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Statistical analyses

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Rolnictwo w 2019 r.

Agriculture in 2019

Preface

Agriculture as an important sector in the Polish national economy is the main source of livehood for a large part of society. Areas used in agricultural production to produce safe, high-quality food cover almost half of the total country's area, while determining the landscape as well as the natural environment of rural areas. Integration with the European Union and globalization processes have caused that Polish agriculture has become part of an open, worldwide economic system. Gaining the chance of free access to the European market, Polish agriculture was subjected to competitive pressure at the same time. In order to meet the associated challenges, Polish agriculture is a subject of constant transformation.

In the consecutive edition of the study was presented comprehensive set of statistical information on agriculture in the areas: production results, production and economic conditions, changes in the main agricultural markets, business tendency, supply and consumption of basic means of production as well as the most important structural changes. The production results of agriculture in 2019 are presented against the background of years 2010–2018. The publication contains an analysis of the basic processes taking place last year in agriculture.

We would like to thank all people and institutions for their cooperation and the data provided for this publication. All your comments and suggestions regarding the theme of the study will be a valuable clue when working on subsequent editions of publications.

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Skróty
Abbreviations

Skrót Abbreviations	Znaczenie Meaning
tys. thous.	tysiąc thousand
mln	milion million
zł PLN	złoty zloty
szt. pcs	sztuka piece
Gg	gigagram gigagram
kg	kilogram kilogram
kt	kilotona kilotonne
dt	decytona deciton
t	tona tonne
mm	milimetr millimetre
ha	hektar hectare
m^2	metr kwadratowy square metre
m^3	metr sześcienny cubic metre
l	litr litre
hl	hektolitr hectolitre
^0C	stopień Celcjusza centigrade
h	godzina hour
r.	rok year
GHG	gazy cieplarniane geenhouse gases
NH_3	amoniak ammonia
CH_4	metan methane
NO_x	tlenek azotu x wartościowy nitric oxide x valuable
CO	tlenek węgla carbon monoxide
CO_2	dwutlenek węgla carbon dioxide

Ekw. CO_2 *Eq. CO_2*	Ekwiwalent CO_2 Equivalent CO_2
UR UAA	użytki rolne Utilised Agricultural Area
RER EAA	Rachunki Ekonomiczne Rolnictwa Economic Accounts for Agriculture
AWU	roczna jednostka pracy Annual Work Unit
cd. cont.	ciąg dalszy continued
dok. cont.	dokończenie continued
Lp. *No.*	liczba porządkowa oridinal number
ASF	Afrykański pomór świń African Swine Fever
OSN	obszary szczególnie narażone na zanieczyszczenia związkami azotu, pochodzącymi ze źródeł rolniczych areas particularly exposed to pollution with nitrogen compounds from agricultural sources
PM_x	mieszanina zawieszonych w powietrzu cząsteczek o średnicy nie większej niż x mikrometr a mixture of molecules suspended in the air with a diameter of not more than x micron
TSP	całkowity pył zawieszony, wszystkie aerozole, o średnicy cząstek zarówno poniżej, jak i powyżej 10 mikrometrów total suspended dust, all aerosols, with particle diameters both below and above 10 micrometers
wbc	waga bita ciepła post slaughter warm weight
UE EU	Unia Europejska European Union
Eurostat	Urząd Statystyczny Unii Europejskiej Statistical Office of European Union
KOWR	Krajowy Ośrodek Wsparcia Rolnictwa National Center for Agriculture Support
KOBIZE	Krajowy Ośrodek Bilansowania i Zarządzania Emisjami The National Centre for Emissions Management
LULUCF	Użytkowanie gruntów, zmiana użytkowania gruntów i leśnictwo Land use, land-use change, and forestry
UNFCCC	Ramowa konwencja Narodów Zjednoczonych w sprawie zmian klimatu United Nations Framework Convention on Climate Change
IPCC	Międzyrządowy Zespół ds. Zmian Klimatu Intergovernmental Panel on Climate Change
WAM	przy dodatkowych środkach with additional measures
PROW	Program Rozwoju Obszarów Wiejskich Rural Development Programme
ARiMR	Agencja Restrukturyzacji i Modernizacji Rolnictwa Agency for Restructuring and Modernisation of Agriculture
Polski FADN FADN	Sieć Zbierania i Wykorzystywania Danych Rachunkowych z Gospodarstw Rolnych Farm Accountancy Data Network

Executive summary

In 2019, as in the previous year, over 1.4 million farms used 14.7 million ha and maintained 10.0 million Livestock Unit – LSU (1.2% more than in the previous year).

Still, in the farms structure, over half (53.5%) were the smallest farms, i.e. up to 5 ha of UAA. The percentage of largest farms with an area of 50 ha and more of UAA was only 2.4%.

The average area of agricultural land on the farm has been maintained for several years at the level of about 10 ha (in 2019 it amounted to 10.4 ha).

The **sown area** in 2019 was 10.9 million ha and was close to the area a year ago. As usual, cereals (72.4% of the total sown area) dominated the crop structure, followed by industrial crops (10.8%) and fodder crops (8.9%).

In comparison with the previous year, the sown area of some crops increased from approx. 1% to approx. 5%. An increase in the sown area of basic cereals was recorded for wheat – by 3.9%, triticale – by 2.1% and rye – by 1.1%. The area of rape and turnip rape increased by 3.6%, potatoes by 4.1% and maize for grain – 3.1%. The sugar beet cultivation area increased to a lesser extent – by 1.3%. However, the area of ground vegetables decreased significantly – by 10.6%

The total **cattle** population (as of December 2019) had 6.3 million heads and was by 1.3% higher than in December of the previous year. An increase in the number of cattle herds occurred in most utility groups, except for cows (less by 0.5%), with the largest increase in the calves herd (by 2.2%).

The **pig** population (as of December 2019) had 11.2 million heads and was 1.7% higher than a year ago. The number of all utility groups increased throughout the year. The number of pregnant sows (by 3.6%) and piglets from 20 to 50 kg (by 3.4%) increased the most. With the increase in live pigs prices, profitability of pig fattening has improved compared to the previous year. The threat of African Swine Fever disease (ASF) continued.

In the 2018/19 farming year, the consumption of **mineral fertilizers** per pure ingredients (NPK) decreased compared to last year, with a significant decrease in the use of nitrogen fertilizers. The consumption of manure also decreased, and the consumption of lime fertilizers remained at a low level, still insufficient compared to the soil acidification registered in the country.

In the sale of **industrial feed** used in livestock nutrition there were no major changes as compared to the previous year. Total sales of feed amounted to approx. 10499 thous. tonnes.

According to official data, sales of **plant protection products** for agriculture purposes in the commodity mass, compared to the previous year, decreased by about 8.5%. Over the year, the dynamics of changes in the sale of protection products varied depending on their type and were related to, among others with the intensity of occurrence of specific pathogens over the considered period, e.g. herbicide sales fell by 16.6% while fungicide sales increased by 13.3%.

In 2019, after two years of growth, there was a decrease in **global agricultural production** calculated in constant prices (compared to 2018 by 3.0%). The decrease was due to a decrease in crop (by about 4%) and animal (by about 2%) production.

The value of **global agricultural production** in current prices increased compared to 2018 by 7% as a result of an increase in both crop (by approx. 12%) and animal production (by approx. 3%). This increase was influenced, apart from changes in the volume of crop and animal products, changes in prices of agricultural products correlated with domestic supply and changes in prices occurring on foreign, primarily EU agricultural markets.

The value of **market production** in current prices was higher than a year ago. Calculated per 1 ha of UAA, the value of marketable crop production increased from PLN 2219 in 2018 to PLN 2451 in 2019, and of livestock production – from PLN 3635 to PLN 3705.

In 2019, the volume of **procurement of basic crop products** (cereals, potatoes, sugar beet, vegetables and fruit) was smaller compared to the previous year. Only the procurement of rape and turnip rape was larger than a year ago. Deliveries of maize for grain were at the previous year's level. Procurement volume of live cattle and pigs also decreased while procurement of live poultry and milk was larger.

On private farms, with an increase in the prices of sold per year agricultural products by approx. 15% and an increase in the prices of purchased goods and services by approx. 3%, the ratio of prices of sold agricultural products to the prices of purchased goods and services was much more favorable for agricultural producers and amounted to 111.6.

In 2019, the upward trend in agricultural land prices continued. The price of arable land in private turnover increased to 47.2 thous. PLN per ha versus 44.4 thous. PLN a year ago.

In the year under review, the increase in **Polish foreign trade in agri-food products,** observed since Poland's accession to the EU, has continued. The value of export of agri-food products was higher by 5.8%, and import by 5.2%. The exchange closed with a positive balance

The income situation of farms has improved compared to 2018. Estimated, based on data collected in the Polish FADN system, **the income from a family farm** in 2019 was 43 745 PLN and was higher by nearly 15% compared to 2018. The increase in income was the result of an increase in production value by 30.7% with higher total costs by 32.4% and operating subsidies higher by 13.4% .

The income situation of farms depends on their economic size and agricultural type. Among the diverse population of farms there are those that are not able to function without financial support (the smallest farms and economically the largest farms as well as those classified to "herbivores" type). Others are able to generate income without using subsidies (especially farms with medium and large economic size).

There are also farms where the average income per one full-time family member is higher than the average annual net salary in the national economy.

In recent years, dynamic processes of modernization, specialization and intensification of agricultural production have been observed, and with them the following **regionalization.**

The areas of central, eastern and northern Poland are areas with a predominance of rye, cereal mixtures and maize. Orchards and berry fruit plantations are concentrated in Mazowieckie (Grójec region), Lubelskie voivodship, Sandomierszczyzna, as well as in Wielkopolska and Lodz voivodship. The cultivation of intensive cereals, mainly wheat as well as sugar beet and rapeseed is more often found in the south-east and west of the country and in the region of Zuławy and Warmia.

Breeding of **dairy cattle** is mainly concentrated in the following provinces: Podlasie, Mazowieckie, Warminsko-Mazurskie and Wielkopolska, while **pigs** in the Wielkopolska, Mazowieckie, Lodz and Kujawsko-Pomorskie voivodships. Larger herds of **sheep** are found only in the mountainous regions of Malopolska and Podkarpackie.

Climate change, which has become more and more visible recently, is affecting agriculture, and at the same time agriculture contributes to these changes. Despite the promotion of an integrated and ecological management system, the conventional system is still dominating, whose goal is primarily to intensify production without proper care for the environment.

In 2018, there were in Poland only 7.9 thous. farms using **integrated production methods** (including those notified and with a certificate) and 19.2 thous. farms using ecological production methods (including during conversion and with certification).

In recent years, as a result of these mentioned intensification and concentration processes, the role of agriculture as an emitter of **greenhouse gases** and other types of pollution, such as ammonia, has increased. The source of this type of emission is primarily the growing consumption of means of production (fertilizers, pesticides, fuel, energy), manure management, agrotechnical treatments and the burning of crop residues. The increase in emissions is also closely correlated with changes in the population of the main species of farmed animals, i.e. cattle and pigs.

In 2018, the share of the agricultural sector in GHG total emissions amounted to 8%, PM10 dust 12%, volatile non-methane compounds and TSP dust, both 14% and ammonia 94%. Such a significant level of ammonia emissions results primarily from the irrational management of manure (79% of this compound's emissions). The remaining part of ammonia emissions is associated with the consumption of mineral fertilizers (21% of NH_3 emissions), mainly nitrogen fertilizers.

Structural changes, modernization of agriculture and introduced pro-environmental measures affect the systematic decrease in GHG emissions (by over one third compared to 1988).

Chapter 1

Economic and social aspects

1.1. The economic situation in agriculture in the context of the main factors of the socio-economic development of the country

In 2019, the **rate of economic growth in Poland** slowed down modestly but still remained high. The annual **GDP** increased in real terms by 4.1% (by 5.3% in the previous year). According to Eurostat estimates, the EU-28's GDP decreased to 1.3% (1.8% in 2018). In comparison to the 28 EU states, Poland was among the fastest developing countries. Higher GDP growth dynamics were reported in Hungary (5.0%), Serbia (4.5%) and Romania (4.4%). A similar rate of economic growth was measured in Croatia (4.1%) and Ireland (4.1%).

The rate of economic growth in Poland was slower than the year before. The GDP increased by 4.1% (5.3% in 2018). The domestic demand continued to be the main driver of economic growth.

The economic situation in Polish agriculture in 2019 was influenced mainly by price changes in European and global agricultural markets. Variations in national prices of agricultural products occurring throughout the year led to improvement or deterioration of farms' financial standing, depending on their specialisation. In 2019, price increases positively impacted the situation of cereals, potato, poultry and pig producers. The situation of milk producers improved slightly. In case of vegetables and fruit, the price increase resulted in a much higher production value, despite lower yields.

The increase in domestic prices positively impacted the economic situation of agricultural producers (global production in current prices increased by 7.0%), especially those who specialised in crop production (11.8% of increase compared to 2018). The global animal production value growth rate was significantly lower (by 2.9%).
Farms' financial performance depended primarily on production efficiency and profile, direct payments and additional support on selected markets and under specific conditions. The agriculture's economic cycle was affected by production and economic factors, situation in foreign agricultural markets and altering demand for selected agro-food products resulting from modifications of eating habits. In 2019, agricultural entrepreneur's income calculated on the basis of economic accounts for agriculture (EAA) was 8.4% higher than in the previous year and amounted to PLN 44,217.

In 2019, market conditions of agricultural production improved significantly year to year. It is estimated that with a much higher price rise of agricultural products sold by individual farmers (15.1%) and less pronounced growth in prices of goods and services purchased for current agricultural production, consumption and investment (3.2%), the price index – **'price gap'** – was much more advantageous for agricultural producers than the year before (111.6 vs. 94.4 in 2018). The current financial result of farms, as usual, was impacted by direct payments and additional support under special conditions in certain markets.
Economic performance of farms varied and depended on production efficiency and profile. The economic standing of agriculture was shaped by production and economic factors, changing eating habits with the consequent increase in demand for preferred agro-foods and, to a great extent, situation in foreign agricultural markets.

According to FADN estimates made by the Institute of Agricultural and Food Economics – National Research Institute, family farm income increased year to year by 5.6% and reached PLN 43,745.

In 2019, 1.4 million of farms utilised 14.6 million ha and maintained 9,961.0 thousand of large livestock units. The farm area structure is changing slowly. Despite production specialisation and concentration, farm fragmentation remains significant. More than half of the farms do not exceed 5 ha. At the same time, most of them have low economic potential and limited efficiency.

Plant production is strongly influenced by environmental and climatic factors and, above all, natural disasters. In 2019, high temperatures and low precipitation affected a large part of the country. Production of main crops – apart from potato, sugar beet, vegetables and fruit – was higher that in the previous year. With yield and price increase, the value of crop production (in current prices) grew by 11.8% year to year. At the same

time, the value of market crop production increased by 10.6%. Compared to the previous year, the share of crop output in global marketed agricultural output decreased slightly (by 0.7 percentage point). However the value of marketed crop output calculated per 1 ha of UAA increased to PLN 2,451 from PLN 2,219 in the previous year, that is by 10.5%.

The increase of livestock production value in current prices resulted from, above all, live pig price growth with production volume being similar to the one in the previous year as well as higher production and prices of live poultry, cow milk and chicken eggs. The animal production value growth contributed to the slowdown of breeding livestock and non-breeding livestock value decrease (by ca. 33%). In such conditions, the global animal production value in current prices increased during the year by 2.8% and marketed animal output by 2.1%. Similarly to crop production, the share of marketed animal output in total production decreased by 0.7 percentage point. The marketable animal output value from 1 ha UAA grew to PLN 3,705 from PLN 3,635 in 2018, that is by 1.9%.

The **pig population** in December 2019 consisted of 11,215.5 thousand animals and was by 1.7% bigger than in the previous year. The animal numbers in all utility groups increased. The highest growth occurred in pregnant sows (3.6%) and piglets between 20 kg and 50 kg (3.4%). The number of piglets up to 20 kg increased only slightly (by 0.4%). In 2019, as per data from the EU TRACES veterinary system for controlling the import and export of live animals and animal products in member states, 7,271.6 thousand of pigs were imported. The unfavourable pig production conditions are still linked to the presence of the African Swine Fever (ASF) in Poland and potential threat of disease spreading. In 2019, 2,477 ASF cases were confirmed (3,347 in 2018). By December 2019, 262 ASF outbreaks in pigs were reported, including 48 new outbreaks vs. 109 outbreaks in the previous year. Therefore, there was a decrease in the occurrence of new outbreaks. The range of the disease did not change significantly and covered mainly eastern provinces. The biggest number of ASF cases was reported in the warmińsko-mazurskie province.

The total **cattle population** consisted of 6,260.9 thousand heads and was 1.3% bigger than in December 2018. The cattle stock increased in all utility groups with the highest figures reported for calves – 2.2%.

Further development of **poultry** farming was noted, which was reflected by output increase by 4.1% (in post-slaughter warm weight).

Milk and chicken egg production increased by 2.3% and 2.1% respectively.

In 2019, favourable trends in the labour market continued. Both the number of people employed in the national economy and the average employment in the business sector increased, although to a lesser extent than in the previous year. Registered unemployment was further reduced. The registered unemployment rate was exceptionally low (5.2%). Shrining working age population, despite the increase in young people's economic activity, resulted in lower number of individuals looking for work. Employers' needs often could not be satisfied due to noticeable shortage of personnel with the required qualifications. In that situation, the ever-higher influx of economic migrants, mainly from Ukraine, positively impacted the supply of jobseekers. Foreigners were employed also in agriculture, above all, in seasonal works at harvest time.

The biological nature of agrarian production and its dependence on weather conditions causes periodic accumulation of work in farms and, in consequence, the need to employ seasonal workers. The increased workload, especially during harvest, requires employment adjustment to real needs and engagement of additional workers from outside the farm. Shortages of domestic workers for agrarian works are made up for by foreigners.

The Polish law provides several options to employ foreigners.

Tablica 1. Zatrudnienie obcokrajowców według rodzaju pozwolenia na pracę w 2019 r.
Table 1. Employment of foreigners by type of work permit in 2019

Rodzaj pozwolenia na pracę Type of work permit	Ogółem Total				Rolnictwo, leśnictwo, łowiectwo i rybactwo Agriculture, forestry, hunting and fishing			
		2018= =100	w tym obywatele Ukrainy of which Ukraine citizens	w % in %		2018= =100	w tym obywatele Ukrainy of which Ukraine citizens	w % in %
Liczba oświadczeń wpisanych do ewidencji przez powiatowe urzędy pracy Number of statements entered to the records by poviat labor offices	472 667	29,9	347 433	73,5	5 552	42,3	3 659	65,9
Zezwolenia na pracę dla cudzoziemców Work permits for foreigners	444 738	135,3	330 495	74,3	2 682	73,4	2 227	83,0
Liczba zezwoleń na pracę sezonową wydanych przez powiatowe urzędy pracy[a] Number of seasonal work permits issued by poviat labor offices[a]	183 941	132,4	179 466	97,6	126 898	106,8	124 812	98,4

a Dane wstępne.
a Preliminary data.
Źródło: Ministerstwo Rodziny, Pracy i Polityki Społecznej i dane GUS
Source: Ministry of Family, Labor and Social Policy and Statistics Poland data

For foreigners interested in temporary jobs in Polish agriculture, it most advantageous to be employed based on a seasonal work permit that was issued for the first time in 2018. In 2019, district labour offices granted ca. 184 thousands of seasonal work permits, which was over 32% more that in the previous year. Most of the permits (69.0%) concerned employment in agriculture, forestry, hunting or fishing. A dominating part of all types of seasonal work permits was issued to Ukrainian citizens.

As the household budget survey shows, the material situation of Polish households has been systematically improving since 2004. In 2019, the growth rate of average disposable income was higher than the year before. The disposable income was PLN 1,819 and on the annual basis it was 5.0% higher. The average monthly spending per capita (PLN 1,252), including consumption of goods and services (PLN 1,201), was also higher than in 2018 (by 3.1% and 3.3% respectively). The economic situation of farmers' households remained poorer than that of other social and economic groups except for pensioners. Farmers' households had a disposable income of PLN 914 per capita and the lowest share of expenditure in income and the highest average excess of income over expenditure.

Since Poland's accession to the EU, a significant role in the farmers' income increase has been played by the **EU financial support for agriculture**, including, above all, direct payments.

Year 2019 was the fifth year since the implementation of the direct payment system by Regulation of the European Parliament and the Council (EU) 1307/2013. Direct payments, together with the Common Market Organisation for fruit and vegetables, are aid instruments in the first CAP pillar of the European Agricultural Guarantee Fund (EAGF). The applicable national legal act is, i.a. the Act on payments under direct support scheme of 5th Feb 2015 (Journal of Laws, 2018, item 1312).

The majority of Polish farmers use direct payments as an add-on to their household budget. What is more, depending on the household standing, direct aid is also used to cover current costs of production, household modernization, investment and innovation.

According to the EC report of July 2019, agricultural producers in the EU are highly dependent on public support (from both CAP pillars). The average share of direct payments in income from agricultural production in the EU between 2013 and 2017 was 26%. However significant differences were noticed between member states, e.g. from 20% or less in Croatia, Cyprus, Malta, Italy and the Netherlands to over

40% in the Czech Republic, Denmark, Luxemburg, Slovakia and Sweden. In Poland, the share of direct payments in income from agricultural production in the above-mentioned years was 30%. Taking into account all subsidies, the total public support in average income from agriculture in the EU was ca. 37%, in Poland – ca. 45%.

The total Polish direct payment budget for 2014–2020 is EUR 23.7 billion and consists of EUR 23.5 billion from EU funds (including 25% shift from second pillar) and national contribution of EUR 0.2 billion.

In Poland the direct payment system in 2019 included the following elements:
• single area payment,
• greening payment,
• young farmer payment,
• additional payment,
• livestock production payments (cattle, cows, sheep, goats),
• crop production payments (pulses for grain, fodder plants, sugar beet, starch potato, tomato, strawberry, hop, flax and hemp),
• temporary national support (tobacco payment not associated with production).

The financial envelope earmarked for support to Polish farmers in 2019 was PLN 15.22 billion.

During the campaign, on the 31st of March 2020, 1,317.6 thousand applications were submitted to the fund administrator and 1,298.9 thousand decisions granting area payment were made. The total amount of direct payments made in the 2019 campaign was PLN 14,099 million.

