other crops, the increase in yields compensated for the reduction in cultivation area (Figure 8.8).

Figure 8.8. Harvests of Primary Agricultural Crops in Poland from 1990 to 2021



Source: own elaboration based on data from the Central Statistical Office (GUS).

Grain yields grew at a rate of 1% annually, hovering around 30 million tons per year since 2010. In earlier years, this figure stood at around 25 million tons. Sugar beet production exhibited significant fluctuations over the past three decades, with production levels in 2020-2021 (around 15 million tons) being similar to those in 1990-1998. Over the entire examined period, the rate of change was -0.14% annually. Potato harvests notably decreased from 30

to 7 million tons, with a decline rate of 5.5% annually. Conversely, rapeseed yields experienced an opposite trend. Here, yield growth stemmed from both doubling the cultivation area and achieving nearly 30% yield increase. Consequently, rapeseed harvests nearly tripled, from 1 to 3 million tons annually, with a growth rate of 5.7% per year.

8.4. Livestock Production

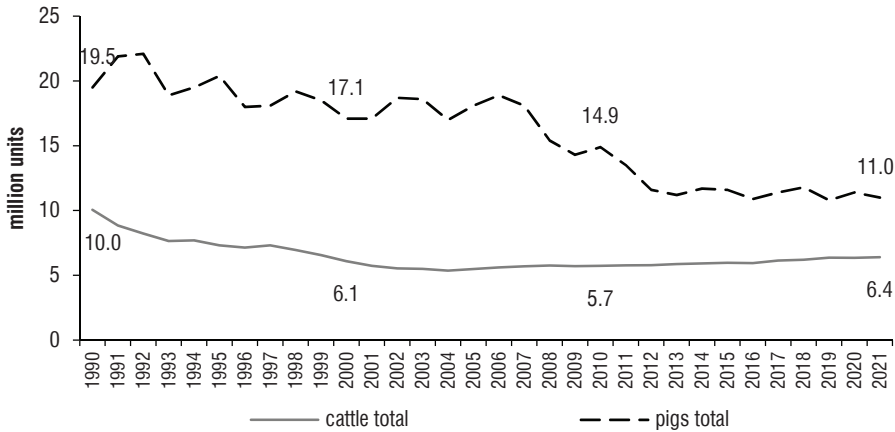
Animal production holds a significant position within Polish agriculture, comprising 60% of commodity production and enabling higher output per unit of input, which is important given the low concentration in agriculture (Runowski 2014). Until 2004, livestock numbers in Poland consistently decreased (Figure 8.9). Cattle numbers decreased from 10 to 5.5 million head, while cow numbers dropped from 5 to 2.8 million head. After 2004, cattle numbers increased to 6.4 million head in 2021, yet cow numbers continued to decline, reaching 2.5 million head. Concurrently, a process of production concentration within larger herds occurred due to regulations concerning milk production and acquisition, as well as economies of scale realised in larger herds (Runowski 2007; Rusielik, Świtłyk, 2012).

Swine numbers decreased at a faster pace compared to cattle. In 2021, the total swine population constituted only 52% of the 1990 population, with the sow population being merely 38%. This signifies significant production constraints stemming from relatively low profitability, persistent low prices, and challenges in herd expansion. Environmental protection measures also posed substantial barriers to swine production concentration (Ziętara 2017). The total swine population declined at a rate of -2.6% annually, with sow numbers decreasing at an even steeper rate of -3.9% per year.

In animal production, similar to crop production, an increase in unit yields was observed. The milk yield of cows in Poland increased by 94% from 1990 to 2021, rising from approximately 3 to over 6 thousand litres annually per cow. The growth rate was as high as 2.5% per year (Figure 8.10). Until 2002, this was mainly due to the elimination of weaker herds, and in later periods, it resulted from production concentration and biological advancements. Milk production remained relatively stable throughout the entire period, averaging around 12 billion litres, with an increase observed

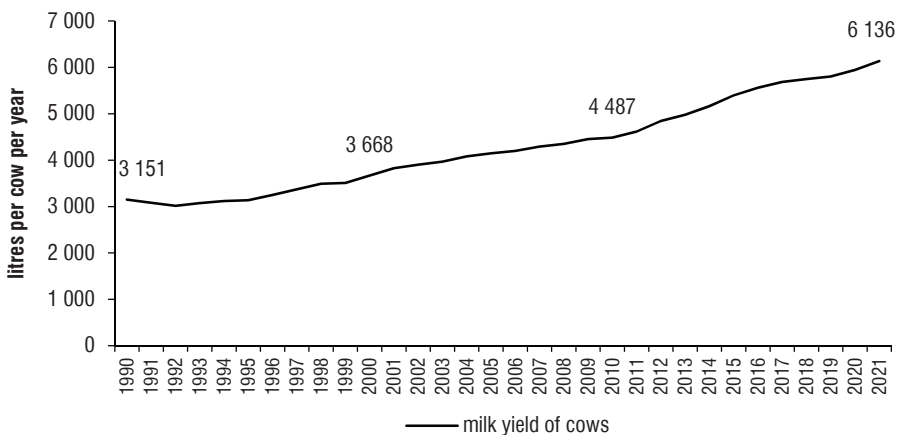
after 2017, reaching approximately 14.5 billion litres in 2021. The production level is likely to be maintained at a similar level due to demand constraints, but further production concentration is anticipated, driven by significant economies of scale, both in technical and marketing aspects (Parzonko et al., 2023; Rusielik & Świtłyk, 2012; Wilczyński, 2012).

Figure 8.9. Cattle and Pig Population in Poland from 1990 to 2021



Source: own elaboration based on data from the Central Statistical Office (GUS).