The direct payment system is complementary to other forms of support for agriculture and rural areas that include:

• restructuring measures in the Rural Development Programme for 2014–2020, e.g. support for farmers transferring small farms, support for young farmers and restructuring aid,
• agriculture and environment measures in the Rural Development Programme for 2014–2020 and support for ANC areas,
• changes in common organisation of agricultural markets with a special support for agriculture producer organisations and associations aimed at empowering farmers in the marketing chain and developing crisis management instruments,
• support for professional reorientation of farmers and members of their families planned under Cohesion Policy operational programmes.

According to plans, the total public support in the Rural Development Programme for 2014–2020 will be EUR 13,612 million, including: EUR 8,698 million from the European Agricultural Fund for Rural Development (EAFRD) and EUR 4,915 million of national contribution. The EAFRD provides funds for all activities associated with development and competitiveness of Polish agriculture, food processing and rural areas (II CAP pillar). The above-mentioned financial aid instruments are implemented by the Agency for Restructuring and Modernisation of Agriculture (ARMA) that also functions as the paying agency.

Since the 22nd of April 2020, within the budget of the Rural Development Programme for 2014–2020 of PLN 58,470 million, 4,376,852 agreements with beneficiaries were made at the value of PLN 40,030 million (68.5% use of the limit). The following table presents payments made in the most important areas.

Tablica 2. Płatności obszarowe do gruntów rolnych zrealizowane w ramach Kampanii
Table 2. Area payments for agricultural land made under Campaign

Płatności obszarowe Area payments	Kampania Campaign 2010	Kampania Campaign 2012	Kampania Campaign 2013	Kampania Campaign 2014	Kampania Campaign 2015	Kampania Campaign 2016	Kampania Campaign 2017	Kampania Campaign 2018	Kampania Campaign 2019
	w mln zł in million PLN								
Jednolita płatność obszarowa Single area payment scheme	7 816	10 215	11 442	12 676	6 285	6 285	6 418	6 422	6 409
Uzupełniająca płatność bezpośrednia Supplementary payments	4 109	2 336	1 527	197	153	153	144	133	122

Źródło: Ministerstwo Rolnictwa i Rozwoju Wsi według stanu na dzień 30.04.2020 r.
Source: The Ministry of Agriculture and Rural Development as of 30.04.2020.

Farmers receiving direct payments are obliged to comply with cross-compliance standards. Since 2018 basic documents required during cross-compliance check include:

- calculations of the maximum nitrogen rate or the fertiliser plan,
- register of agrotechnical treatments associated with nitrogen fertilisation,
- in case of manure storage in a heap – a location map with date of submission,
- in case of manure disposal/ acquisition – a disposal agreement,
- records of plant protection product applications,
- certificate of plant protection product training,
- field sprayer inspection protocol.

In 2019, following amendments in national legislation, cross-compliance animal identification and registration requirements changed, e.g. in protection and surveillance zones established in accordance with the Act on Animal Health Protection and Control of Infectious Animal Diseases. The deadline for making entries in the pig record keeping logbook was shortened from two days to one day following an event that required registration.

Tablica 3. Wysokość stawek płatności bezpośrednich realizowanych przez ARiMR w 2019 r.
Table 3. Amount of rates of direct payments carried out by ARMA in 2019

Rodzaj płatności Type of payment	Stawka płatności Payment rate	Koperta finansowa na rok 2018 w tys. zł Financial envelope for 2018 in thous. PLN
Jednolita Płatność Obszarowa Single area payment scheme	471,64 zł/ha	6 752 844
Płatność na zazielenienie Greening payment	316,54 zł/ha	4 532 111
Płatność dla młodego rolnika Payment for young farmers	165,10 zł/ha	302 140
Płatność dodatkowa Supplementary payment	184,98 zł/ha	1 304 861
Płatność do bydła Cattle payment	302,77 zł/szt.	759 553
Płatność do krów Cow payment	387,29 zł/szt.	671 701
Płatność do owiec Sheep payment	104,08 zł/szt.	20 585
Płatność do kóz Goat payment	51,95 zł/szt.	1 178
Płatność do strączkowych na ziarno (do 75 ha) Pulses for grain area payment (up to 75 ha)	765,80 zł/ha	226 605
Płatność do strączkowych na ziarno (powyżej 75 ha) Pulses for grain area payment (over 75 ha)	382,90 zł/ha	
Płatność do roślin pastewnych Feed area payment	463,71 zł/ha	75 535
Płatność do chmielu Hops payment	2 054,33 zł/ha	3 701
Płatność do ziemniaków skrobiowych Starch potato area payment	1 110,09 zł/ha	38 306
Płatność do buraków cukrowych Sugar beat area payment	1 524,18 zł/ha	359 009
Płatność do pomidorów Tomato area payment	2 250,81 zł/ha	12 415
Płatność do truskawek Strawberries area payment	1 136,95 zł/ha	43 553
Płatność do lnu Flax area payment	569,14 zł/ha	2 525
Płatność do konopi włóknistych Hemp area payment	135,44 zł/ha	411
Płatność do tytoniu – Virginia Virginia tobacco area payment	3,28 zł/kg	74 227
Płatność do tytoniu – pozostały tytoń Tobacco area payment – other	2,31 zł/kg	41 661

Źródło: Na podstawie informacji ze strony internetowej ARiMR www.arimr.gov.pl
Source: Based on information from the ARMA website www.arimr.gov.pl

Consumer goods and services price increase rate in 2019 was higher than in 2018. The more dynamic price rise in food and non-alcoholic beverages resulted from faster increase of prices of agricultural products sold by individual farmers. Sell prices of these producers were 15.1% higher that in the previous year.

Tablica 4. Dynamika cen detalicznych środków do produkcji rolnej
Table 4. The dynamics of retail prices of means of agricultural production

Wyszczególnienie Specification	2010	2015	2016	2017	2018	2019
	rok poprzedni = 100 previous year = 100					
Nasiona siewne, drzewka, sadzonki i inne. Seeds, saplings, seedlings and other	102,9	94,5	105,9	98,5	100,6	104,7
Nawozy mineralne lub chemiczne oraz wapniowe Mineral or chemical and lime fertilizers	89,4	100,1	95,8	97,9	100,5	106,8
w tym: including:						
azotowe nitrogenous	91,4	100,3	93,3	98,7	100,8	108,7
fosforowe phosphorous	82,9	99,0	100,4	96,8	99,4	107,4
wapniowe lime	101,6	101,8	100,6	100,6	100,6	101,5
Środki ochrony roślin Plant protection products	100,8	101,6	101,3	102,1	101,4	101,9
Zwierzęta hodowlane i ptactwo Farm animals and birds	104,8	101,3	99,6	101,0	102,3	.
Pasze Feeds	100,4	97,2	99,3	100,8	102,5	103,8
Maszyny i narzędzia rolnicze Agricultural machinery and tools	101,4	100,6	100,6	101,6	102,8	103,5
Materiały budowlane Building materials	99,2	99,6	100,0	101,3	103,4	104,6
Paliwa, oleje i smary techniczne (łącznie z węglem) Fuels, oils and technical lubricants (including coal)	108,8	89,8	94,4	105,9	108,5	101,0
Obsługa maszynowa produkcji rolniczej i ogrodniczej Machine maintenance of agricultural and horticultural production	103,5	101,5	100,3	102,5	102,2	103,1
Usługi weterynaryjne Veterinary services	101,6	101,0	100,6	101,8	102,9	102,5

In 2019 prices of basic means for agricultural production increased. The highest price increase vs. 2018 concerned fertilisers, seeds, saplings, seedlings and building materials. Significant price increase was also recorded for feeds, machinery and machine maintenance. The greatest slowdown in price rise concerned fuels, oils and lubricants, whereas prices of veterinary services dropped slightly.

A subjective assessment of the situation in agriculture can be found in a **farm business cycle survey**. Farmers asked about their opinions in December 2019 confirmed persistence of unfavourable conditions for agrarian production (low prices of agricultural products, high prices of production means, adverse weather conditions). The forecast for the first half of 2020 was pessimistic too. It should be noticed that farmers' opinions were less negative than in December 2018.

In December 2019, the least pessimistic in their assessment of agrarian production profitability were animal farm users whereas most pessimistic were farmers specialising in crop production. Optimistic opinions on agricultural production profitability were expressed by ca. 17% of respondents – users of farms with over 30 ha of utilised agricultural area, breeders of pigs and poultry for slaughter as well as farmers specialising in dairy cattle and laying poultry. Among crop producing farms, the least negative opinions on production profitability were expressed by farmers growing plants under glass as well as rape and turnip rape producers. On the other hand, the most negative views on agrarian production profitability were voiced by farmers growing sugar beet as well as fruit trees and bushes.

In the second half of 2019, the least pessimistic in their assessment of the general situation of farms and agricultural production profitability were farmers growing fruit trees and bushes, potato and field vegetables. At the same time, farmers specialising in pig breeding expressed more positive than negative opinions on agrarian production profitability and demand for agricultural produce. Negative opinions noticeably dominated in the group of sugar beet growers and breeders of cattle for slaughter.

In December 2019, forecasts concerning general situation of farms, agrarian production profitability and demand for agricultural produce were unfavourable. Farm users' moods deteriorated in comparison to 2018. Most worried about their future were farmers growing crop under glass and breeders of cattle for slaughter.

1.2. Production results of agriculture

The global value of agrarian production in current prices increased in 2019 by 7.0% year to year, which was a result of 11.8% increase in crop production value and 2.9% increase in animal production value. In crop production, the biggest value growth concerned potato (25%) and vegetables (ca. 24%). High production value growth occurred also in fruit (ca. 13%) and cereals (over 11%). A slight decrease in production value occurred only in industrial crops (ca. 1%). Increased value of animal production was a result of higher value of animals and chicken eggs (ca. 4%) and milk (ca. 2%). The animal production value rise slowed down the decrease in breeding and non-breeding herd value (by ca. 33%).

In 2019, cereals procurement prices and marketplace prices changed in different directions. Procurement prices of specific cereal species during the year were slightly lower than in the previous year (by 1–2%), except for rye (ca. 1%). Mean annual prices of the main cereal species increased in marketplaces by ca. 10% - 12% year to year. With a dynamic, systematic growth of pigs for slaughter prices in the domestic market, during the year the procurement prices increased by ca. 20% and in marketplaces by ca. 15%. In consequence, the relation between live pigs prices and rye prices improved significantly (10.8 in the IV quarter) thus pig fattening became much more profitable. Live poultry supply in the domestic market remained high and prices of poultry for slaughter were slightly higher than in the previous year (ca. 3%). Beef prices dropped by 2–3%. Following the 2018 global slowdown in demand for milk and milk products and milk price decrease, in 2019 the milk market downturn persisted, which was reflected by the price of the raw material in Poland. After the 25.5% price rise in 2017, prices decreased in 2018 by 3.2% and in 2019 increased by only 0.5%.

As a result of these changes, the gross agricultural production price index was 110.3, with 116.3 for crop production and 105.2 for animal production. The same index for marketable agricultural production was 109.6, with 116.8 for crop production and 105.3 for animal production. At the same time, the procurement price index for gross agricultural output was 108.4, with 114.9 for crop output and 105.7 for animal output.

Changes in the level of agricultural production in particular years are illustrated by dynamics indices of gross agricultural output in constant prices.

Tablica 5. Wskaźniki dynamiki globalnej produkcji rolniczej (w cenach stałych)
Table 5. Dynamics indices of gross agricultural output (in constant prices)

Wyszczególnienie Specification	2010	2015	2016	2017	2018	2019
			rok poprzedni = 100 previous year = 100			
Produkcja globalna Gross output	**97,3**	**96,1**	**107,1**	**103,1**	**101,5**	**97,0**
Produkcja roślinna Crop output	90,6	89,1	110,3	100,6	100,3	96,1
Produkcja zwierzęca Animal output	105,0	103,4	103,8	105,7	102,6	97,8
			2010=100			
Produkcja globalna Gross output	**100,0**	**106,2**	**113,7**	**117,2**	**119,0**	**115,4**
Produkcja roślinna Crop output	100,0	101,9	112,4	113,1	113,4	109,0
Produkcja zwierzęca Animal output	100,0	109,2	113,3	119,8	122,9	120,2

Since 2016, gross production value in constant prices has systematically grown. In 2019, a decrease of 3% took place, with ca. 4% decrease in crop output and over 2% in animal output. The crop production was influenced by reduced fruit tree production in orchards – by ca. 13%, fruit production from berry plantations and fruit bushes in orchards by ca. 16% and potato by ca. 12%. Basic cereals production was higher than in the previous year by ca. 10% (including rye by ca. 14%, wheat and triticale – ca. 12% each, rape and turnip rape o ca. 8%). The decrease in animal production resulted from reduced volumes of animals for slaughter (in post-slaughter warm weight) – pigs by ca. 5% and cattle with calves by ca. 1%.

Changes in marketable agricultural output in current prices in 2010–2019 are illustrated by the share of market agricultural output in gross output.

Tablica 6. Udział towarowej produkcji rolniczej w produkcji globalnej (w cenach bieżących)[a]
Table 6. Share of market agricultural output in gross output (in current prices)[a]

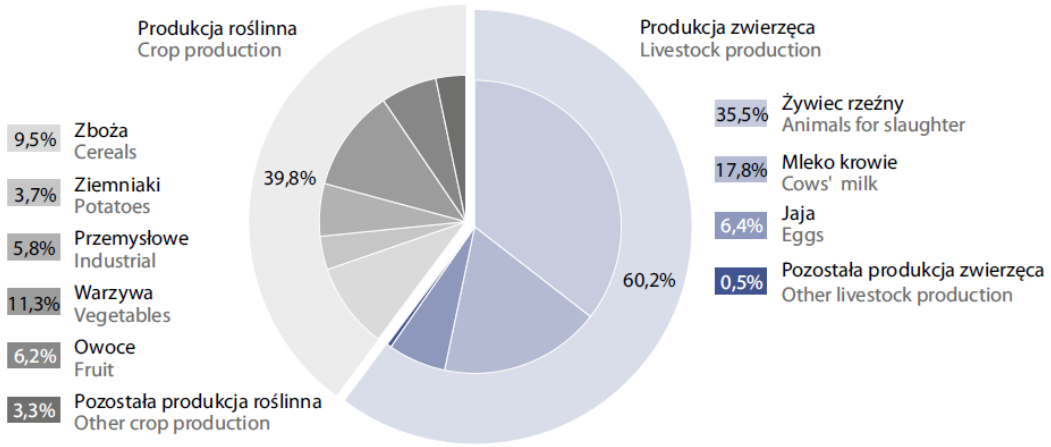
Wyszczególnienie Specification	2010	2014	2015	2016	2017	2018	2019
Produkcja globalna Gross output	**70,3**	**72,8**	**75,2**	**74,1**	**73,6**	**76,2**	**75,0**
Produkcja roślinna Crop output	58,1	58,1	62,3	60,9	59,6	61,7	61,0
Produkcja zwierzęca Animal output	84,0	88,2	88,2	87,6	86,8	89,1	88,4

a Łącznie z naliczonymi za dany rok płatnościami uzupełniającymi.
a Including supplementary payments charged for a given year.

Since 2000 the share of market agricultural output in gross output has gradually increased. In 2009, it exceeded 70%. In 2019, with crop product supply being lower than in the previous year, the share of market agricultural output in gross output lowered to 75.0% (from 76.2% in 2018), crop output lowered to 61.0% (from 61.7% in 2018.) and animal output lowered to 88.4% (from 89.1% in 2018). Agricultural products intended for sale find customers in the domestic market and in continuously developing foreign markets. In the context of prevailing raw material supply pressure in European and global agricultural markets and the consequent difficulties in selling agricultural produce, since 2015 steps have been taken to diversify the directions of agricultural and food product export.

In 2019, the structure of marketed agricultural production did not change significantly compared to 2018. The share of animal production decreased by 0.7 percentage point due to a reduction in milk production share by 0.5 percentage point and livestock by 0.3 percentage point. The share of marketed crop output in gross marketed output resulted, above all, from higher share of marketed vegetable production (1.6 percentage points), 'other crop' (0.7 percentage point), fruit and potato (ca. 0.6 percentage point each), accompanied by lowered share of cereals (1.6 percentage points) and industrial crop (0.5 percentage point).

Wykres 1. Struktura towarowej produkcji rolniczej w 2019 r.
Chart 1. Structure of market agricultural production in 2019



Changes in marketed agricultural output since 2010 are illustrated by dynamics indices of marketed agricultural output in constant prices.

Tablica 7. Wskaźniki dynamiki towarowej produkcji rolniczej (w cenach stałych)
Table 7. Dynamics indices of market agricultural output (in constant prices)

Wyszczególnienie Specification	2010	2014	2015	2016	2017	2018	2019
			rok poprzedni = 100 previous year = 100				
Produkcja towarowa **Market output**	**98,4**	**102,1**	**99,3**	**105,7**	**102,9**	**103,3**	**96,1**
Produkcja roślinna Crop output	89,0	96,0	94,1	109,5	99,8	100,5	94,7
Produkcja zwierzęca Animal output	106,1	106,9	102,8	103,1	105,1	104,9	97,0
			2010=100				
Produkcja towarowa **Market output**	**100,0**	**112,2**	**111,4**	**117,7**	**121,1**	**125,1**	**120,2**
Produkcja roślinna Crop output	100,0	113,8	107,1	117,3	117,1	117,7	111,5
Produkcja zwierzęca Animal output	100,0	110,4	113,5	117,0	123,0	129,0	125,1

After three years of regular growth, in 2019 the value of market agricultural output in constant prices decreased, in total by ca. 4%, including ca. 5% drop in crop output and 3% in animal output.

The main element of market output determining its volume and variations is the procurement of agricultural produce. In 2019, the procurement of marketed agricultural products in constant prices was 6% lower that the year before (crop products – 8.5%, animal products – 4.9%).

Since 2012, the share of procurements in marketed output has been above 70%. In 2019, in comparison to the previous year, the share of agricultural products procurement and sell in marketplaces (in current prices) in market output was 72.7% (75.1% in 2018) and 25.6% (23.1% in the previous year) respectively. The lower than the year before share of procurement in marketed output resulted from lower values of procured cereals (ca. 5%), rape and turnip rape (ca. 5%) and fruit (1%) and live cattle (ca. 15%).

Tablica 8. Wskaźniki dynamiki skupu produktów rolnych (w cenach stałych)
Table 8. Dynamics indices of agricultural products procurement (in constant prices)

Wyszczególnienie Specification	2010	2015	2017	2018	2019		
	rok poprzedni = 100 previous year = 100					2010=100	2015=100
Ogółem **Total**	**105,8**	**106,7**	**108,5**	**99,7**	**102,8**	**104,7**	**101,2**
Produkty: roślinne Products; crop	96,1	107,0	107,6	93,8	105,2	99,7	103,2
zwierzęce animal	110,5	106,6	108,9	102,5	101,7	107,0	100,3

In 2019, in comparison to the previous year, the total agricultural product procurement in constant prices decreased by 6.0%. The value of crop procurement was 8.5% lower than in the year before due to reduction in fruit (ca. 13%), vegetables (ca. 12%), potato (ca.10%) and cereal (7%) procurement. Lower values were also reported in animal product procurement (ca. 5%) with drop in procurement of most products of animal origin. Higher procurement value was seen only in live poultry and milk procurement (by 3.5% and 1.8% respectively).

The economic situation in agriculture depends on the production results obtained in particular by private farms.

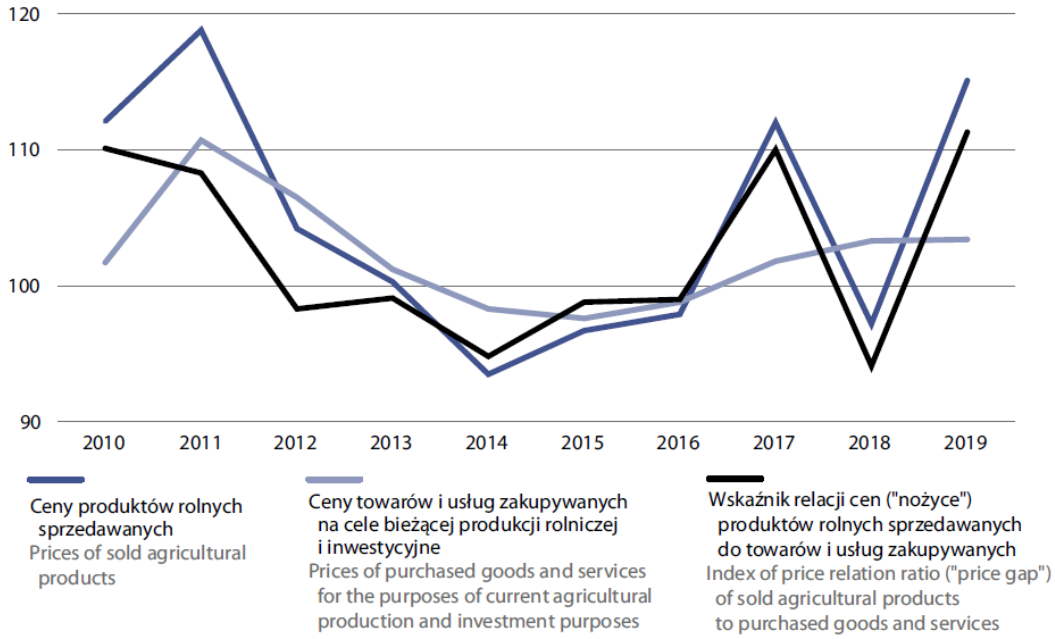
Tablica 9. Udział gospodarstw indywidualnych w produkcji rolniczej (ceny bieżące)
Table 9. Share of private farms in agricultural output (current prices)

Wyszczególnienie Specification	2010	2015	2017	2018	2019
	w % in %				
Produkcja globalna Gross agricultural output					
Ogółem Total	**88,3**	**87,8**	**90,3**	**88,5**	**88,5**
Produkcja roślinna Crop output	88,0	88,8	90,2	90,2	90,4
Produkcja zwierzęca Animal output	88,5	86,7	90,3	87,1	86,6
Produkcja końcowa Final output					
Ogółem Total	**87,1**	**86,7**	**90,1**	**87,5**	**87,5**
Produkcja roślinna Crop output	85,5	87,1	89,8	88,7	89,2
Produkcja zwierzęca Animal output	88,3	86,5	90,2	86,8	86,3
Produkcja towarowa Market output					
Ogółem Total	**85,0**	**85,9**	**88,2**	**87,0**	**86,5**
Produkcja roślinna Crop output	82,9	86,4	86,5	88,3	88,7
Produkcja zwierzęca Animal output	86,7	85,5	89,3	86,2	85,0

Between 2010 and 2015, the share of private farms in the total agricultural production was 88–89% and in marketed production - 85–87%. In 2017, the best year in terms of conditions and production results, the share of these units exceeded 90% in total production and 88% in marketed output. In 2019, the share of private farms in total production was at the level of 2018, that is 88.5% and in market output it decreased from 87.0% to 86.5%. In times of changing agricultural production conditions, the high share of market output in total production shows that private farms are shifting towards marketable production.

Improvement of production results strongly impacted the economic situation of private farms. As a result of the price increase of agricultural products sold by private farms by 15.1% (2.8% decrease in 2018) and moderate rise of prices of consumption goods and services bought by these farms, current agricultural production and investment by 3.2% (2.9% increase in 2018), the ‘price gap’ index was beneficial for agriculture and amounted to 111.6 (94.4 in 2018).

Wykres 2. Wskaźnik "nożyc cen" w rolnictwie
Chart 2. Index of price relation ("price gap") in agriculture

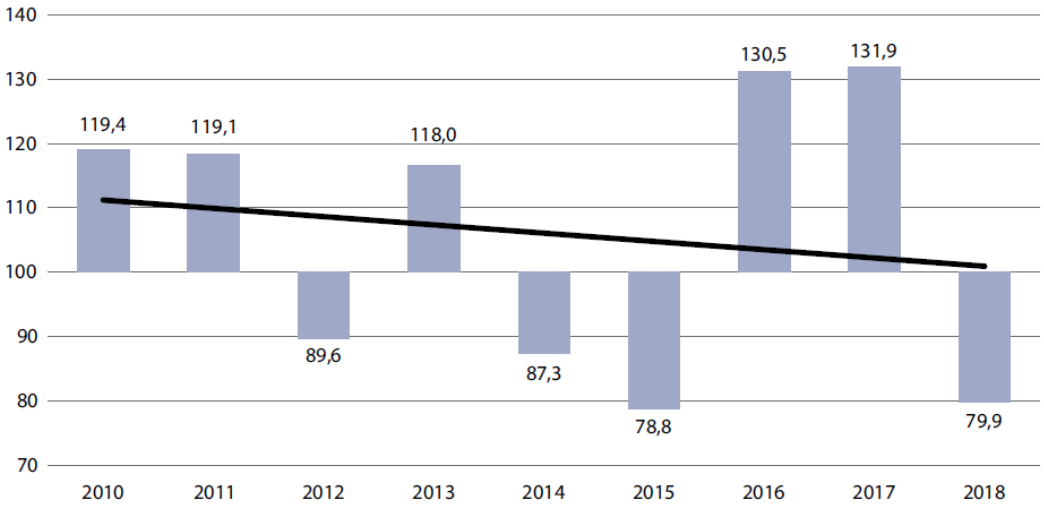


The global production, EU and national subsidies as well as goods and services utilised in current agricultural production generate income from work in private farms.

On that basis, the average income solely from work in a private farm from 1 conversion ha is calculated. The income does not include profits from other sources, e.g. pension, disability allowance and other welfare aids (such as the 500+ programme). The average income is a mean value calculated for the whole country on the basis of private farm revenues. Actual profits from agricultural activity may differ hugely in particular farms.

The index is used, among other things, to determine eligibility for family benefit, social scholarship, housing allowance, alimony payment or the Family 500+ welfare programme. During the last decade, the average income from work in private farm from 1 conversion ha has been changing dynamically, which is shown in the following chart.

Wykres 3. Dynamika przeciętnego dochodu z pracy w indywidualnym gospodarstwie rolnym z 1 ha przeliczeniowego
Chart 3. The dynamics of average income from work in private farm from 1 conversion hectare



Considerable production volume dependence on weather, agricultural product prices, situation in international markets, prices of production means and current standing of the domestic market cause marked annual variations of this index.

In 2017, as a result of many favourable factors, gross production increased significantly and intermediate consumption grew moderately, so in consequence the average income from work in a private farm from 1 conversion ha was rather high (31.9 increase%). In 2018, the income from work in a private farm was lower than in the two previous years (20.1% decrease). Gross production downfall and unfavourable relation between prices of agricultural products sold and goods and services bought by private farms led to deterioration of financial conditions of agricultural production and consequential deterioration of farms' economic standing.

An analysis of current performance – gross production increase and the relation between prices of agricultural products sold and prices of gods and services bought by private farmers – suggests an improvement in farms' financial standing in 2019.

Since 1998, Statistics Poland and the Institute of Agricultural and Food Economics – National Research Institute have analysed Economic Accounts for Agriculture (EAA). The EAA is a macro-economic calculation that takes account of the volume and value of farms output in a given year.

The EAA is a satellite calculation in relation to agriculture income calculated with the national accounts method.

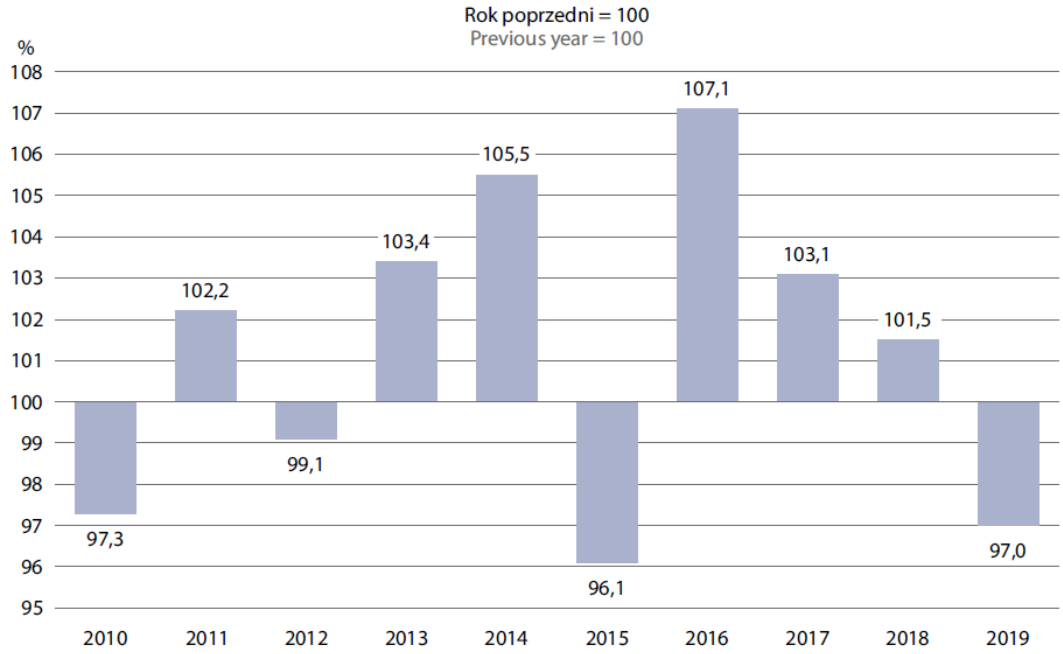
It is the main objective of the EAA to determine:

– total national agriculture income and income per work unit defined as one full-time employed individual (in Poland 1 AWU – Annual Work Unit = 2,120 h),
– agriculture contribution to national economy in cohesion with national accounts,
– characteristic changes in agriculture,
– comparisons of agriculture output and economic results in different countries and EU agriculture income monitoring.

According to the EAA, gross agricultural output in 2019 in producer's current prices, including direct subsidies, amounted to PLN 113.4 billion and was 6.2% higher than in the previous year. The production value increase resulted from 8.7% price rise with 2.3% production volume decrease.

The year to year production value increase resulted mainly from higher crop output (14.5%) and, to a lesser extent, services offered by farms (3.1%) and other production (secondary cumulative agricultural activity – by 2%) with animal output value similar to the one in the previous year (0.4% increase).

Wykres 4. Zmiany globalnej produkcji rolniczej
Chart 4. Changes of gross agricultural output



As for crop production value, the highest increase took place in potato, vegetables and fruit and the lowest in cereals and oil plant production. Production value increased by 36.6% for potato, 24.6% for vegetables and 21.3% for fruit. The increase resulted from significant price growth compensating production volume decrease due to adverse weather conditions. Prices of fruit increased by 52.7%, potato by 41.3% and vegetables by 36.4%. Ultimately, crop production value (in basic prices) in 2019 was 13.6% higher than in the previous year and increased by 11.2% in comparison to the average in 2010-2018.
In 2019, the crop output share in gross production value increased over 3% year to year. However, in relation to previous years, the share dropped gradually – from over 50% in 2010–2013 to 46.5% in 2019 (43.2% in 2018). The share of fodder plants has also continued to decrease – from 7.5% in 2010 to 2.6% in 2019. Similar trend occurred in cereals (from17.7% to 15,3%) and industrial plants (from 7.4% to 5.8%). The share of vegetables in gross production increased from 9.2% in 2010 to 12.6% in 2019.

Animal output value increased slightly year to year – by 0.8% in producer's prices and by 0.4% in basic prices and by 12.2% in comparison to the average for 2010–2018. In 2019, output value increased only in milk (4.4%) and pigs and poultry (ca. 1.6% each). In case of poultry, it was a result of 3.7% production volume growth and in case of milk it resulted from 2.4% production volume increase and ca. 2% price rise. The pig production value increase resulted from over 19% price rise, which fully compensated for nearly 15% drop in production volume. In other animal production units prices dropped.
Similarly to crop production, animal production also experienced structural changes such as further increase in poultry and cattle production value and share in gross production – poultry share increased from 8.9% in 2010 to 11.8% in 2019, cattle increased from 4.9% in 2010 to 6.9% in 2019.

In 2019, according to EAA, the increase in agricultural output value was accompanied by increase (2.9%) in indirect use, and in relation to the average for 2010–2018 the increase was 11.5%. In this account category, the highest increase during the year concerned purchase prices of fertilisers (6.8%), seeds (4.7%), other goods and services (4.3%) and building maintenance (3.9%). The lowest increase was recorded for energy and fuel (0.2%).

The agricultural production value increase by over 6% with less than half increase in indirect use and depreciation resulted in 13.6% increase of net added value (including product subsidies) in comparison to the previous year (from PLN 3,2546 million to PLN 3,6956 million). Compared to 2010–2018, the value increased by ca.12%.

Another EAA category, the factor income in 2019 increased by PLN 3,669 million (7.4%) in relation to the previous year. It was a result of adding to that category all other production subsidies (including, among others, single area payment, agricultural environmental and climate payments, payments for areas with natural constraints or other special constraints – ANC, historical product payments) and taxes on production paid by farmers. On the other hand, entrepreneurial income – the last income generation category – being a measure of remuneration for unpaid work resources, capital engaged and lease, increased by PLN 3,432 million (8.1%) in relation to the previous year.

Thus, the factor income in current prices for 1 AWU increased in 2019 by 7.4% year to year and by 31.1% in relation to the average for 2010–2018.

In real terms, after elimination of price changes, the factor income calculated by Eurostat for 2019 (based on the second EAA estimation) increased by 4.4% year to year and in constant prices of 2010 increased by 40.3%.

Tablica 10. Wyniki ekonomiczne dla rolnictwa w Polsce (w cenach bieżących)
Table 10. Economic results for agriculture in Poland (in current prices)

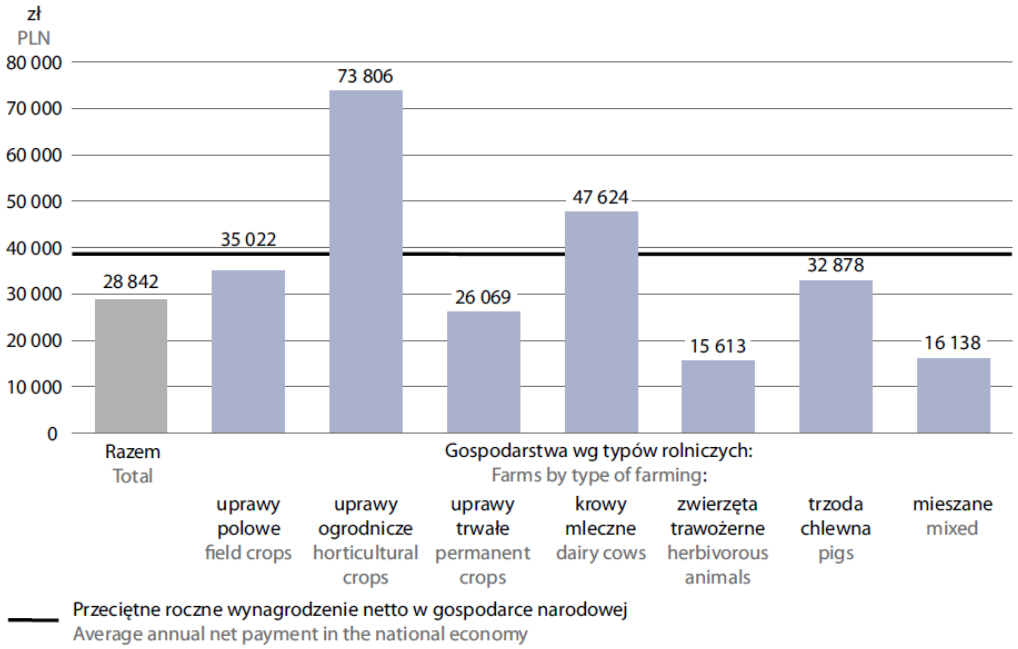
Lp. No.	Wyszczególnienie Specification	2010–2017	2017	2019	
		mln zł million PLN			2018=100
1.	**Globalna produkcja rolnicza (A+B+C+D) Gross agricultural output**	**97 031**	**106 815**	**113 395**	**106,16**
A	Produkcja roślinna Crop output	44 724	45 513	52 115	114,50
B	Produkcja zwierzęca Animal output	46 687	56 210	56 689	100,85
C	Dopłaty do produktów Subsidies on products	2 955	2 381	1 800	75,60
D	Pozostała produkcja i usługi Other output and agricultural services	2 665	2 711	2 791	102,96
2.	**Zużycie pośrednie Total intermediate consumption**	**59 544**	**66 749**	**68 687**	**102,90**
3.	**Wartość dodana brutto (1–2) Gross value added at basic prices**	**37 487**	**40 066**	**44 708**	**111,59**
4.	Amortyzacja Fixed capital formation	6 741	7 520	7 752	103,09
5.	**Wartość dodana netto (3–4) Net value added at basic prices**	**30 746**	**32 546**	**36 956**	**113,55**
6.	Pozostałe podatki do produkcji Other taxes on production	1 854	1 702	1 763	103,56
7.	Pozostałe dotacje do produkcji Other subsidies on production	15 244	18 619	17 939	96,34
8.	**Dochód z czynników produkcji (5–6+7) Factor income**	**44 136**	**49 463**	**53 132**	**107,42**
9.	Wynagrodzenia pracowników Compensation of employees	5 250	7 178	7 415	103,30
10.	**Nadwyżka operacyjna (8–9) Operating surplus/mixed income**	**38 886**	**42 285**	**45 717**	**108,12**
11.	Koszty dzierżaw Rents and other real estate rental charges to be paid	309	270	293	108,57
12.	Saldo odsetek zapłaconych i uzyskanych Balance of interest paid and interest received	1 189	1 207	1 207	100,00
13.	**Dochód przedsiębiorcy rolnego (10–11–12) Entrepreneurial income**	**37 388**	**40 808**	**44 217**	**108,35**
14.	Dopłaty ogółem Total subsidies	18 199	21 000	19 739	93,99
16.	Nakłady pracy w rolnictwie ogółem (w tys. AWU) Total agricultural labour input (in 1000 AWU)	1 843	1 676	1 676	100,00
17.	Dochód z czynników produkcji na 1 AWU w zł Factor income per 1 AWU in PLN	24 176	29 516	31 705	107,42

The Institute of Agricultural and Food Economics – National Research Institute, in the farm accounting data collection and utilisation system (so-called Polish FADN) calculates income from a family farm.

In 2019, the FADN study of Poland covered 730,883 farms, of which 45% were defined as ‘mixed’ farms, 25% – ‘field crops’, 11% – ‘dairy cows’, 7% – ‘herbivorous animals’, 5% – ‘permanent crops’ and 4% – ‘horticultural crops’. In total, commercial farms used 12,291 thousand ha, which corresponded to 85.1% of the total agricultural land and 96.9% of the total large livestock units.

Wykres 5. Dochód z rodzinnego gospodarstwa rolnego na osobę pełnozatrudnioną rodziny i przeciętne roczne wynagrodzenie netto w gospodarce narodowej w 2019 r

Chart 5. Income from a family farm for a full-time family worker and average annual net payment in the national economy in 2019



a Dochód z rodzinnego gospodarstwa rolnego na osobę pełnozatrudnioną rodziny (jednostkę przeliczeniową pracy rodziny) obliczony jest tylko dla gospodarstw rolnych, w których występują nakłady pracy własnej.
a Income from a family farm for a full-time family wocker (conversion unit of family work) is calculated for farms with own labour input.

It is estimated that an average income from a family farm in 2019 was PLN 43,745 and was nearly 15% higher than in 2018. The increase was a result of 30.7% production value increase with 32.4% higher total costs and 13.4% higher operational subsidies.

Tablica 11. Rachunek dochodu przeciętnego gospodarstwa w polu obserwacji Polski FADN

Table 11. Income account of an average farm in the field of Polish FADN observation

Wyszczególnienie Specification	2015	2016	2017	2018	2019[a]
	w zł in PLN				
Produkcja ogółem Total output	106 986	107 964	112 975	105 542	137 902
Koszty ogółem Total costs	94 459	94 773	94 170	91 657	121 366
Dopłaty do działalności operacyjnej Subsidies for operating activities	22 398	23 396	24 578	26 167	29 679
Raty dotacji inwestycyjnych Installments of investment subsidies	893	909	835	780	941
Dochód z rodzinnego gospodarstwa rolnego Income from a family farm	33 551	35 297	42 113	38 104	43 745

a Dane szacunkowe.
a Estimated data.

According to 2019 estimates, the average income from a family farm for a full time family worker was 5.6% higher than in the previous year, but it was 26.3% lower than the average annual net payment in national economy.

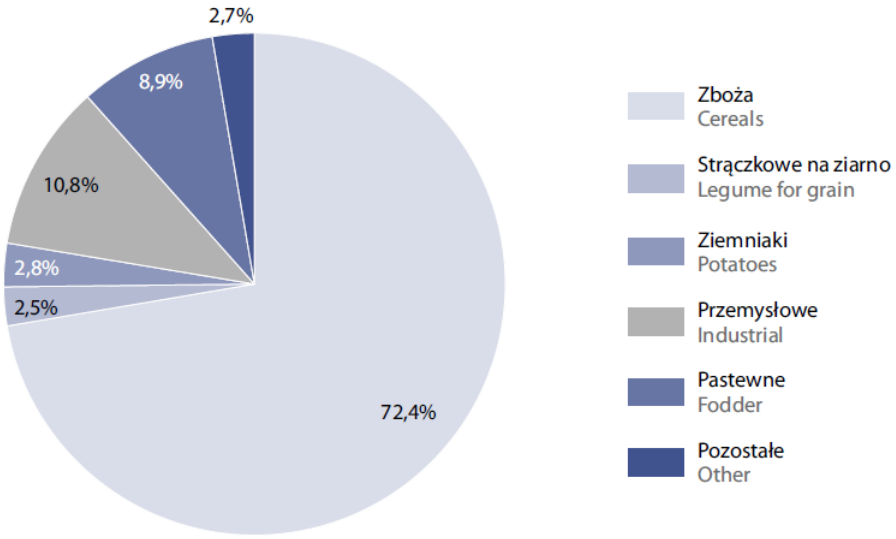
1.3. Crop production

In 2019, land prices in private turnover continued to grow. The average price of arable land increased by 6.4% to PLN 47.2 thousand per 1 ha. The highest land price per 1 ha growth dynamics concerned meadows classified as poor – from PLN 23.2 thousand to PLN 25.4 thousand and arable land classified as poor (sandy) from PLN 31.7 thousand to PLN 34.6 thousand (over 9%). The increase in price per 1 ha of arable land of medium class (rye-potato) – PLN 48.7 thousand and high class (wheat-beet) – PLN 58,3 thousand corresponded to 6.8% and 5.0% respectively. The smallest growth was recorded for meadows classified as good – by nearly 3% to PLN 31.2 thousand per 1 ha with PLN 30.3 thousand in the previous year.

In 2019, the total sowing area was ca. 10.9 million ha and increased by only ca. 68 thousand ha (0.1%) during the year.

The highest share in sowing structure was recorded for cereals – 72.4%, including wheat – 23.0% and triticale – 12.1%, followed by industrial crops – 10.8% and fodder crops – 8.9%.

Wykres 6. Struktura powierzchni zasiewów w 2019 r.
Chart 6. The structure of sowing area in 2019



The total cereals sowing area (basic cereals with cereal mixed, oats, barley, maize, buckwheat, millet and other cereals) increased by 1.1% to 7.9 million ha. Compared to the previous year, a significant increase in basic cereal sowing area was recorded for winter barley (10.8%), winter wheat (6.1%) and winter triticale (4.1%) and a decrease for spring triticale (10.0%) and spring wheat (4.9%). Winter rape sowing area increased by 4.3%, potato – by 4.1% and maze for grain – by 3.1%. Sugar beet sowing area increased by only 1.3%.

The field vegetable sowing area decreased significantly – by 10.6%, rape and spring turnip rape – by 16.0%.

Tablica 12. Plony i zbiory głównych ziemiopłodów w 2019 r.
Table 12. Yields and production of main corps in 2019

Wyszczególnienie Specification	Zbiory Production			Plony Yields		
	w mln t in million tonnes	2018=100	2011–2015[a]=100	w dt/ha in dt/ha	2018=100	2011–2015[a]=100
Zboża ogółem Cereals total	29,0	108,3	125,8	36,7	107,0	121,1
w tym zboża podstawowe z mieszankami zbożowymi of which basic cereals including cereal mixed	25,1	110,3	124,8	35,2	109,0	121,0
w tym of which						
pszenica wheat	11,0	112,1	135,8	43,9	108,1	121,3
żyto rye	2,5	113,6	119,6	27,2	112,4	129,5
jęczmień barley	3,4	110,7	122,8	34,6	110,9	116,9
owies oats	1,2	105,7	111,5	24,9	106,0	109,7
pszenżyto triticale	4,6	112,2	126,1	34,9	110,1	120,3
mieszanki zbożowe cereal mixed	2,5	98,7	99,2	26,5	105,2	110,4
Rzepak i rzepik Rape and turnip rape	2,4	107,8	122,3	27,1	103,8	122,1
Ziemniaki[b] Potatoes[b]	6,6	88,2	101,8	214	85,3	112,5
Buraki cukrowe Sugar beets	13,8	96,7	147,6	575	96,0	121,1
Warzywa gruntowe Field vegetables	3,8	93,7	88,3	x	x	x
Owoce z drzew[c] Tree fruits[c]	3,5	76,9	x	x	x	x
Owoce jagodowe[c] Berrys[c]	0,5	82,4	x	x	x	x

a Przeciętne roczne. b Łącznie ze zbiorami w ogrodach przydomowych. c W sadach.
a Average annual. b Including production from kitchen gardens. c In orchards.