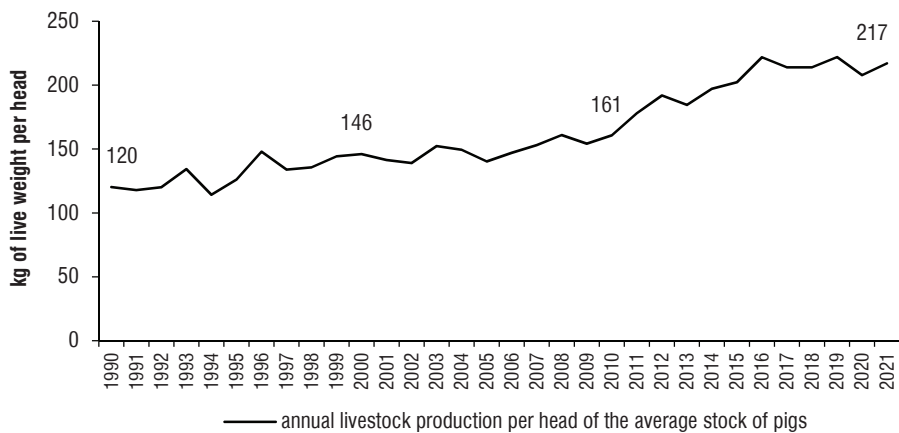
Figure 8.10. Total Milk Yield of Cows in Poland from 1990 to 2021



Source: author's own elaboration based on GUS data.

In swine production, an increase in efficiency was also observed. The fattening period was shortened, and sow prolificacy increased. As a result, pork production per head of the average swine population increased, especially after 2005 (Figure 8.11). On average, from 1990 to 2021, pork production per head of the population increased by approximately 80%, from 120 kg/head to 215 kg/head. This represented a substantial growth – at a rate of 2.17% annually – stemming from production concentration, improved production technology, as well as the import of piglets and weaners.

Figure 8.11. Pigs Livestock Production per Head of Herd in Poland from 1990 to 2021



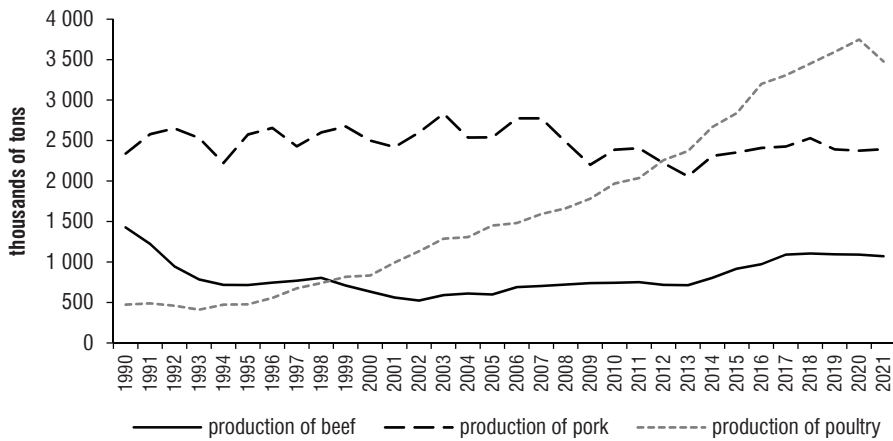
Source: own elaboration based on data from the Central Statistical Office (GUS).

The next issue is livestock production. Similarly, as in crop production, the scale of this production arises from changes in herd size and productivity. In the 1990s in Poland, approximately 4.0 million tons of livestock were produced annually, and after 2010, this figure had risen to 6.4 million tons per year. Since 2013, the majority of livestock production has been poultry, with its production rapidly increasing (Figure 8.12). From 2018, poultry production reached 3.5 million tons annually, accounting for a substantial 51% of total production. From 1990 to 2012, swine production dominated, at around 2.52 million tons annually.

Changes in livestock production structure were primarily driven by an increase in poultry production, followed by a secondary reduction in average cattle livestock production by approximately 10%, and swine livestock

production by around 5%. The growth in poultry production stemmed from the scaling-up of commercial poultry farming, which saw a several-fold increase in poultry population during the specified period, rising from approximately 40 to 180 million head.

Figure 8.12. Livestock Production by Live Weight in Poland from 1990 to 2021



Source: own elaboration based on data from the Central Statistical Office (GUS).

Summary

Clear transformations occurred in Polish agriculture from 1990 to 2021, encompassing alterations in resource utilisation, the scale of crop and livestock production, as well as plant and animal productivity. However, progress in terms of agricultural structure remained notably limited. Agriculture continues to be fragmented, with an average farm size of merely 12 hectares. Within the context of structural changes in agriculture, positive tendencies are notable. In addition to small-scale farms, which often serve social purposes, there has been an increase in the number of larger farms (above 25-30 hectares), including some of a more entrepreneurial nature, well-invested, and characterised by sustainable agricultural production. Modern large-scale commercial farms have also emerged, originating from the privatisation of former state-owned agricultural enterprises. The number of medium-sized farms has decreased, as they were deemed too small to ensure the expected income for farm families,

yet simultaneously too large to be managed by individuals with multiple occupations. The level of agricultural sustainability in terms of achieving economic, environmental, and social objectives has improved. Notably, the privatisation of state-owned agriculture not only facilitated the substantial transfer of land resources to individual farms but also gave rise to modern, high-efficiency commercial enterprises operating under various legal forms, contributing to a dual model of Polish agricultural development. The past decades affirm that such coexistence is feasible and serves the productive, environmental, and societal goals of Polish agriculture effectively.

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