The production of main crops in 2019 was higher than in the previous year. The increase in cereals and rape production resulted mainly from sowing land enlargement. Yields of all main crops were higher than in the previous year and above the average for 2011–2015, despite adverse weather conditions - high temperatures that significantly exceeded mean levels of many years coincided with very low precipitation. Agro-metrological conditions caused reductions in production of potato, sugar beet, field vegetables and hay from permanent pastures. Production of plants harvested green (fodder legumes, maize, small grain legumes) and eatable legumes also decreased. Production of fruit from trees and berry plantations in orchards was lower than in 2018.

Tablica 13. Skup ważniejszych produktów roślinnych
Table 13. Procurement of major crop products

Wyszczególnienie Specification	2010	2015	2017	2018	2019
Zboża w tys. t Cerelas in thousand tonnes	9 383,2	12 005,0	12 927,1	11 271,3	10 669,2
w tym zboża podstawowe[a] of which basic cereals[a]	8 275,4	9 896,7	10 488,6	8 628,4	8 028,3
pszenica whea	5 603,2	6 785,5	7 768,8	6 042,4	5 426,3
żyto rye	940,6	889,5	921,5	810,6	863,5
jęczmień barley	850,9	877,2	850,7	729,3	729,5
owies i mieszanki zbożowe oats and cereal mixed	103,4	117,2	114,5	134,8	101,7
pszenżyto triticale	777,3	1 227,2	833,1	911,3	907,3
kukurydza na ziarno maize for grain	650,2	2 098,9	2 416,2	2 623,0	2 624,3
Ziemniaki w tys. t Potatoes in thousand tonnes	1 143,4	1 530,4	1 818,9	1 727,2	1 559,0
Buraki cukrowe w mln t[b] Sugar beets in million tonnes[b]	9,6	10,7	14 724,5	14 823,3	14,4
Rzepak i rzepik w tys. t Rape and turnip rape in thousand tonnes	1 986,1	1 898,3	1 730,6	1 585,3	1 660,6
Warzywa w tys. t Vegetables thousand tonnes	1 370,5	1 652,0	1 847,9	1 830,7	1 606,3
Owoce w tys. t Fruit in thousand tonnes	1 615,1	2 554,7	2 085,9	3 150,0	2 745,7

a Łącznie z mieszankami zbożowymi. b Łącznie ze skupem ze zbiorów w 2018 r., który w I kwartale 2019 r. wyniósł 1100,4 tys. t.
a Including cereal mixed. b Including the procurement from the harvests in 2018 which in the first quarter 2019 amounted to 1100,4 thous t.

The **procurement volume of basic crops** in 2019 compared to 2018 lowered for total cereals (by 5.3%) and sugar beet (by 2.7%). The biggest reduction in supplies was recorded for fruit (by 12.8%), vegetables (by 12.3%) and potato (by 9.7%). Procurement volumes increased only for rape and turnip rape (4.5%).

Tablica 14. Wartość skupu produktów roślinnych (ceny bieżące)
Table 14. Procurement value of crop products (current prices)

Wyszczególnienie Specification	2010	2015	2017	2018	2019
	mln zł million PLN				
Ogółem **Total**	**41 324,5**	**57 040,2**	**65 308,6**	**64 243,0**	**65 594,6**
Produkty roślinne **Crop products**	**13 777,6**	**18 600,1**	**19 545,4**	**19 080,9**	**19 152,1**
w tym: of which:					
Zboża Cereals	5 241,3	7 492,6	8 087,5	7 712,5	7 185,5
w tym zboża podstawowe[a] of which basic cereals[a]	4 575,7	6 287,0	6 742,0	6 062,5	5 592,1
Ziemniaki Potatoes	417,7	610,9	673,9	735,5	909,4

a Podstawowych z mieszankami zbożowymi bez ziarna siewnego.
a Basic with cereal mixed without seed.

The total cereals sowing area in 2019 was ca. 7.9 million ha, including basic cereals with cereals mixed – ca. 7.1 million ha.

Compared to the previous year

• as for basic cereals with cereals mixed, spring cereals sowing area covered 2.7 million ha and was reduced by 0.1 million ha (4.2%) and winter cereals sowing area grew by ca. 0,2 million ha and covered 4.3 million ha,
• extensive cereals (rye, oats and cereals mixed) sowing area shank by ca. 52 thousand ha (2.2%) to ca. 2.3 million ha, whereas intensive cereals (wheat, barley and triticale) were grown on over 4.8 million ha – an area close to the one of previous year.

The total cereals production was estimated at 29.0 million - ca. 8.3% more than in the previous year. The production of basic cereals with cereals mixed was estimated at 25.1 million – ca. 10.3% more than in 2018. The share of extensive cereals (rye, barley, cereals mixed) in the total production of basic cereals with cereals mixed decreased year to year and amounted to 24.3% (25.6% in 2018), whereas the share of intensive cereals (wheat, barley and triticale) increased to 75.5% (74.4% in 2018).

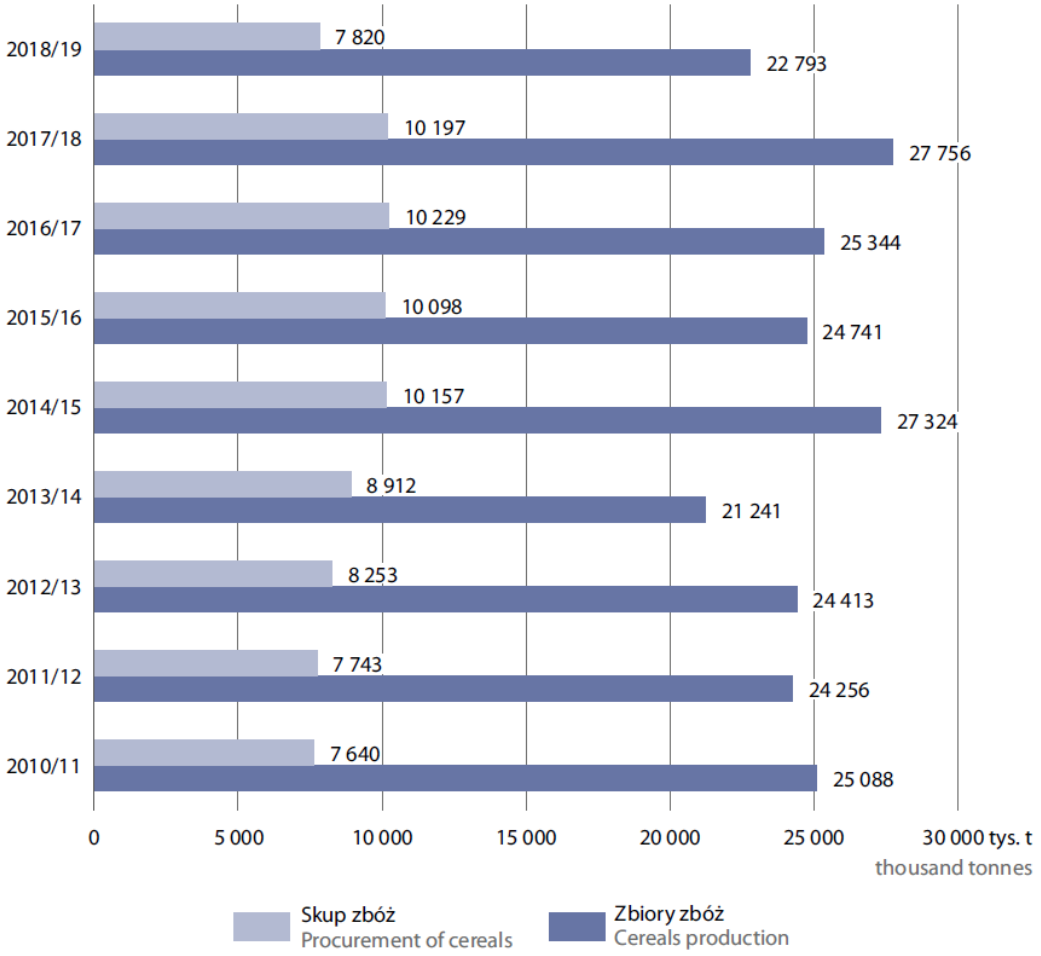
Tablica 15. Skup zbóż w roku gospodarczym 2018/2019
Table 15. Procurement of cereals in the farming year 2018/2019

Wyszczególnienie Specification	VII–XII 2018		I–VI 2019	
	w tys. t in thousand tonnes	VII–XII 2017=100	w tys. t in thousand tonnes	I–VI 2018=100
Ziarno zbóż[a] **Cereals[a]**	**5 175,8**	**76,9**	**2 593,8**	**76,5**
w tym: of which:				
pszenica wheat	3 535,5	73,8	1 937,1	77,9
żyto rye	482,3	76,5	233	72,1
Kukurydza ogółem Maize total	1 996,1	112,3	753,1	120,1

a Podstawowych z mieszankami zbożowymi bez ziarna siewnego.
a Basic with cereal mixed without seed.

With an increased domestic supply of grain, purchase prices of most cereal types were relatively stable. They grew slightly (less than 1%), except for wheat, the price of which grew ca. 1% during the year. Compared to the previous year, grain prices in marketplaces increased significantly (between ca.10% and 12%).

Wykres 7. Zbiory i skup zbóż podstawowych z mieszankami zbożowymi
Chart 7. Production and procurement of basic cereals with cereal mixed



Compared to 2018, the total rape and turnip rape sowing area increased by3.6% to 0.9 million ha. Production of rape and turnip rape grew to 2,4 million t (7.8% year to year).

Rape and turnip rape harvest started in the second decade of July and peaked in the third decade of the month. In the first half of August, rape and turnip rape production had been completed across the country.

The potato sown area in 2019 was moderately (4.1%) bigger than in the last year and covered ca. 302 thousand ha. With an increased area and yield per 1 ha (estimated yield - 214 dt/ha, 37 dt/ha or 14.7% lower than in the previous year), potato production amounted to 6.6 million t was 11.4% lower. Potato yield potential was limited by high temperatures and very low, unevenly distributed precipitation. Due to the limited potato supply, its average procurement price grew by 37.0% in comparison to the previous year. In marketplaces eatable potato cost nearly twice as much as in 2018.

High temperatures in June and a significant precipitation deficit prevailed at the time of tuber formation and initial tuber bulking (the time of the highest demand for water) and significantly reduced their yield potential. Potato digging started in August and finished in the second half of October. The quality of potato tubers in 2019 was low with a big share of small and deformed tubers.

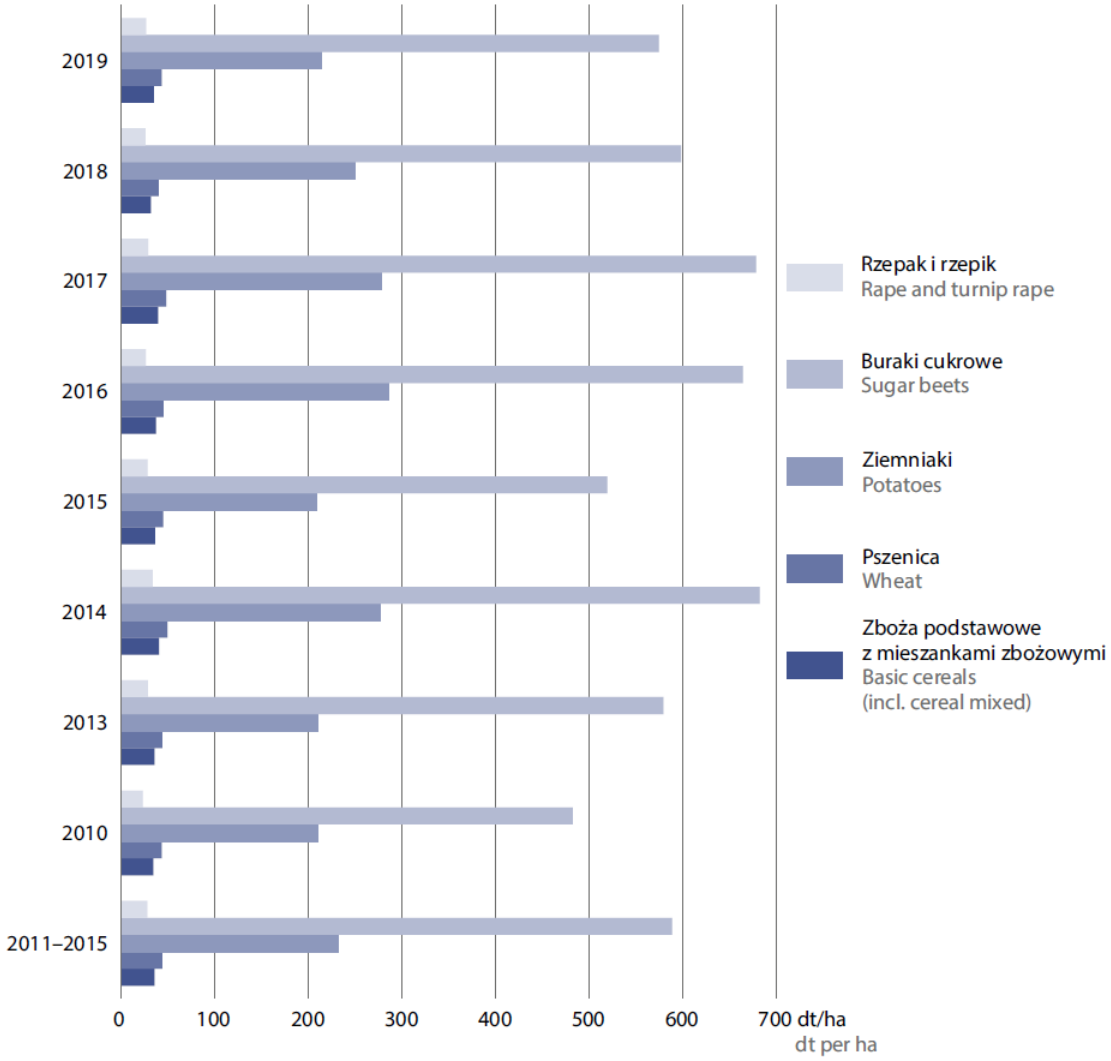
The sugar beet sown area was close to the one in the previous year - ca. 240 thousand ha. The sugar beet production was estimated at 13.8 million t and it was 3.3% lower than in 2018.

Weather conditions did not favour dynamic growth of sugar beet root. High temperatures with low, unevenly distributed precipitation hindered crop growth and development. Soil wetness improved in September,

causing leaf and root mass reconstruction in some plantations, which however occurred at the cost of polarisation. The beet campaign started in September, developed according to the schedule and was completed in the first half of November. With limited supply, the average sugar beet procurement price was exceeded that of the previous year by 1.4%.

Yields of permanent meadows expressed in hay amounted to 12.3 million t and were 3.4% lower than in 2018, whereas meadow grass yields expressed in hay were estimated at 44.6 dt/ha. In many parts of the country plant vegetation and biomass growth conditions in meadows were not favourable. Meadow plant vegetation conditions after the first cut were mostly disadvantageous. Very high temperatures and limited precipitation after the first cut did not promote intensive meadow plant growth. In regions where soil moisture favoured meadow sward growth after the first cut, in the first half of July the second meadow hay harvest took place. In regions of unfavourable precipitation distribution grass from the third cutting was not collected or only care cutting was made.

Wykres 8. Plony głównych ziemiopłodów rolnych
Chart 8. Yields of major agricultural crops



Tablica 16. Zbiory warzyw gruntowych
Table 16. Field vegetables production

Wyszczególnienie Specification	2011–2015[a]	2018	2019		
	w tys. t in thousand tonnes			2011–2015[a]=100	2018=100
Ogółem Total	**4 358,4**	**4 109.0**	**3 849,8**	**88,3**	**93,7**
Kapusta Cabbage	1 075,7	913.2	836,9	77,8	91,6
Kalafiory Cauliflowers	226,6	219.9	206,9	91,3	94,1
Cebula Onion	613,9	562.9	535,4	87,2	95,1
Marchew jadalna Edible carrot	793,0	726.4	678,3	85,5	93,4
Buraki ćwikłowe Beetroots	333,6	298.2	280,9	84,2	94,2
Ogórki Cucumbers	264,0	245.4	222,3	84,2	90,6
Pomidory Tomatoes	262,5	253.0	240,5	91,6	95,1
Pozostałe[b] Others[b]	789,2	889.9	848,6	107,5	95,4

a Przeciętne roczne. b Pietruszka, pory, selery, rzodkiewka, sałata, rabarbar, szparagi, koper i inne.
a Average annual. b Parsley, leeks, celery, radish, lettuce, rhubarb, asparagus, fennel and others.

Field vegetable production, due to long-lasting drought that had started already in springtime, was ca. 6% lower than in 2018 and amounted to 3.8 million ton. Production of all basic filed vegetables was reduced. Only in irrigated plantations yields were satisfactory. The biggest yield decrease concerned cucumber (over 9%), cabbage (ca. 8%), edible carrot (ca. 7%) and cauliflower and beetroot (ca. 6%) and the lowest – tomato (ca. 5%). The weather in September and October favoured especially higher yields of late varieties of cabbage, cauliflower and beet. Among field vegetables, the highest production was recorded for cabbage – 0.8 million ton, edible carrot – 0.7 million ton and onion – 0.5 million ton. Procurement prices of basic varieties of vegetables were mostly higher than in 2018. The price of 1 dt of cabbage was PLN 136 (90.5% increase), onion – PLN 160 (49.4% increase), beetroot – PLN 47 (28.1% increase). More costly than in 2018 were also tomatoes – PLN 192/dt (10.0%) and cucumbers – PLN 211 /dt (9.3%). Less costly was carrot - PLN 53 (1.4%) as well as other vegetables (e.g. parsley, Brussels sprouts, sweet maize) - PLN 143 (3.4%).

Production of vegetables under glass, with similar sown area, during both winter and autumn amounted to 1169,2 thousand t and was only 0.7% higher than in the previous year.

Tablica 17. Zbiory owoców z drzew w sadach
Table 17. Fruit tree production in orchards

Wyszczególnienie Specification	2018	2019	
	w tys. t in thousand tonnes		2018=100
Ogółem Total	**4 494,8**	**3 456,4**	**76,9**
Jabłonie Apple trees	3 999,5	3 080,6	77,0
Grusze Pear trees	90,9	67,6	74,3
Śliwy Plum trees	121,1	95,0	78,4
Wiśnie Sour cherry trees	200,6	151,9	75,7
Czereśnie Sweet cherry trees	60,0	44,4	74,1
Brzoskwinie Peaches	10,6	8,5	80,7
Morele Apricots	3,6	3,1	87,2
Orzechy włoskie Walnuts trees	8,5	5,2	61,9

The fruit tree production in 2019 amounted to 3.5 million t and was ca. 23% below the previous year's record level. The last fruit tree vegetation period was marked by exceptionally unfavourable conditions that significantly limited the yield of most species. In numerous plantations losses caused by black frost in spring, during blooming and fruit setting, were very high. Inadequate soli wetness, especially during spring and summer, and tree overloading with record amounts of fruit in the previous year, contributed to yield reduction in specific plantations. Apple orchards' production was estimated at ca. 3 million t, which also was ca. 23% below the very high production of the previous year. Production from pear orchards was assessed to be over 67 thousand t (ca. 26% less than in 2018), whereas pear - ca. 95 thousand t (over 20% less). According to estimations, cheery orchards produced ca. 152 thousand t (ca. 24% less than in the previous year) and sweet cheery - ca. 44 thousand t (nearly 26% below the 2018 record level). In the current season, the total production of peach, apricot and walnuts was estimated at ca. 17 thousand t.

The production of fruit from bushes in orchards and berry plantation was only 0.5 million t, (ca. 18% less then in 2018). The strongest production decrease in comparison to the previous season was estimated for raspberry (nearly 35%). Summer varieties suffered cold injury during winter. In some plantations spur blight of raspberry occurred. Insufficient soil wetness contributed to yield restraining. The production was estimated at over 75 thousand t. The total currant (both black and coloured) production was estimated at nearly 126 thousand t (ca. 23% below the previous year). The gooseberry production, similarly to previous years, was estimated at ca. 9.6 thousand t (16% less than in the previous year). The strawberry yield (including kitchen gardens) was estimated at over 177 thousand t (ca. 10% less than in the previous year). Some plantations, especially early species, were injured by spring frost. Insufficient soil wetness and very high temperatures in June adversely impacted the yield. Summer strawberry harvesting was slightly shortened, especially in non-irrigated plantations, whereas the yield of everbearing varieties was definitely better. The production of other fruit trees and fruit from berry plantations in orchards were estimated at over 87 thousand t (only ca. 3% less than in the very good 2018). Most fruit varieties in this group however had significantly poorer yields than in the previous year. On the other hand, fruit production areas have been extended.

Procurement prices of tree fruit, fruit from bushes and berry plantations in most cases were significantly higher than last year (by 28.4% on average). Prices of cheery (PLN 299 /1 dt) and chokeberry (PLN 140/dt) increased nearly three times. Raspberry price doubled (PLN 652/dt). Sweet cheery and peach price increased by ca. 85% (PLN 812/dt and PLN 432/dt respectively). Only the price of strawberry PLN 385/dt dropped down (1.4%).

Tablica 18. Zbiory owoców z plantacji jagodowych oraz z krzewów owocowych w sadach
Table 18. Fruit production from berry plantations and fruit bushes in orchards

Wyszczególnienie Specification	2018	2019	
	w tys. t in thousand tonnes		2018=100
Ogółem **Total**	**577,7**	**476,3**	**82,4**
Truskawki i poziomki Strawberries and wild strawberries	195,6	177,0	90,5
Maliny Raspbaries	115,6	75,7	65,4
Porzeczki Currants	164,6	126,2	76,6
Agrest Gooseberries	11,5	9,6	83,5
Pozostałe[b] Other[b]	90,3	87,8	97,2

a Przeciętne roczne. b Aronia, borówka wysoka oraz inne krzewy owocowe i plantacje jagodowe.
a Average annual. b Chokeberry, highbush blueberry and other fruit bushes and berry plantations.

In 2019, the total area of fodder crops cultivated in the main crop, including permanent grasslands, amounted to 4.1 million ha and decreased by ca. 70 thousand ha (1.7%) year to year. The decrease in fodder crops area resulted from the limitation of field fodder crops (4.8%).

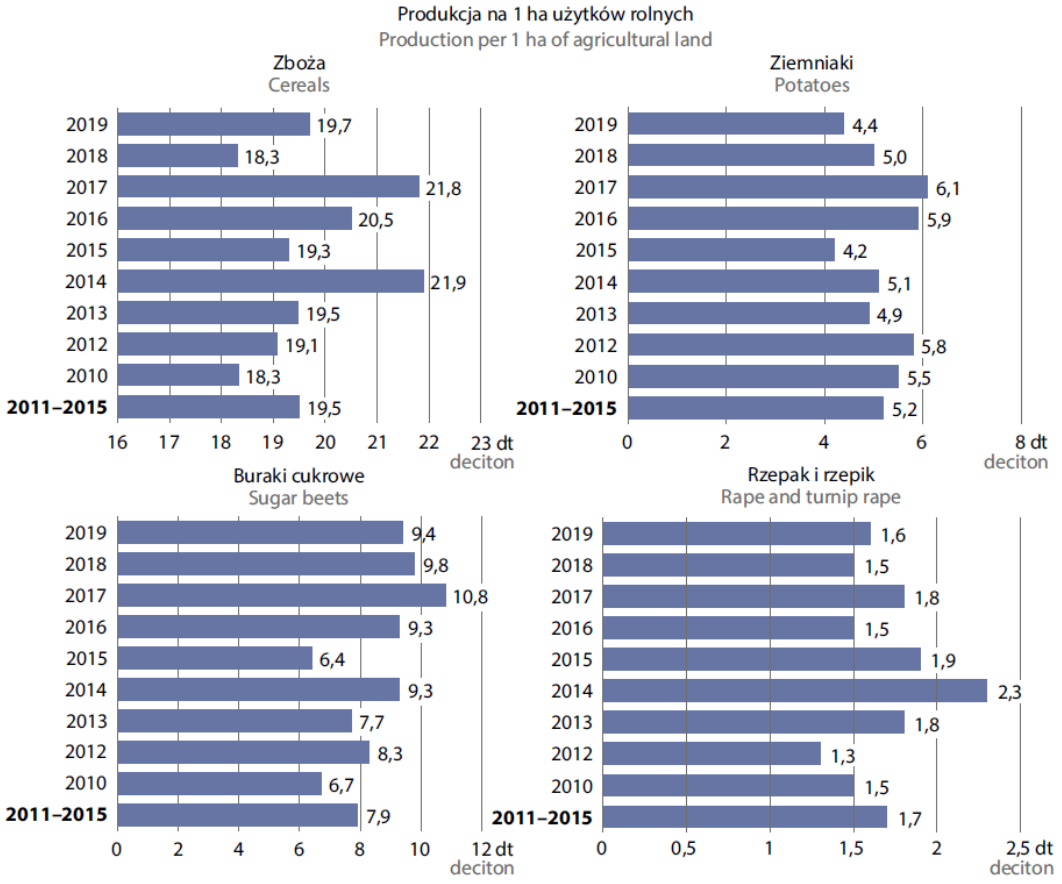
The production of fodder crops compared to the previous year increased in the group of feed root plants odder by 23.1%, whereas the production area of small-seed legumes, maize for green feed and permanent grassland increased.

Tablica 19. Zbiory roślin pastewnych na paszę
Table 19. Production of fodder crops

Wyszczególnienie Specification	2011–2015[a]	2018	2019		
	w tys. t in thousand tonnes			2011–2015[a]=100	2018=100
Okopowe pastewne Feed root plants	649,5	203,5	250,4	38,5	123,1
Strączkowe pastewne Feed pulses	423,9	320,3	302,6	71,4	94,5
Motylkowe drobnonasienne[b] Smallseeds legumes[b]	9 286,9	7 664,3	6 650,2	71,6	86,8
Kukurydza na zielonkę Maize for green feed	22 912,9	25 629,4	24 331,9	106,2	94,9
Trwałe użytki zielone[c] Permanent grasslands[c]	14 955,7	14 006,2	13 501	90,3	96,4
łąki trwałe permanent meadows	12 808,0	12 765,1	12 334,6	96,3	96,6
pastwiska trwałe permanent pastures	2 147,8	1 241,2	1 166,4	54,3	94,0

a Przeciętne roczne. b Łącznie z trawami i pastwiskami polowymi. c W przeliczeniu na siano.
a Average annual. b Including grass and field pasture. c In terms of hay.

Wykres 9. Produkcja ważniejszych produktów roślinnych
Chart 9. Production of major crop products



1.4. Animal production

The animal production – with stable cereal procurement prices and increasing prices in marketplaces and growing prices of feeds - in 2019, was shaped mainly by export opportunities and changes in prices in European agricultural markets that strongly correlated with prices in domestic markets. Cattle stocks and pig stocks increased. Poultry production continued to develop.

In 2019, production of animals for slaughter in post-slaughter warm weight, balanced with export and import of live animals, above all due to reduced production of live pigs (5.4%) and cattle (1.1%) and higher production of live poultry (4.1%), was close to the one in the previous year (99.9%). The reduction in live pigs production was a consequence of pig stock decrease noticed at the end of 2018 due to adverse conditions for pig fattening throughout 2018.

Chicken egg production increased by 2.1% and milk by 2.3% year to year.

Tablica 20. Sprzedaż pasz[a] stosowanych w żywieniu zwierząt gospodarskich
Table 20. Sales of feeds[a] used in feeding livestock

Wyszczególnienie Specification	2010	2015	2016	2017	2018	2019
	w t in tonnes					
Ogółem **Total**	**7 304 047**	**9 394 073**	**9 515 023**	**10 468 295**	**10 513 836**	**10 498 500**
Do karmienia: Feeding:						
trzody chlewnej pigs	1 640 112	1 889 904	2 071 835	2 420 532	2 536 404	2 417 200
bydła cattle	1 007 315	878 983	916 805	1 097 882	1 134 115	1 150 300
drobiu poultry	4 224 643	6 085 277	5 989 966	6 361 717	6 420 544	6 597 200
pozostałych zwierząt[b] other animals[b]	159 684	295 501	289 074	228 973	240 011	174 400
Przedmieszki Masterbatch	272 293	244 408	247 343	359 191	182 762	159 400

a Dostawy pasz na rynek krajowy przez producentów i importerów. b Konie, owce, ryby.
a Feed supplies for internal market by producers and importers. b Horses, sheep, fish.

In 2019, with the total feed price increase of 3.8%, the sale prices of industrial feed for farm animals was similar to the one in the previous year and amounted to 10,499 thousand t (10,514 thousand t in 2018). Smaller quantities of feed were bought by pig producers – 2,417.2 thousand t (4.7%). Higher than in 2018 were the sales of cattle feed (1,150.3 thousand t) and poultry feed (6,597.2 thousand t) – by ca. 1.4% and 2.8% respectively. Following high sales of pre-mixed feed in 2017 (annual growth above 45%), in 2018 and 2019 its sale decreased (by 50.9% and 12.8% respectively) and amounted at 159 thousand ton in the analysed year. In the total fodder sales, as usually, the highest share - 62.8% had feed for poultry. The share of feed for pigs was 23,0%, cattle – 11.0% and other animals – 1.7%. The value of feed sold was PLN 14,126 million and remained close to the previous year's level (PLN 14132 million).

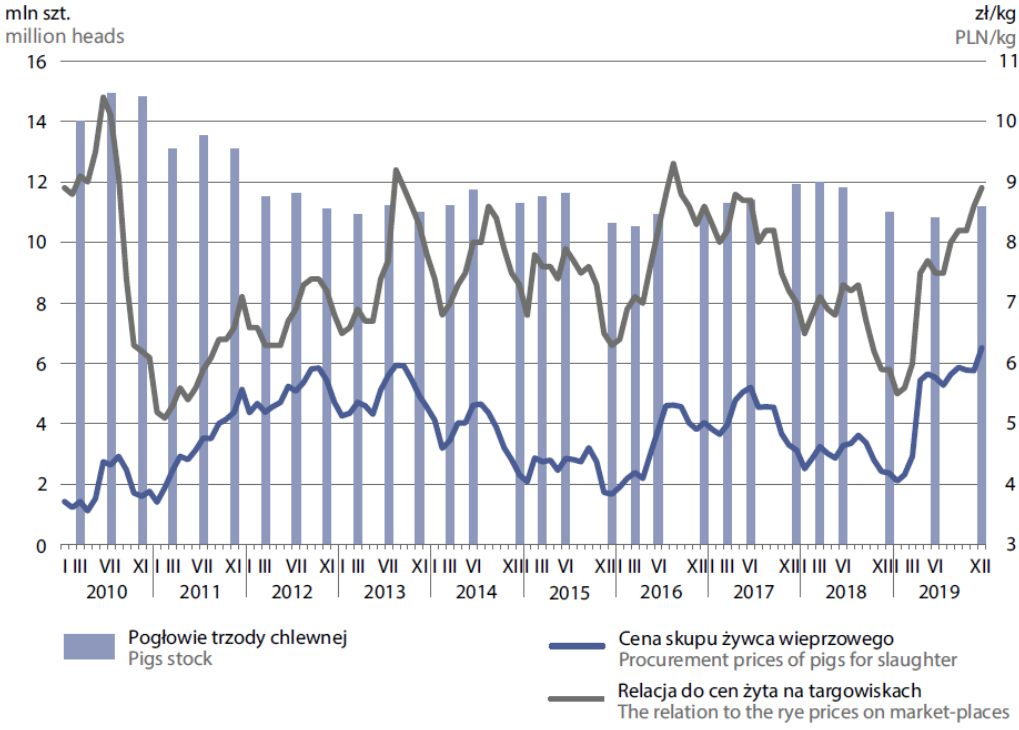
Tablica 21. Skup żywca rzeźnego w przeliczeniu na mięso
Table 21. Procurement of animals for slaughter in terms of meat

Wyszczególnienie Specification	I–VI 2019		I–XII 2019	
	w tys. t in thousand tonnes	I–VI 2018 =100	w tys. t in thousand tonnes	I–XII 2018=100
Ogółem[a] **Total[a]**	**2 188,2**	**95,2**	**4 558,0**	**96,9**
w tym: of which				
wołowy (z cielętami) beef (with veal)	199,7	89,2	417,4	88,5
wieprzowy pork	823,3	92,6	1 679,5	90,7
drobiowy poultry	1 161,4	98,3	2 454,1	103,4

a Wołowy, cielęcy, wieprzowy, barani, koński i drobiowy: łącznie z tłuszczami (w wbc).
a Beef, veal, pork, sheep, horse and poultry: including fats (in post-slaughter warm weight).

Increasing live pigs prices in the German market were reflected in domestic market changes. The main reason of the price rise was growing import of pork products by China, where due to ASF spread the pig population had been reduced by one third. Domestic prices of live pigs, strongly correlating with prices in the European market, after the 2018 decrease, showed a strong upward trend. At the beginning of 2019, the pork market was characterised by low prices, however at the turn of April, prices started to grow dynamically. They remained high till the end of 2019 and in December multi-year records were broken. Following seasonal price rise, the average live pig procurement price in 2019 was PLN 5.39 /kg - 20.3% higher than in the previous year. The average price of 1 piglet (ca. PLN 200) was also higher (10.1%) than the year before.

Wykres 10. Ceny skupu żywca wieprzowego i ich relacja do cen żyta oraz pogłowie trzody chlewnej
Chart 10. Procurement prices of pigs for slaughter and their relation to the rye prices and pigs population



Production and market conditions of pig breeding improved throughout the year and live pig prices increased. Animal production profitability grew noticeably year to year.

At the end of the year, cereal price reduction further improved the situation in the livestock market. The relation of livestock procurement to rye prices in marketplaces in 2019 was between 5.5 in January and 8.9 in December (7.3 and 5.9 respectively in 2018).

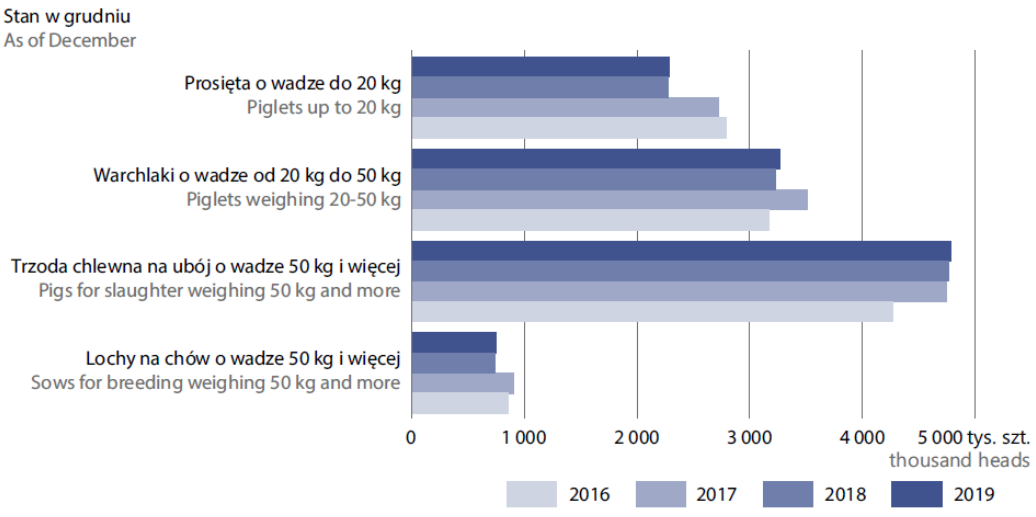
Tablica 22. Pogłowie trzody chlewnej[a]
Table 22. Pigs stock[a]

Wyszczególnienie Specification	XII 2018		VI 2019		XII 2019		
	w tys. szt. in thousand heads	XII 2017=100	w tys. szt. in thousand heads	VI 2018=100	w tys. szt. in thousand heads	XII 2018=100	w % in %
Ogółem Total	**11 027,7**	**92,6**	**10 781,4**	**91,2**	**11 215,5**	**101,7**	**100,0**
Prosięta do 20 kg Piglets up to 20 kg	2 278,9	83,7	2 418,7	88,2	22 88,2	100,4	20,4
Warchlaki od 20 kg do 50 kg Piglets between 20 and 50 kg	3 228,7	92,0	3 043,6	88,6	3 338,7	103,4	29,8
Trzoda chlewna o wadze 50 kg i więcej: Pigs of 50 kg and more:							
na ubój for slaughter	4 761,9	100,2	4 550,3	95,5	4 817,5	101,2	43,0
na chów for breeding	758,3	82,0	768,7	86,7	771,1	101,7	6,8
w tym lochy of which sows	744,6	82,0	754,8	86,7	756,8	101,6	6,7
w tym prośne of which mated sows	501,6	81,3	530,6	90,9	519,5	103,6	4,6

a Według stanu na dzień: 1 VI, 1 XII.
a As of: 1 VI, 1 XII.

The 2019 increase in pig population was a result of, above all, pig breeding profitability improvement caused by live pig procurement price increase.

Wykres 11. Struktura pogłowia trzody chlewnej
Chart 11. Structure of pigs population

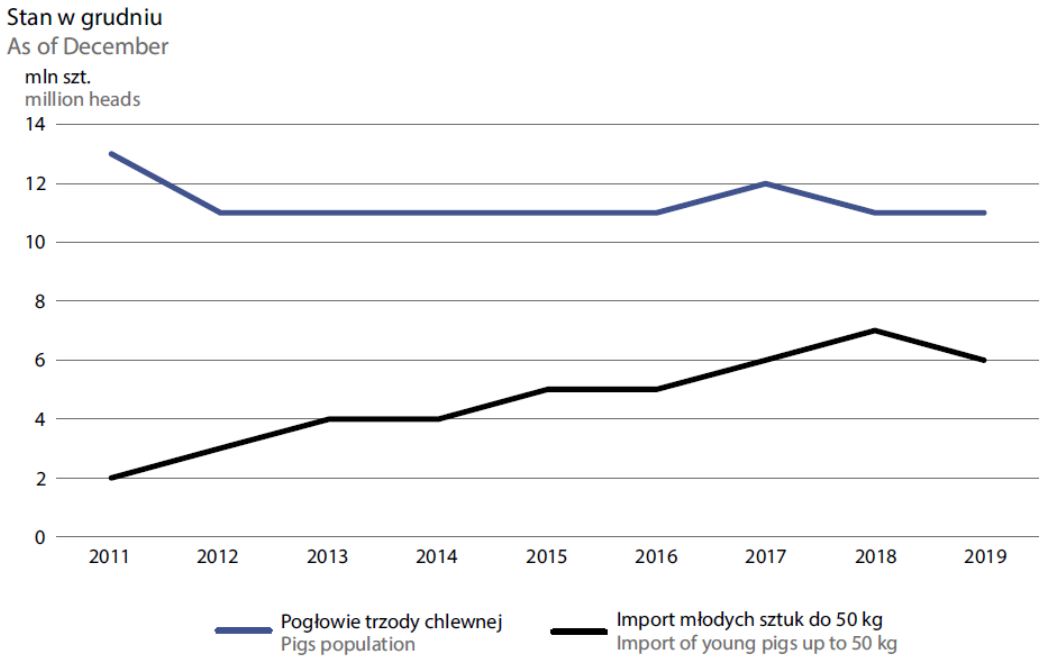


At the beginning of December 2019 r. the pig population amounted to 11,215.5 thousand and was 187.8 thousand bigger that in the same month of the previous year and compared to June 2019, it increased by 434.1 thousand. The annual growth was reported for all utility groups. The biggest increase occurred in piglets between 20 kg and 50 kg (110.0 thousand), fattening pigs for slaughter (55.6 thousand), pigs for

breeding (12.8 thousand, including 12.2 thousand sows, of which 17.9 thousand matted sows). The smallest increase occurred in piglets up to 20 kg – 9.3 thousand.

The small increase in the population of domestic piglets up to 20 kg remained to be compensated for by import of young pigs of up to 30 kg. In 2019, the young pig import amounted to 6,317.9 thousand and was 7.8% higher than in the previous year. In December 2019, the number of pigs per 100 ha UAA was 76.4 with 80.0 in the previous year, the number of sows per 100 ha UAA was 5.2 on average with 5.1 in 2018.

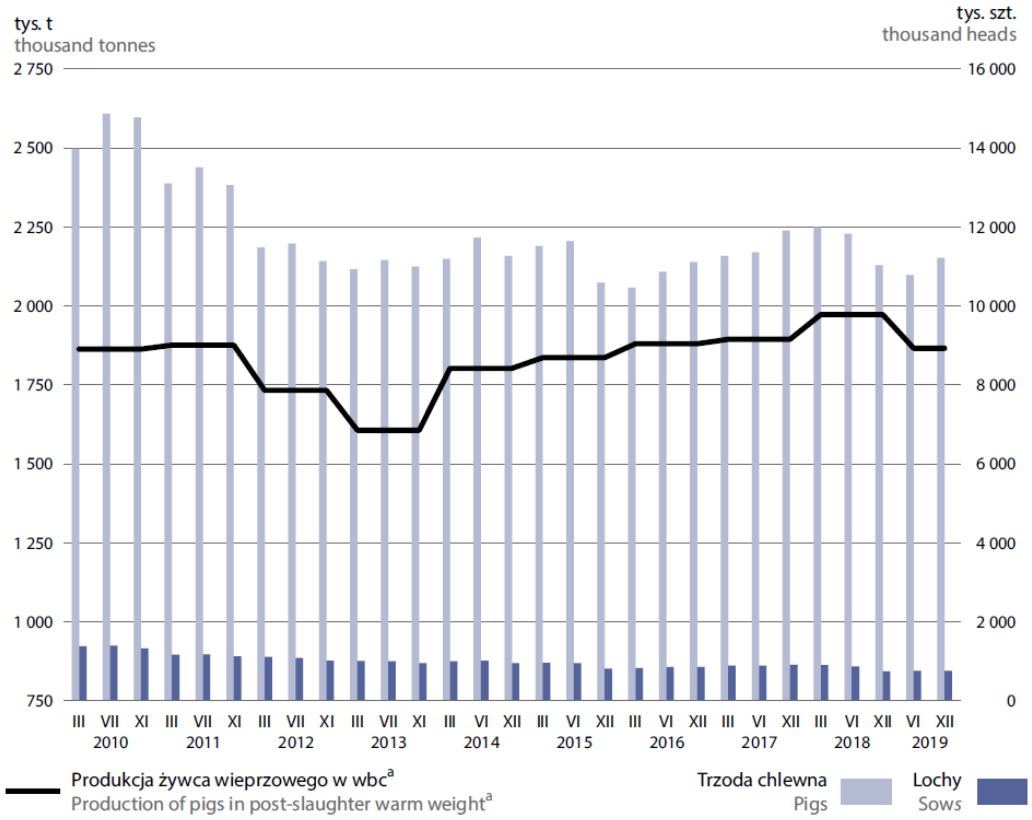
Wykres 12. Pogłowie trzody chlewnej i import młodych sztuk do 50 kg
Chart 12. Pigs population and import of young pigs up to 50 kg



An analysis of pigs stock registered in December 2019 shows that in comparison to December 2018 the share of pigs for breeding remained the same (the share of sows decreased by 0.1 percentage point and the share of mated sows increased by 0.1 percentage point, the share of piglets and pigs for slaughter decreased by 0.3 and 0.2 percentage point respectively. Only the share of piglets between 20 kg and 50 kg increased (0.5 percentage point). The increase in the population of piglets between 20 kg and 50 kg with unchanged population of pigs for breeding is an evidence of continued interest in contracted pig breeding. The system of contracted pig breeding is implemented mainly by farmers who have an adequate infrastructure and are able to take into their farms big groups of animals at a time. Based on the contracts made, producers breed young pigs imported mainly from EU countries.

The situation in pigs breeding was adversely affected by ASF cases and immediate killing of infected and potentially infected in-contact pigs. According to the General Veterinary Inspectorate, between the disease outbreak and December 2019, 262 outbreaks of ASF were reported. A sign of further disease spreading in 2019 were 48 new outbreaks. A pig breeder who receives a ban on pig rearing can apply to the Agency for Restructuring and Modernisation of Agriculture for financial support due to lost profits from pig production.

Wykres 13. Pogłowie trzody chlewnej i produkcja żywca wieprzowego
Chart 13. Pigs population and production of pigs for slaughter



a Od 2018 r. zmieniono współczynniki przeliczeniowe żywca rzeźnego w wadze bitej ciepłej (wbc), dane nie są porównywalne z danymi za lata poprzednie.
b Since 2018 change of conversion rates in post-slaughter warm weight, data incomparable with data for previous years.

The national production of pigs in post-slaughter warm weight (1866 thousand ton) compared to 2018 decreased by 5.4%. The share of pigs for slaughter (expressed in kg of live weight) in the total production of animals for slaughter was 33.7% (35.6% in 2018).

In December 2019, the pig population (in relation to 2018) increased in 9 provinces. The biggest growth was recorded in: pomorskie (11.3%), mazowieckie (7.1%), łódzkie (6.3%) and podlaskie (6.2%). The biggest reduction in the pig stock was recorded in: dolnośląskie (19.6%), lubuskie (14.7%) and opolskie (13.2%). The share of wielkopolskie province in the national pig stock was still the biggest and amounted to 35.9% vs. 36.0% in 2018. The number of pigs per 100 ha UAA was also the highest in wielkopolskie and amounted to 228.5 vs. 234.7 in 2018. The lowest share in the national pig stock was recorded in lubuskie (1.1%), małopolskie and podkarpackie (1.2%), dolnośląskie (1.6%), śląskie and świętokrzyskie (1.8% each). Regionalisation of pig breeding is clearly visible. In December 2019, 67.3% (66.5% in 2018) of the stock was maintained in four neighbouring provinces: wielkopolskie – 35.9%, mazowieckie – 11.1%, łódzkie – 10.5% and kujawsko-pomorskie – 9.8%.

The national production of poultry, conditioned by growing export, in post-slaughter warm weight amounted to 2,704 thousand t and was 4.1% higher than in 2018. The share of poultry for slaughter (expressed in kg of live weight) in the total production of animals for slaughter was 50.6% and increased by 2.1 percentage point year to year.

The poultry market was relatively stable. Poland strengthened its leading position in poultry production, both with respect to broiler chickens and turkey. With constantly growing competition in the main markets, the increase in production of poultry was maintained. The average price of poultry for slaughter between January and December 2019 - with continued growth of domestic supply (by 3.4%) – amounted to PLN 3.90/kg and was 3.5% higher than in the previous year.

Similarly to poultry, Polish egg production grew and in 2019 amounted to 12,056 million units. Compared to the previous year it was 2.1% higher.

The performance efficiency of laying hens increased. The average annual number of eggs from one laying hen was 220 vs. 217 in 2018. The procurement of chicken eggs for consumption amounted to 823 million. It was 9.7% higher than in the previous year and constituted 6.8% of the total production.

The national production of cattle stock including calves expressed as meat (in post-slaughter warm weight) was 566 thousand t and decreased by 1.0%. The procurement of cattle stock including calves (617.1 thousand t) was 11.2% lower. Livestock prices were lower than in the previous year. The mean annual procurement price of cattle without calves (PLN 6.33/kg) lowered by 3.7%. The year 2019 in the beef market started unfavourable for livestock producers due to the scandal associated with sick cow slaughtering for meat in one of Polish meat plants. Spreading information about the scandal reduced demand for Polish beef in foreign markets. Livestock purchase prices lowered during the year mainly due to limited beef export volume from Poland.

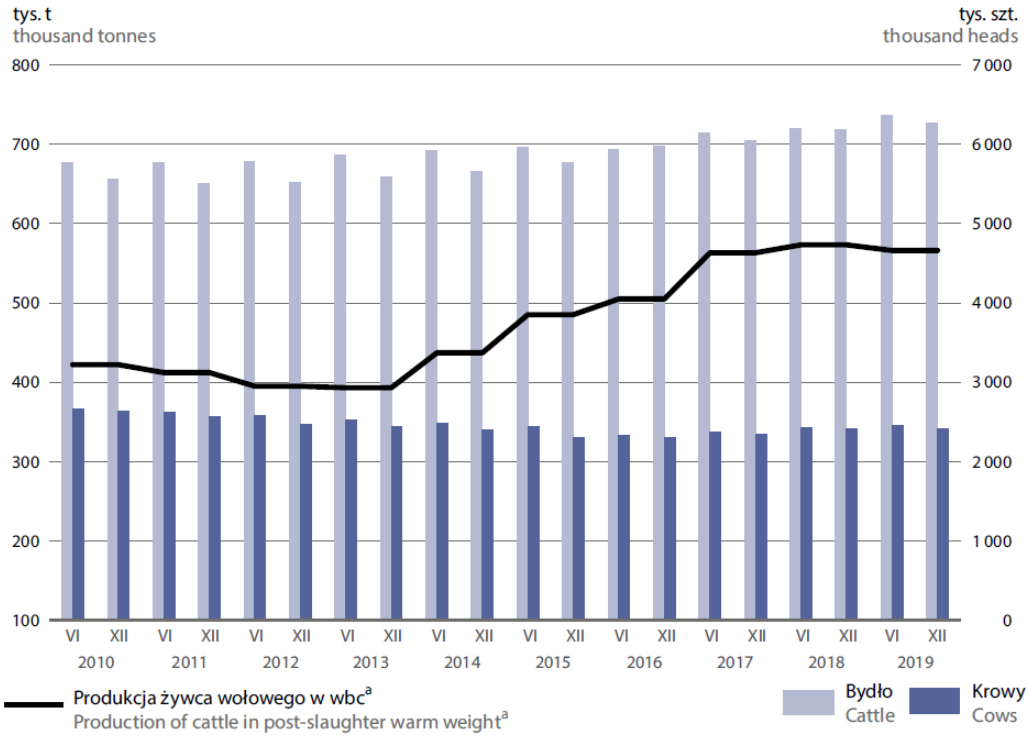
Tablica 23. Pogłowie bydła
Table 23. Cattle stock

Wyszczególnienie Specification	VI 2019			XII 2019		
	w tys. szt. in thousand heads	VI 2018=100	w % in %	w tys. szt. in thousand heads	XII 2018=100	w % in %
Ogółem **Total**	**6 358,0**	**102,5**	**100,0**	**6 261,6**	**101,3**	**100,0**
Cielęta poniżej 1 roku Calves less than 1 year old	1 770,8	105,0	27,9	1 747,6	102,2	27,9
Młode bydło od 1 do 2 lat Bovines aged between 1 and 2	1 767,6	101,9	27,8	1 756,5	101,4	28,1
Bydło 2-letnie i starsze Bovines aged 2 years and over	2 819,6	101,4	44,3	2 757,5	100,6	44,0
w tym krowy of which cows	2 461,0	101,3	38,7	2 406,3	99,5	38,4
w tym mleczne of which dairy	2 221,5	99,5	34,9	2 166,9	97,9	34,6

Deterioration of cattle stock production profitability, resulting mainly from livestock price reduction and feed price increase, caused slowdown in cattle population growth.

In December 2019, the total cattle population amounted to 6,261.6 thousand and was 1.3% bigger (by 78,3 thousand) than in the same period in 2018. Most utility groups – except for cows - were reduced in size. Studies showed a reduction in cow population during the year to 2,406.3 thousand (0.5%). The share of cows in the herd was reduced by 0.7 percentage points during the year, which might forecast calf population decrease.

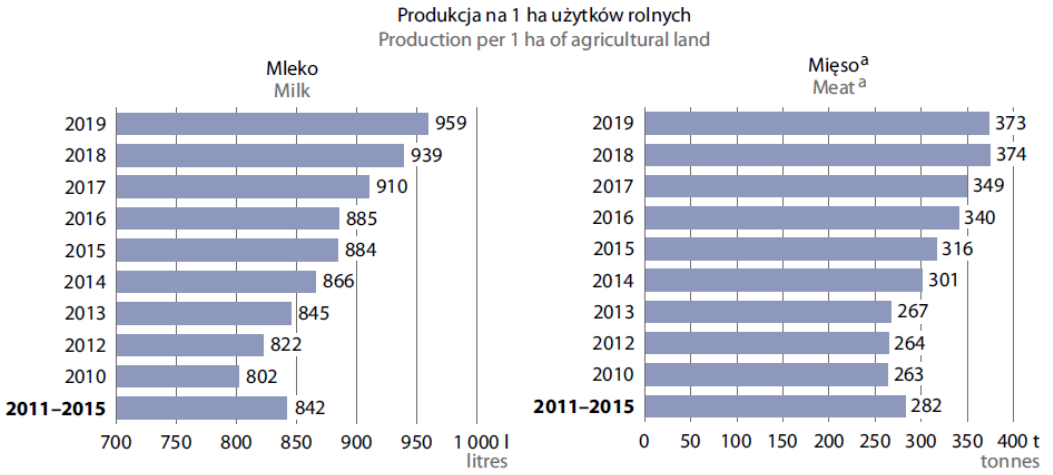
Wykres 14. Pogłowie bydła i produkcja żywca wołowego[a]
Chart 14. Cattle population and production of cattle for slaughter[a]



a Łącznie z cielęcym. Od 2018 r. zmieniono współczynniki przeliczeniowe żywca rzeźnego w wadze bitej ciepłej (wbc), dane nie są porównywalne z danymi za lata poprzednie.
a Including calves. Since 2018 change of conversion rates in post-slaughter warm weight, data incomparable with data for previous years.

The cattle population, measured in December 2019, increased in 12 provinces. The increase was most dynamic in warmińsko-mazurskie (4.7%), dolnośląskie (4.1%) and pomorskie (3.9%).
Cattle population decreased in 4 provinces. The decrease was most pronounced in podkarpackie (8.0%) and małopolskie (2%). In other provinces the total cattle population decreased by less than 2%. Similarly to previous years, podlaskie had the highest number of cattle per 100 ha UAA – 93.0 (93.9 in 2018) with the national average being 42.6.

Wykres 15. Produkcja mięsa i mleka
Chart 15. Production of meat and milk

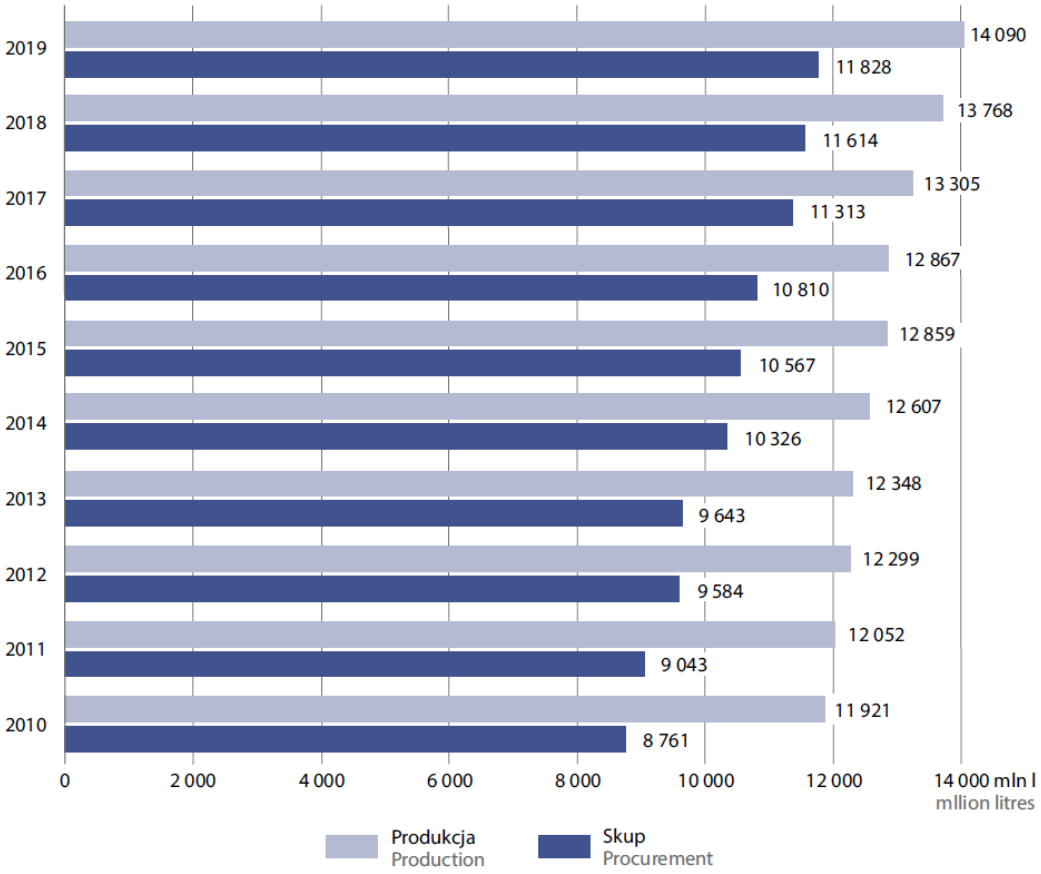


a Wołowe, cielęce, wieprzowe, baranie, końskie, drobiowe, kozie, królicze i dziczyzna; łącznie z tłuszczami i podrobami; w wadze poubojowej ciepłej. Od 2018 r. zmieniono współczynniki przeliczeniowe żywca rzeźnego w wadze bitej ciepłej (wbc), dane nie są porównywalne z danymi za lata poprzednie.
a Beef, veal, pork, mutton, horseflesh, poultry, goat, rabbit and game; including fats and pluck; in post-slaughter warm weight. Since 2018 change of conversion rates in post-slaughter warm weight, data incomparable with data for previous years.

In Poland, the increase in milk production and profitability resulted from raw material changes in foreign agricultural markets. Milk production, increasing regularly since 2010, in 2019 amounted to 14,090 million l in total and was 2.3% higher than in the previous year. The average annual milk yield from 1 cow has been constantly growing. In 2019 it was 1.0% higher than in the previous year and amounted to 5,803 litres.

Since 2007, the milk procurement price has been growing. In 2019, producers delivered 11,827.9 million litres – 1.8% more than in 2018. The raw material procured corresponded to 83.9% of the total production vs. 84.4% in the previous year.

Wykres 16. Produkcja i skup mleka
Chart 16. Production and procurement of milk



With higher procurement, the average milk price (PLN 135.27 /hl) was close to (higher by only 0.5%) the one in 2018.

In marketplaces, the average price of a milking cow (PLN 3,314) was 8.5% higher than in the previous year and a one-year-old heifer (PLN 2,405) cost 8.4% more.

Tablica 24. Produkcja żywca rzeźnego[a]
Table 24. Production of animals for slaughter[a]

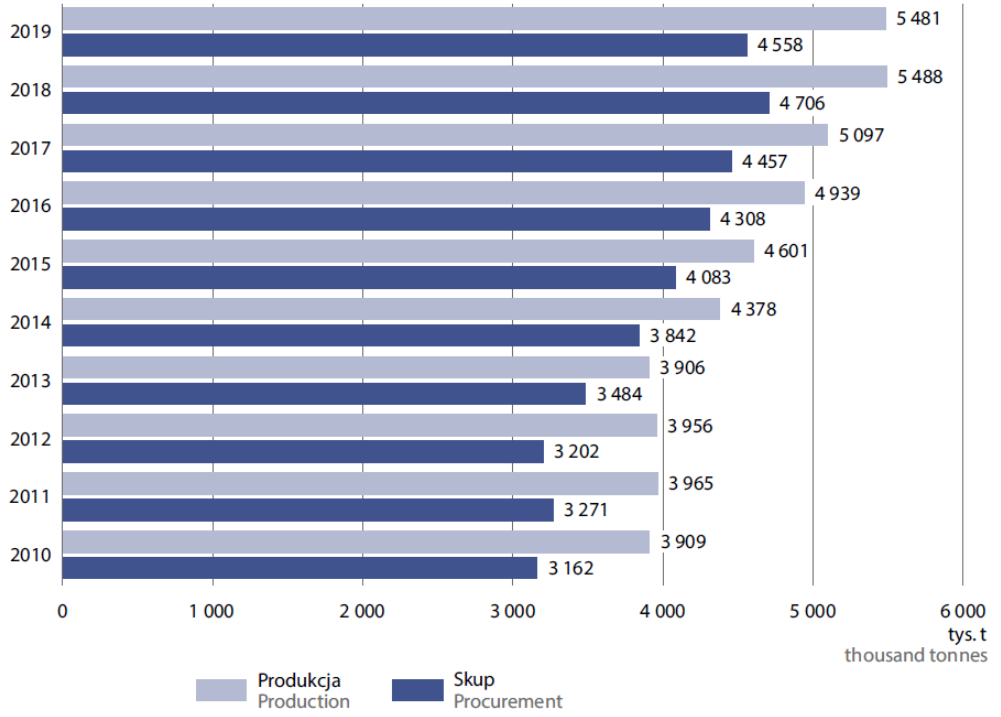
Wyszczególnienie Specification	2018		2019[b]	
	w tys. t in thousand tonnes	analogiczny okres ub. roku = 100 corresponding period of previous year=100	w tys. t[b] in thous. t[b]	analogiczny okres ub. roku = 100[c] corresponding period of previous year=100[c]
Ogółem **Total**	**5 186**	**104,0**	**5 176**	**99,8**
w tym: of which				
wołowy[d] beef[d]	571	100,9	566	99,0
wieprzowy pork	1 973	104,2	1 866	94,6
drobiowy poultry	2 597	104,7	2 704	104,1

a W przeliczeniu na mięso łącznie z tłuszczami (w wbc); wołowy, cielęcy, wieprzowy, barani, koński, drobiowy, kozi, króliczy i dziczyznę. b Od 2018 r. przeliczona wg nowych współczynników. c Łącznie z cielęcym.
a In terms of meat in post-slaughtered warm weight; beef, veal, pork, sheep, horse, poultry, goat, rabbit and game. b Since 2018 calculated using new coefficient. c Including veal.

In 2019, the production of livestock for slaughter in terms of meat with fat was close to the one in 2018. Production of poultry, sheet and goat for slaughter increased. Production of cattle with calves, pigs, horses and rabbit for slaughter decreased.

Supplies of livestock for slaughter (in post-slaughter warm weight) to national entities purchasing agricultural products were 3.1% lower than in the previous year (4,558.0 thousand t) and corresponded to 88.5% of production in 2019 vs. 91.3% in 2018.

Wykres 17. Produkcja i skup żywca rzeźnego (w wbc)
Chart 17. Production and procurement of animals for slaughter (in post-slaughter warm weight)



a Od 2018 r. zmieniono współczynniki przeliczeniowe żywca rzeźnego w wadze bitej ciepłej (wbc), dane nie są porównywalne z danymi za lata poprzednie.
a Since 2018 change of conversion rates in post-slaughter warm weight, data incomparable with data for previous years.

1.5. Food security

1.5.1. Global Food Security Index

Country's food self-sufficiency means the ability of the whole economy, including agriculture, food processing and other sectors such as trade, to meet national demand for agricultural products for direct consumption and for food production. Food self-sufficiency is used as one of the measures of food security. The analysis of Poland's food self-sufficiency with respect to agricultural production shows that the country is self-sufficient in the production of most basic agricultural raw materials for consumption and food production that at the same time can compete with their quality in international trade. In 2019, the self-sufficiency dynamics in terms of basic agricultural production slowed down compared to the previous year, which was reflected by slightly lower marketable production (3.9% in constant prices), however, Poland still remains competitive in both domestic and foreign markets.

Agricultural production as a source of raw materials for the food industry is strictly associated with the environment and strongly depended on its changes, such as abrupt temperature or weather changes. The relation between sufficient food production and the environment is a compromise between growing production, intensifying climate changes and depleting natural resources. The first global index used to assess food security, taking account of various factors such as: economic and physical availability, food quality and resistance to climate change, is the GFSI - Global Food Security Index.

In 2019, the 8th GFSI study covered 113 countries. The GFSI multifactorial assessment criteria are based on the analysis of food systems and effects of environmental changes triggered by variations in agricultural production. Environmental threats are analysed with the Natural Resource & Resilience criteria. Such phenomena as temperature changes, deforestation and water resource depletion are analysed. With respect to the environmental risk, Poland ranks 10th in the GFSI together with Austria (1st – the Czech Republic, 2nd – Finland and 3rd – Denmark).

With respect to food security in the GFSI study, in 2019 Poland ranked 24th and 26th in 2018 (75.6 score). First in this category was Singapore (87.4 score), second – Ireland (84.0 score), third – the USA (83.7 score). In the group of European countries Poland ranked 17th. An analysis of the indices shows that 88% of the countries covered by the study had sufficient quantities of accessible food to feed their populations.

Against the global backdrop, Poland's food self-sufficiency improved. The increase in agricultural production, with relatively stable domestic consumption, generates surpluses that find customers abroad. In 2019, Poland was the 6th EU state with respect to food production value. The value share of Poland's agricultural and food products in the EU production was ca. 9% (EUR 102.0 billion). The main food producer in the EU in the agricultural sector was Germany (16.4% value share in EU food production – EUR 189.6 billion.[1]

The value of Polish export of food products increased year to year. The most important sales markets were still in the EU, however growing production forced entrepreneurs to constantly look for new markets and develop sales to non-European countries where Polish food becomes more and more popular.

1.5.2. Food safety

In the EU member states, the most important task is to organise food quality tests and to establish one national institution responsible for carrying out such tests or several institutions, one of which would have a dominating role. A system organised in this way has been implemented in 23 out of 28 member states (82.1%). Such institutional changes have not been implemented in 5 member states, including Poland, where five institutions are responsible for food safety control (the General Sanitary Inspectorate, General Veterinary Inspectorate, General Inspectorate of Agricultural and Food Products, Trade Inspection, Main Inspectorate of Plant Health and Seed Inspection), sharing competencies between themselves without any of them playing the lead role. Due to the wide range of activities and partial overlap of competencies, the inspectorates (mentioned above as well as the Office of Competition and Consumer Protection and Inspection for Environmental Protection) have concluded agreements with one another.

If the maximum admissible levels of food contaminants determined by law are exceeded, in order to eliminate the risk, the RASFF (Rapid Alert System for Food and Feed) is notified. In practice, however, with a dispersed organisational structure and time-consuming tests, withdrawal of a contaminated product from the market is delayed. The most frequent cause of RASFF notifications in 2019 (57.9%) was Salmonella detected in food and fodder – 70 notifications (vs. 45 in 2018) and exceeded limits of chemical contamination of food – 29 notifications. Out of 121 notifications concerning serious contamination, 42 were a result of products being stopped at the border.[2] In most cases, product stopping was associated with questionable quality of food products from Turkey and China.

The annual schedule of food sampling as part of official control included 27 lines of food quality testing and covered, inter alia, bioburden, hazardous metals, pesticides, mycotoxins, nitrates, additives, radioactive contamination, materials and articles intended to come in contact with food, 3 – MCPD and its esters, histamine, methanol and hydrogen cyanide, carbamate, ethyl, food irradiation, polycyclic aromatic hydrocarbons (PAHs), furan, tropane alkaloids and GMO. In addition, the 2020 plan includes testing for glyphosphate in cereal products.

In 2019, laboratories of the State Sanitary Inspection acting in the integrated food quality testing system (including materials intended to come into contact with food and packages), tested 87,702 samples of all foodstuffs (vs. 81,938 in 2018), out of which 2.7% did not meet quality standards, in 2018 – 3.0% and in

[1] On the basis of Eurostat data (as of 11.2019).

[2] Source: RASFF Portal – ec.europa.eu. Source: RASFF Portal – ec.europa.eu.

2010 – 3.6 %. Least irregularities in tested samples (1.2%) were detected in the małopolskie province whereas the highest percentage of deviations (7.1%) occurred in the zachodniopomorskie province.

Food contamination in the analysed year remained low. Out of all types of contamination detected in all samples most frequent was bioburden (1.6%).

Based on studies conducted by the European Food Safety Authority (EFSA) – an EU agency offering independent scientific consultancy on the existing and emerging threats in the food chain – only 33% of Poles are interested in food safety. According to the information provided by the agency, food safety is not an important factor influencing Poles' purchasing decisions. The product choice and purchasing decisions are driven by the taste (58%), price (53%) and nutrient content (53%). Food buyers are most afraid of residual antibiotics and steroids in meat (49%) as well as preservatives and additives (45%).

Worries about residual pesticides are expressed by 25% of Poles - their percentage lowered from 80% in 2010 to 45% in 2019. It can be an evidence of growing awareness of the role of plant protection products.

Consumption of basic foodstuffs is associated with the supply of agricultural products, their prices in the domestic market and affluence of the population. Food consumption is also affected by product accessibility at the place of living and changing eating habits. Households in rural areas have a slightly different nutrition model than urban ones.

In 2019, as shown by a household budget survey, the downward trend in consumption persisted (excluding consumption in catering establishments) with respect to many basic foodstuffs per 1 person in a household.

The consumption of: bread (5.4%), sugar (4.9%), vegetables (3.9%) including potato (7.4%), fish and seafood (3.6%), milk (2.4%), meat (2.3%), cereal products (2.2%), oil and fat (1.9%) including plant fats (6.8%), processed meat (1.5%) decreased in volume. The consumption of pasta and pasta products (5.3%), hard and soft cheese (2.3%) and fruit (1.1%) increased. On average, during the analysed year the consumption per capita was : 91.3 kg of vegetables (vs. 95.0 kg in 2018), 61.0 kg of meat (vs. 76.9 kg), including total raw meat 34.4 kg including poultry – 18.4 kg (vs. 42.5 kg). At the same time, there was an increase in catering expenditure (4.6%). Food and non-alcoholic beverage expenditure corresponded to 25.1% of the total expenditure per capita in a household. According to subjective opinions of households, nearly 49% of them assessed their financial situation as good or rather good and ca. 44% as neither good nor bad. On average, during the analysed year, in farmers' households the same groups of products were consumed as in the total population but at higher per-person quantities: 100.1 kg of vegetables, 70.0 kg of meat, including total raw meat 4- 1.6 kg, including poultry– 20.3 kg. In farmers' households consumption of the following foodstuffs per capita was higher than in the total population: bread – 44.2 kg (vs. 35.8 kg in total population) and milk – 37.6 kg (vs. 34.4 kg in total population).

1.5.3. Genetically modified organisms

The official controls of genetically modified organisms carried out by the State Inspection of Plant and Seed Protection have covered marketed seeds (since 2005), maize seeds MON 810 (since 2013) and cultivation of crops with respect to the GMO ban (since 2018 – maize, winter and spring rape and soya). Based on art. 78 of the Act on Plant Protection of 18 Dec 2003 (Journal of Laws, 2017, item 2138) the Inspection performs tasks related to, among others, supervision over the production, assessment, trading and use of seeds and control of GMO crops.

In 2019, the Inspection carried out 3,077 checks across the country, including: 509 checks of seeds (298 samples of maize, 173 samples of winter and spring rape, 30 samples of soya) and 2,563 checks of cultivation of these species and 5 inspections in soya seed plantations. The GMO Detection and Identification Unit of Inspection's Central Laboratory applies PCR and Real- time PCR for genetic modification assays. The GMO MON810 seed admixture was detected in 1 sample of marketed maize (0.4 ± 0.003%). Results of the inspections confirmed that genetically modified crops are not cultivated in Poland and the country is GMO-free in that respect.

In 2019, the Inspection tested 645 food samples for GMO (vs. 695 in 2018). One sample was questioned. Similarly to previous years, samples were collected from products that potentially might contain GMO but

had no such information in the label. Samples were also collected form products bearing a claim "GMO free" and products informing about genetic modification in the label.[3]

1.6. Foreign trade

In 2019, as a result of modernisation changes and development of free trade, Poland's commercial standing strengthened in the European and global market. In the value structure of total Polish export (as per SITC nomenclature), agro-food products maintained last year's 12.8% and the import value was 8.4% vs. 8.0% in 2018.

The export value of agro-food products reached EUR 31.4 billion and was 5.8% higher than in the previous year. The import value was EUR 21.1 billion and increased by 5.2%. The trade exchange has a positive balance of EUR 10.3 billion. Foreign trade volume (as per SITC section) for agro-food products was 3.5% higher than in 2018. The export value structure was dominated by (over 80% share), as in previous years, processed products (2018 – 75.6%).

The main buyer of the Polish agro-food products were EU member states (ca. 81% value share, EUR 25.6 billion). The most important trading partner was still Germany (over 24% share). The country bought agri-food products of the value of EUR 7.6 billion ca. 5% more than in the previous year. Important buyers were also: the United Kingdom (8.9% share), the Netherlands (6.4% share), France and Italy (5.4% each) and the Czech Republic (4.8% share). The export to non-EU countries reached EUR 5.9 billion vs. EUR 5.2 billion in 2018. The export to the Commonwealth of Independent States amounted to EUR1.6 billion EUR and was 17% higher than in the previous year. Ukraine bought ca. EUR 600 million worth of agri-food products, the Russian Federation ca. EUR 565 million and Belarus ca. EUR 269 million. Other countries bought ca. EUR 4.3 billion worth of agri-food products (ca. 12% growth). The export to the USA reached ca. EUR 551 million, Saudi Arabia - ca. EUR 302 million, Israel - ca. EUR 245 million and China - ca. EUR 207 million.

In spite of lower production in 2019, Poland was the biggest EU producer of currant (ca. 126 thousand ton – ca. 24% less than in 2018) and the second biggest world producer, after the Russian Federation. In apple production (as per Statics Poland: 3.1 million ton, similarly to 2018), Poland ranked second globally (following China) and first in the EU (as per EU estimates - 25% share). In strawberry production (ca. 177 thousand ton – ca. 10% less than in 2018), Poland was the 5th biggest global producer. The country is also one of the leading EU producers of cheery, sweet cherry and raspberry.

As for processed agricultural products, during the analysed year, Poland was in the global forefront in: condensed apple juice (2nd place, following China), frozen fruit and condensed soft fruit juice (3rd place, following the USA and China) frozen vegetables (5th place – as per estimate of the Institute of Agricultural and Food Economics: ca. 650 thousand ton). In the EU, Poland maintained the 3rd place in frozen vegetables, following Belgium and Spain. Frozen products had a dominating position in processed food (ca. 53% share).

Poland is the biggest EU exporter of poultry products (in carcass equivalent), 5th biggest exporter of beef products and 6th in pork products. The export of meat products in 2019 brought EUR 6.2 billion (ca. 3% more than in the previous year). The biggest share in export volume had poultry products – ca. 49%, pork products – ca. 26% and beef products– ca. 25%. In the export value structure (as per CN nomenclature), the 2nd biggest share (after ready-to-eat foodstuffs – nearly 7%) was gained by products of animal origin - ca. 4%. In 2019, 1.4 million ton of exported red raw and processed meat (1.5 million ton in 2018) brought EUR 3.8 billion, ca. 6% less than in the previous year. The export of poultry (including offal) increased by ca. 10%, to 1,5 million ton and the export value reached EUR 2.6 billion (ca. 9% more than on 2018).

As a result of continuously growing demand for dairy, the value of products sold in 2019 rose by almost 2% to EUR 2.3 billion. The highest share in export value was gained by EU member states – 74.2% (vs. 78.7% in 2018). The value of dairy exported to the EU was ca. 4% lower than in the previous year. The structure of dairy products sold was dominated by cheese (ca. 35% share). At the same time, cheese accounted for ca. 45% of the domestic production volume (ca. 152 thousand ton).

[3] Source: Ministry of Health.

The export value of vegetables, including processed products, increased by ca. 6% (up to EUR 1.8 billion). The export value of fodder products including cakes increased by ca. 14% (up to EUR 1.4 billion) and fruit including processed fruit by ca. 1% (up to EUR 1.4 billion). The total quantity of exported cereals (seeds and processed cereals) during the first six months of the 2019/2020 production year was 3.4 million ton (in seed equivalent) and was ca. 9% higher than in the same period last year. The export earnings were 5% higher than in the previous year and amounted to EUR 1.7 billion. The revenues from export of primary processed cereal products were ca. 7% lower and amounted to EUR 116 million, whereas the export value of highly processed cereal products increased by ca. 8% to EUR 1.1billion.[4]

Chapter 2

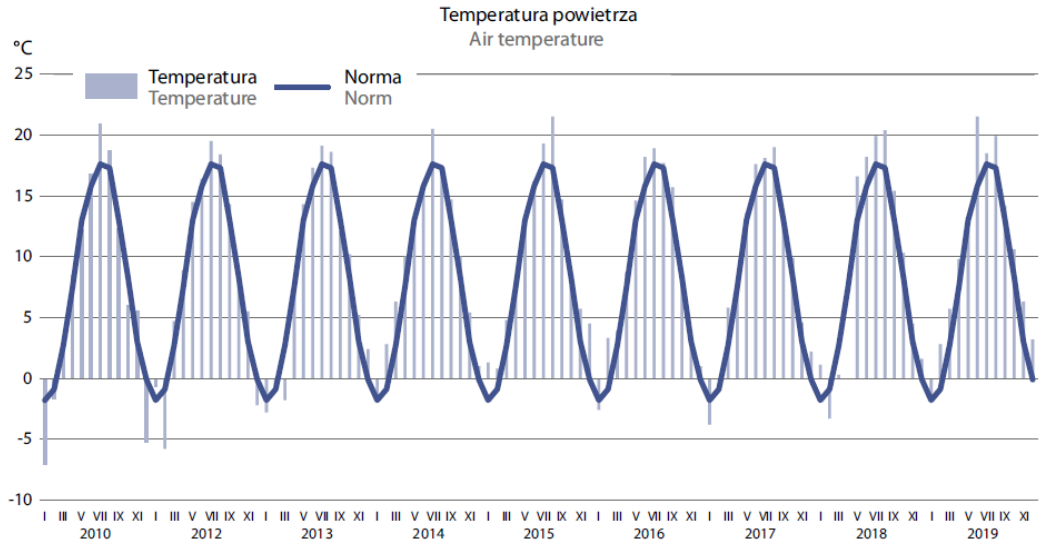
Agri-environmental aspects

2.1. Agrometeorological factors

The crop production is very strongly determined by weather conditions. Severe weather phenomena occurring during the growing season, such as very high or very low temperature or heavy rainfall, can affect the production, harvesting and fieldwork.

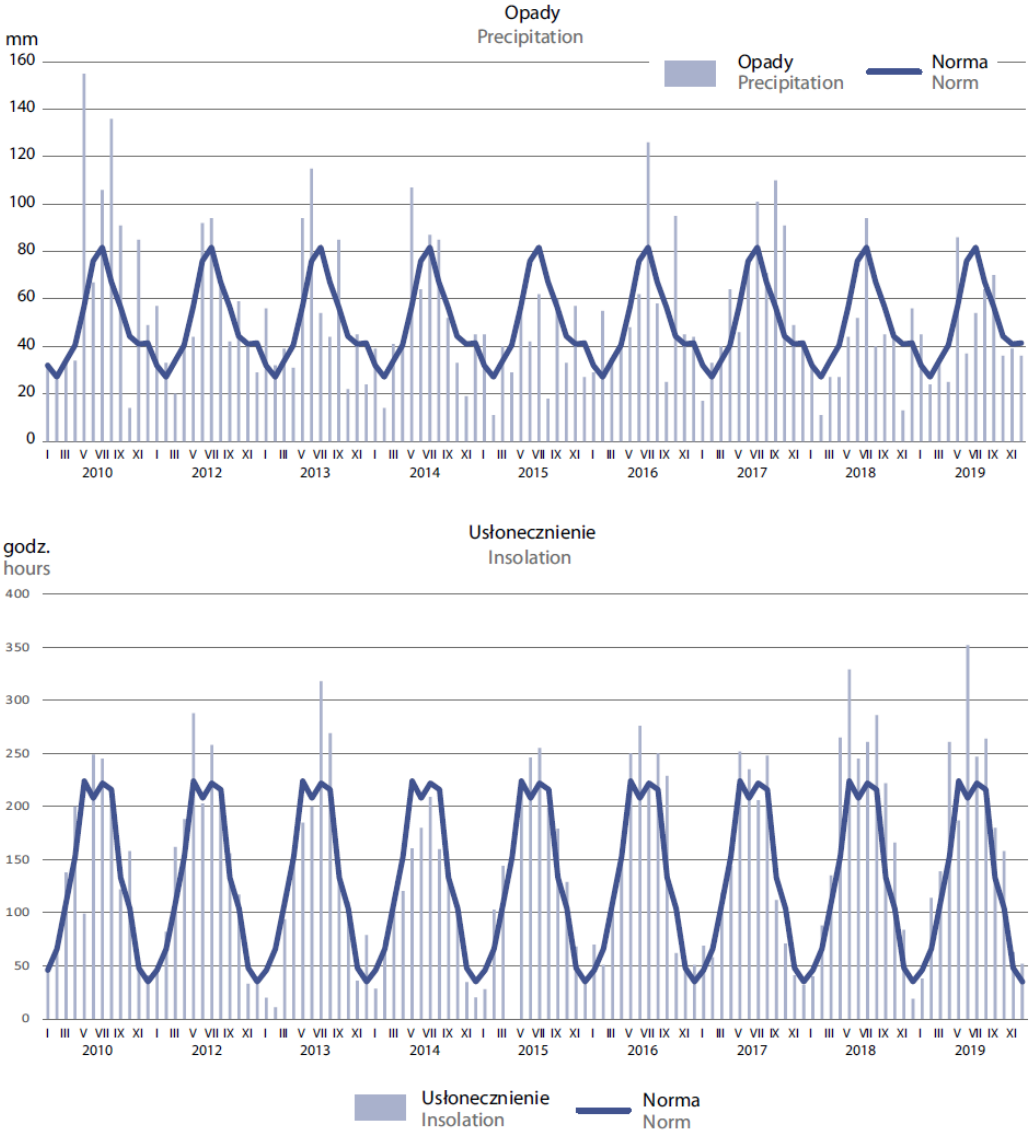
The sowing of winter crops for the 2019 harvest started at optimum time, plants tillered in November and temperature variations supported plant hardening. The weather in December did not pose any major risk to overwintering plants. In January the agrometeorological conditions varied. Air temperature drops, recorded mainly in the first and second decade of the month, reached –22°C at ground level in some places. Rains and sleet at the end of January led to water pocket formation locally in fields, which during night-time temperature drops turned for a short time into ice crust. In some places, strong, drying winds with below-zero temperatures and absence of snow cover caused cold wind burning of exposed plants.

Wykres 18. Temperatury powietrza, opady i usłonecznienie na tle średniej z lat 1971–2000
Chart 18. Air temperatures, precipitation and insolation on the background of the average from 1971–2000



[4] Source: Ministry of Finance (preliminary data).

Wykres 18. Temperatury powietrza, opady i usłonecznienie na tle średniej z lat 1971–2000 (dok.)
Chart 18. Air temperatures, precipitation and insolation on the background of the average from 1971–2000 (cont.)



The weather in March supported field drying and soil warming as well as vegetation of winter crops and permanent grasslands, so mineral fertilisers were applied earlier than in the previous year and herbicide treatments were accelerated. Topsoil moistening at the beginning of the vegetation period was adequate to plant needs.

The sowing of spring crops started in the first days of March and assumed full scale in mid March. Lack of precipitation in spring was responsible for adverse soil conditions for spring crop emergence and vegetation. The situation was worsened by strong, dry winds, cold nights and dried soil. In consequence spring crop growth strongly varied in different plantations.

In April, agrometeorological conditions varied in the country, however, in the second decade of the month and at the beginning of May they were very favourable for plant emergence, vegetation and development. Locally, topsoil – especially sandy - was too dry. Losses in winter crops were significantly lower than in 2018 and according to the assessment of Statistics Poland experts made in the first decade of May 2019, the main reason for ploughing of winter cop plantations was frost injury. Fairly heavy rainfall since mid-May positively contributed to the improvement in spring and winter cereals.

Exceptionally high temperatures in the second and third decade of June, significantly above long-term standards, accompanied by very low precipitation (significantly below the standard), led to excessive drying

of the surface layer of the soil and faster ripening of cereals in the predominant area of the country, which limited the production potential. Harvesting was generally carried out in the third decade of July and first decade of August. Warm, sunny and generally rainy weather in August favoured harvesting. High temperature and shortage of rainfall as well as uneven distribution of precipitation, both in regions and in time, further increased the deficit of water in soil in many regions of the country. In the first half of August, rape and turnip rape harvesting was completed and before the end of the month in the whole country spring and winter cereal harvest was finished. In the fields, post-harvest treatment was carried out: first ploughing and pre-sow ploughing was performed, stubble crops were sowed. In the second half of August potato digging took place.

Warm weather in summer created good conditions for crop harvesting and the precipitation recorded during the month improved the moisture content in the topsoil. Despite rainfall slightly exceeding the long-term average, in some parts of the country soil dryness made fieldwork – especially pre-sow ploughing and winter crop sowing - more difficult. At the beginning of September, winter rape sowing, - that had started in August – was completed. In the first decade of September, rye and triticale and in mid-month winter wheat sowing began. Across the country maize for green feed was harvested and in the second half of September – maize for grain. Locally, at the end of the month stubble crops were harvested.

Agrometeorological conditions in October varied. The weather favoured crop harvest but adversely affected soil wetness. In many regions of the country soil dryness made ploughing and sowing of winter crops more difficult. Colder days at the end of October supported plant hardening. Before the end of the second decade of October, sowing of rye, triticale and winter wheat was completed. Winter crops sown in September started tillering at the end of October. In general, at the end of October maize for grain harvesting was completed. During the month stubble crop gathering continued. Pre-winter ploughing took place. Locally, insufficient soil wetness made pre-winter ploughing difficult.

High air and soil temperatures in November sustained vegetation and created good conditions for germination, growth and development of late sown winter crops. They also facilitated autumn fieldwork as well as gathering of root and fodder crops. In November winter species sown at optimum agrotechnical time tillered. Daily air temperature fluctuations favoured plant hardening. At the beginning of the month, the harvest of sugar beet and maize came to an end. Stubble crop gathering as well as pre-winter ploughing and other autumn fieldwork was also completed. Insufficient soil wetness made pre-winter ploughing difficult. Favourable thermal conditions in many arts of the country prolonged the grazing season till the end of November.

Winter crops were sown at the optimum agrotechnical time on ca. 82% of the area allocated to winter crops (mainly in provinces with sufficient soil moisture), while the remaining areas were sown even 2–3 weeks later. Before entering the state of winter dormancy, winter crops in many regions were well tillered and even overgrown (especially rye and turnip rye).

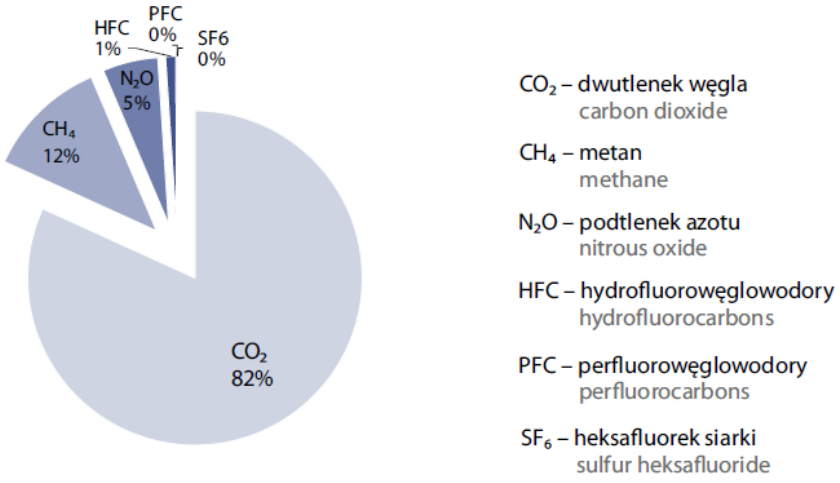
2.2. Greenhouse gas and ammonia emissions

The main category in the emissions from agriculture are greenhouse gases (GHG). They exist as natural components of the atmosphere, however their content increases – and contributes to the greenhouse effect – as a consequence of human activity, including agriculture activity. Changes in modern agriculture are strongly associated with the global climate change. In recent years, due to production intensification and concentration, agriculture contributed to growing emissions of greenhouse gases, ammonium and other contaminants such as atmospheric particulate matter and heavy metals.

The emissions, above all, are a consequence of the growing use of production aids (fertilisers, pesticides, fuels and energy), natural fertiliser management (NH_3, PM10, PM2,5), some agrotechnical procedures on soils used for agriculture (NH_3, NO_x) and crop residue burning (CO, PM10, PM2,5).

In accordance with the UNFCCC position and Kyoto Convention, the EU member states have adopted the 80% GHG emission reduction target for the years 2013–2020, 1988 being the baseline year. Emission reduction calculations do not take account of emission balance and GHG absorption in category 4, land use, land use change and forestry (the so-called LULUCF).

Wykres 19. Udział gazów cieplarnianych w emisji krajowej
Chart 19. Share of greenhouse gases in national emissions



In 2018, the national emission of greenhouse gases (calculated in CO_2 equivalent) was dominated by carbon dioxide (CO_2) whose share in total emissions was 81.8%, methane (CH_4 - 11,.8%) and nitrous oxide (N_2O – 5.4%). Industrial gases were responsible for ca. 1% of the aggregated greenhouse gas emissions.

The total national GHG emission was 412/86 thousand kt in CO_2 equivalent and was 28.6% lower in relation to the baseline year.

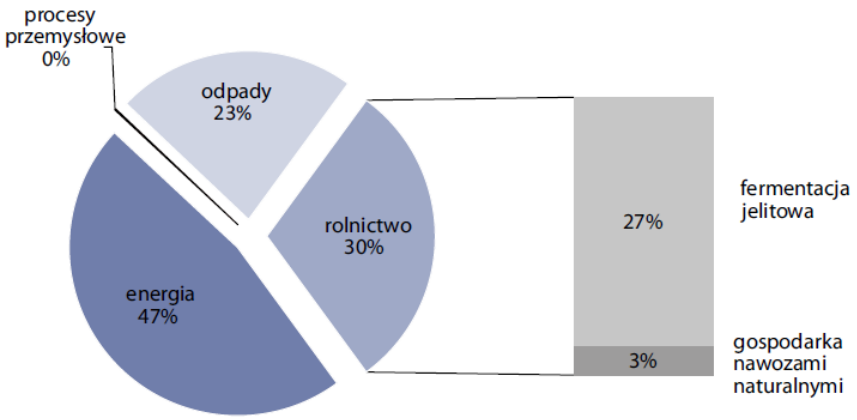
The energy sector has the highest share in the total GHG emissions (ca. 83%, including fuel combustion - 77%). Agriculture was responsible for 8.0% of emissions, industrial processes - 6.0% and waste management - 3.1%.

In total, in 2018 the agricultural sector emitted 33.1 thousand kt of GHG in CO_2 equivalent and, most importantly, achieved of the highest reduction levels in the national economy (minus 32.7% in relation to 1988). The largest part of GHG emissions from agriculture was related to livestock breeding.

In 2018, CO_2 emissions decreased by 28.4% from the baseline year and amounted to 337.71 million ton. The main source of CO_2 emissions was fuel combustion (ca. 92% share). The total national CO_2 emission from agriculture was 919.97 kt in 2018.

CO_2 emissions from agriculture are mainly associated with crop production, especially soil liming (56%) and use of urea fertilisers (44%). The release of CO_2 occurs also during ploughing after application of fertilisers, accompanied by organic mater decomposition.

Wykres 20. Emisja metanu według kategorii w 2018 r.
Chart 20. Methane emissions by category in 2018

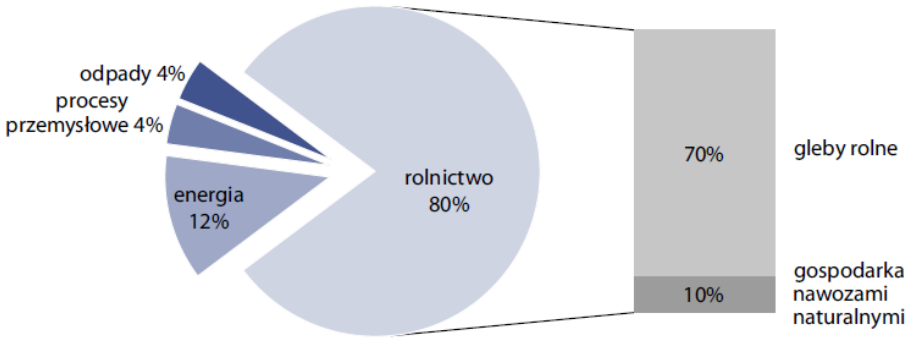


The dominating source of methane emissions from agriculture is intestinal fermentation in farm animals during digestion in ruminants, with ca. 27% share in total methane emissions in 2018.

In 2018, CH_4 emission was 522.34 kt, out of which 96% was associated with cattle maintenance. The most emission-intensive is dairy cattle with an estimated methane emission factor of 126.61 kg CH_4/head/year. Methane is also release during manure management (60.20 kt).

Another important element of GHG emissions is nitrous oxide (N_2O – 74.18 kt in 2018 corresponding to 22.11 million ton in CO_2 equivalent). This emission was 28% below the baseline year value. The agricultural sector is the largest contributor to nitrous oxide emission in Poland (59 kt). This gas is produced as a result of chemical processes in the soil, water and natural fertilisers that take place in agricultural activity. The main segments of agricultural activity emitting N_2O were arable lands – 69.5% and manure management – 10.0%.

Wykres 21. Emisja podtlenku azotu według kategorii ekwiwalentu CO_2 w 2018 r.
Chart 21. Nitrous oxide emissions by category of CO_2 equivalent in 2018



In recent years, agricultural emissions of ammonium (NH_3) increased. Agriculture is responsible for 94% of total ammonium emissions in Poland, with natural fertiliser management alone contributing 79% and mineral fertilisation 21% of the sector emissions.

Ammonium emission in 2018 was 317 Gg. (of which agriculture contributed 298 Gg).

In 2018, according to the National Centre of Emissions Management (KOBIZE) calculations, the most important elements of agricultural activity emitting ammonium were:

• management of natural fertilisers applied to the soil–115.28 kt

• management of mineral fertilisers applied to the soil – 63.41 kt
• management of manure in dairy caw breeding – 35.24 kt
• management of manure in pig breeding – 30.85 kt

The main responsibility for NO_2 emissions from agriculture is associated with mineral fertiliser management (mainly urea). In 2018, NO_2 emission associated with mineral fertiliser use was 46.99 kt (6.2% of national emissions) a natural fertiliser use – 14.89 kt (2% of national emissions).

Moreover, manure management is also associated with release of non-methane volatile organic compounds (NMVOC) representing 13.2% of national emission of this gas. The main contributors are fertilisers from dairy cattle breeding, non-dairy cattle breeding and broiler production (33.4 kt, 22.1 kt and 13.9 kt respectively).

Additional activities directly associated with agricultural production in farms, such as storage, handling and transportation of agricultural products are also sources of TSP and PM10 emissions (4.5% and 7.1% of national emission respectively), in quantitative terms – 17.2 kt each according to the National Centre of Emissions Management, KOBIZE, 2018 data).

Tabela 25. Łączna emisja gazów cieplarnianych wyrażona w kt ekwiwalentu CO_2 w podziale na kategorie źródeł IPCC w latach 1988, 1990 i 2018 oraz prognozowanych w latach 2020–2040 (scenariusz WAM)

Table 25. Total greenhouse gas emissions expressed in kt eq. CO_2 broken down into categories of IPCC sources in 1988, 1990 and 2018 and forecast in 2020–2040 (WAM scenario)

Lp. No.	Kategorie źródeł emisji / / pochłaniania Categories of emission / / absorption sources	1988	1990	2018	2025	2030	2035	2040
1	Energia Energy	476 219,67	382 821,05	342 087,58	294 590,13	267 891,48	227 183,91	203 63,73
2	Procesy przemysłowe i użytkowanie produktów Industrial processes and product use	31 198,21	22 701,35	24 91,89	24 039,81	23 605,13	23 106,20	22 792,66
3	Rolnictwo Agriculture	47 908,81	47 244,30	33 117,07	32 452,22	32 880,91	33 169,74	33 249,44
A	Fermentacja jelitowa Enteric fermentation	21 952,45	21 554,10	13 058,54	12 405,29	12 296,92	12 206,79	12 242,81
B	Odchody zwierzęce Animal excrements	5 499,66	5 413,10	3 715,21	4 665,87	4 963,42	5 096,16	5 142,18
D	Gleby rolne Agricultural soils	17 956,64	17 653,09	15 366,93	14 302,05	14 518,45	14 735,64	14 683,73
F	Spalanie odpadów roślinnych Burning plant residues	31,54	30,63	36,56	37,09	37,85	39,10	40,57
G	Wapnowanie Liming	1 950,86	2 099,38	526,93	489,45	527,19	569,70	631,60
H	Stosowanie mocznika Urea use	517,66	494,00	412,90	552,48	537,08	522,36	508,55
	Całkowita emisja ekw. CO_2 bez uwzględnienia sektora 4 Total emission of CO_2 eq. excluding sector 4	577 257,78	474 350,11	412 856,37	363 471,01	336 252,75	295 011,52	271 109,81

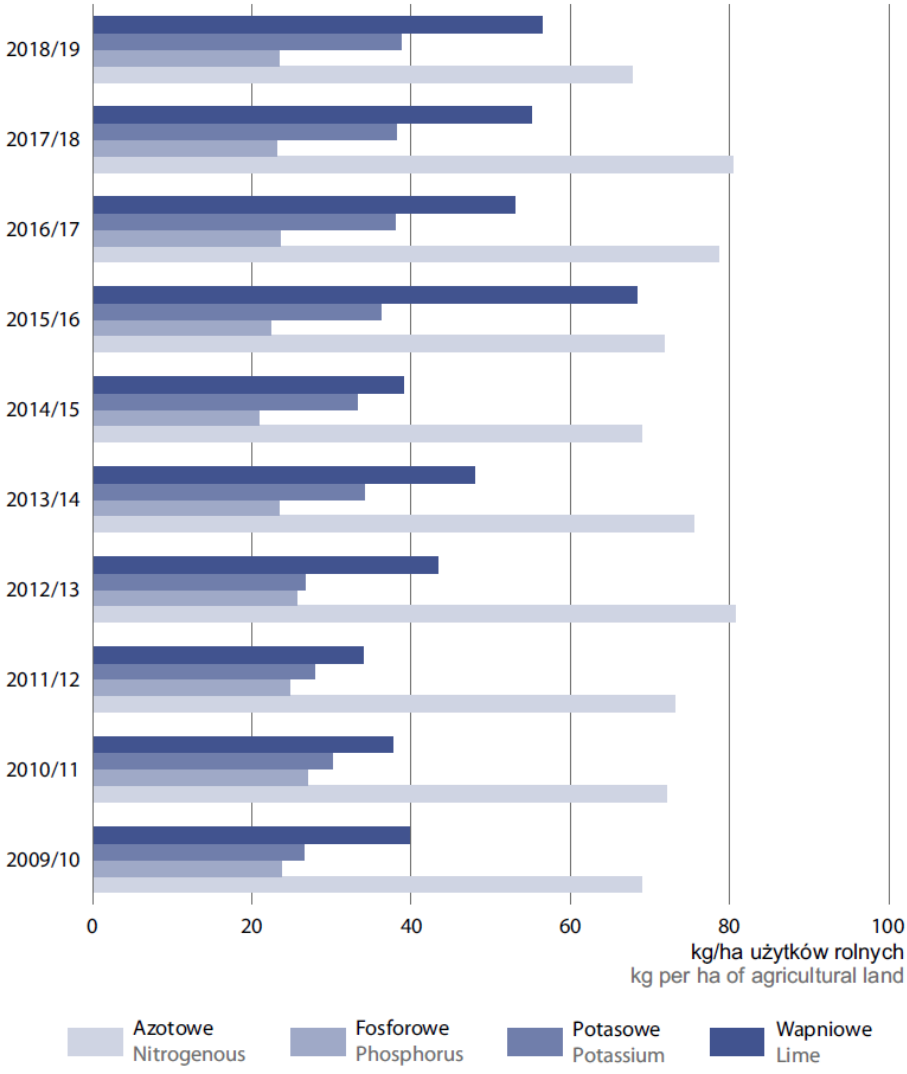
Źródło: Instytut Ochrony Środowiska – PIB, KOBIZE.
Source: The Institute of Environmental Protection – National Research Institute, The National Centre for Emissions Management.

2.3. Fertilization and plant protection products

The use of mineral fertilisers in the 2018/2019 farming year was lower than in the same period a year ago and amounted to 1905.4 thousand tons of NPK (in 2017/2018 - 2076.6 thousand tons of NPK). An average of 129.7 kg NPK was used per 1 ha of agricultural land. Compared to the previous year, nitrogenous fertiliser use decreased the most - by 15.8% and amounted to 67.7 kg/ha.

Nearly 16% decrease in nitrogenous fertilisers use was primarily related with the occurrence of drought covering a large area of Poland, as well as by new regulations. Since 27 July 2018, the 'Operational Programme to reduce water pollution by nitrates from agricultural sources and prevent further pollution' has been in force throughout the country. The introduced regulation defines, among other things: ways and conditions of agricultural use of nitrogenous fertilisers, times when the use of fertilisers is permitted, conditions for storing manure and effluent handling (including areas and capacity of storage facilities), rules for nitrogen fertilisation planning (nitrogen fertilisation plans, maximum nitrogen doses). The results of the June survey show that agricultural producers have adapted to the requirements of the Programme and have verified the measures related to nitrogenous fertilisers usage.

Wykres 22. Zużycie nawozów mineralnych
Chart 22. Consumption of mineral fertilizers

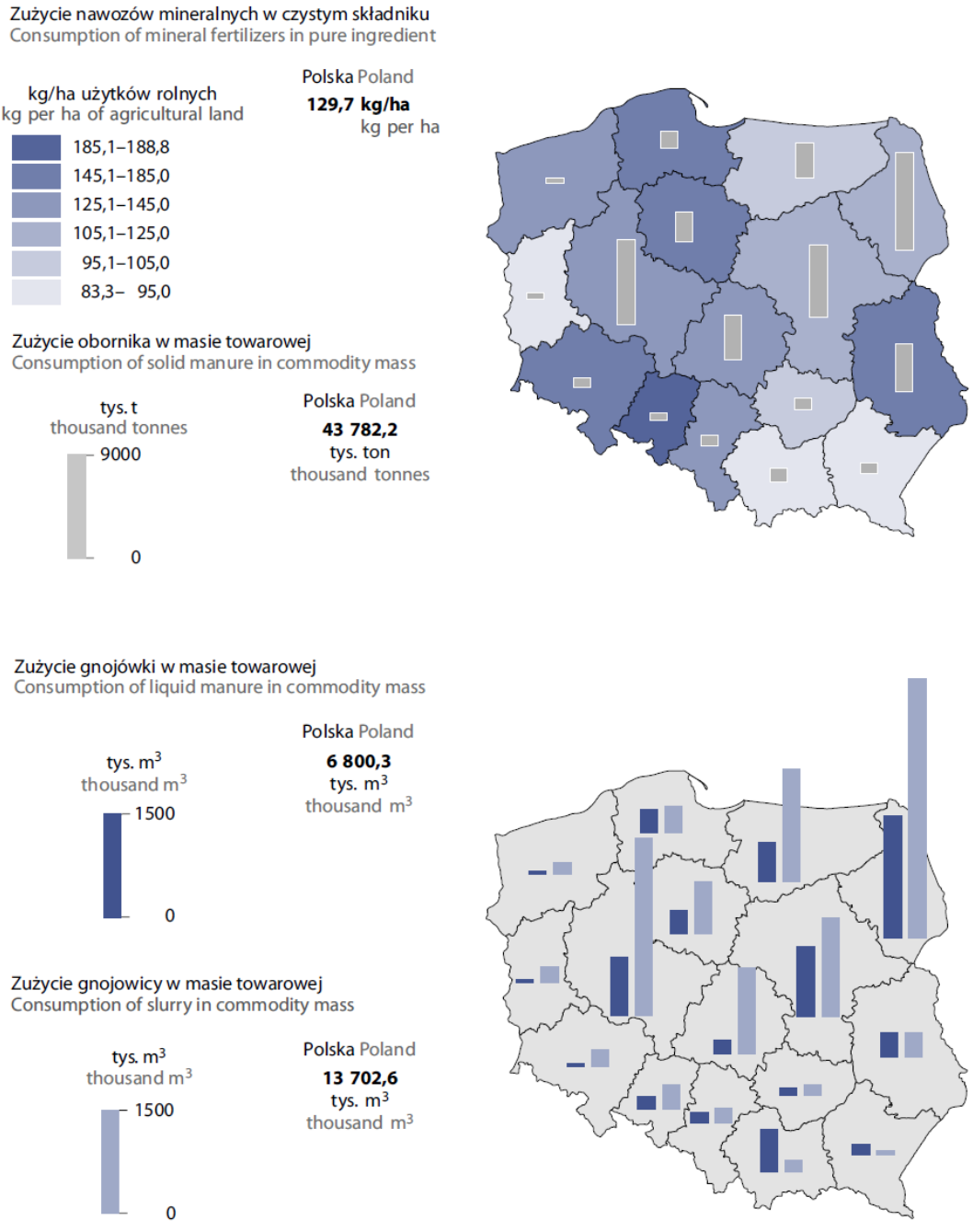


In 2019, 23.4 kg of phosphorus fertilisers and 38.7 kg of potassium fertilisers (calculated for 1 ha of UAA) were applied, i.e. 1.3% and 1.6% respectively more than last year. Alongside with the increasing land use the increased use of fertilisers was recorded. Higher fertiliser use than the national average was recorded in all groups of farms above 20 ha of UAA. The highest consumption was observed in large-area farms from 500 to 1000 ha - 177.6 kg NPK/ha UAA.

Lime fertiliser consumption in the economic year 2018/2019 slightly increased and amounted to 821.0 thousand ton (808.7 thousand ton in 2017/2018). Similarly to NPK, lime fertiliser consumption grew simultaneously with the growth of agricultural land in a farm. The biggest, nearly 2.5-time increase (133.4 kg CaO/ha UR) with respect to average use (55.9 kg CaO/ha) was recorded also in large-area farms with over 1000 ha of arable land.

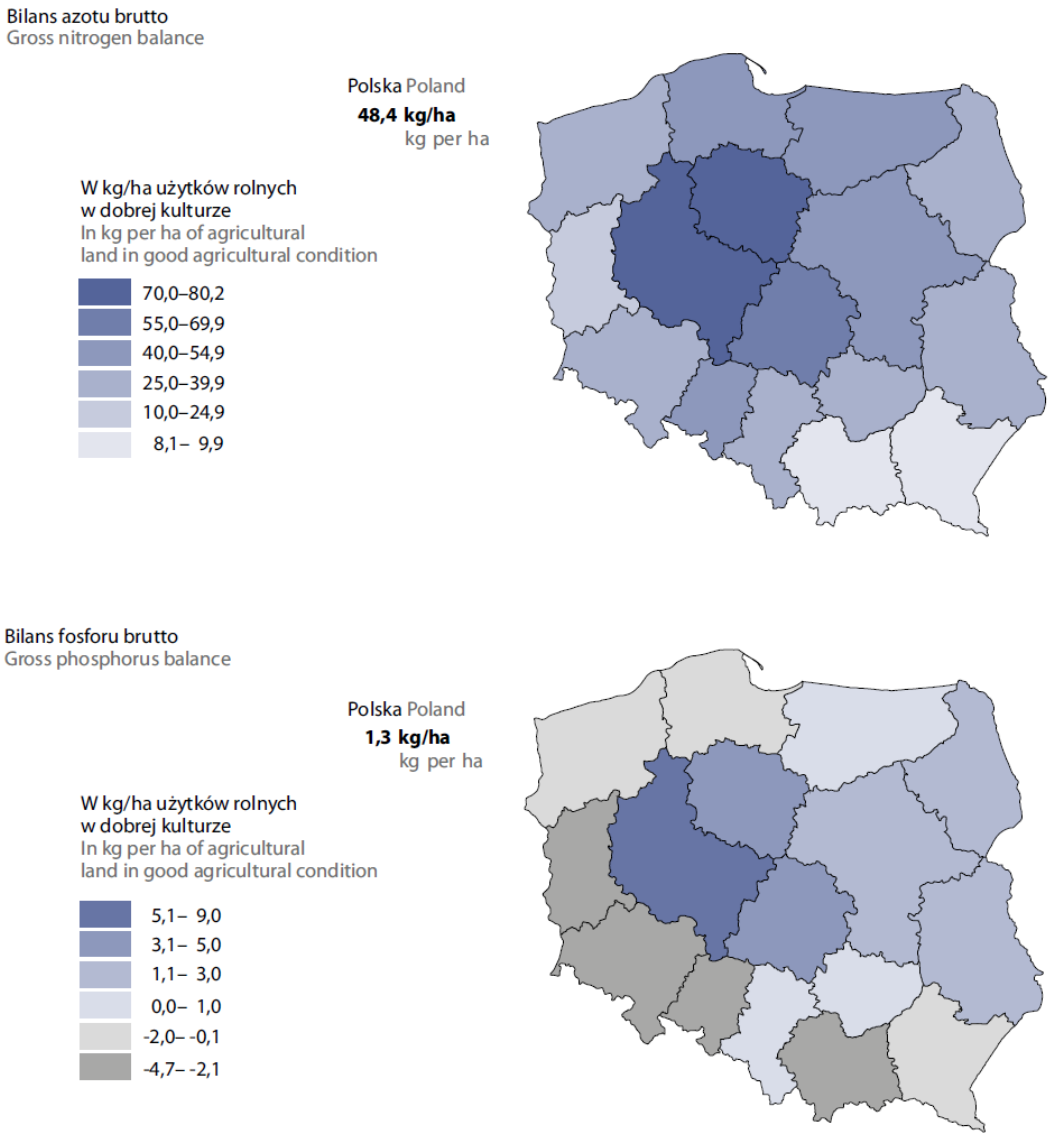
The lime fertiliser doses used are not consistent with the real needs. The average demand for lime in the country is ca. 2 t CaO/ha UAA. Application of such a quantity of CaO would make it possible to bring soil pH in Poland to the level appropriate for crop production. Liming improves soil properties and enhances the use of nutrients introduced into the soil by fertilisers. It improves availability of soil nutrients and, above all, reduces concentration of exchangeable aluminium that is toxic to agricultural crops and curtails yield.

Mapa 1. Zużycie nawozów mineralnych oraz nawozów naturalnych w roku gospodarczym 2018/2019
Map 1. Consumption of mineral and natural fertilizers in the farming year 2018/2019



The consumption of natural fertilisers remained at the previous year level. Only solid manure use decreased slightly to 43.8 million ton (vs. nearly 45 million in 2018). The consumption of liquid manure and slurry did not change significantly and was ca. 7 million m^3 and nearly 14 million m^3 respectively.

Mapa 2. Bilans brutto azotu i fosforu w 2017r.
Map 2. Gross balance of nitrogen and phosphorus in 2017



Ź r ó d ł o: IUNG – PIB według metodologii „Nutrient Budgets" OECD/Eurostat na podstawie danych: GUS, PIOŚ uzyskanych w ramach Państwowego Monitoringu Środowiska.
S o u r c e: The Institute of Soil Sciences and Plant Cultivation according to the OECD/Eurostat "Nutrient Budgets" methodology based on data: Statistics Poland and State Inspection of Environmental Protection obtained under State Environmental Monitoring.

In 2018, sales of plant protection products in marketed product weight amounted to 65.3 thousand t, with only 17 thousand t (ca. 26% of products delivered to the market) coming from domestic production. The sales structure, as usual, was dominated by imported pesticides (ca. 74%) – the volume of sales of these plant protection agents was 48.3 thousand t. In the domestic production structure, germination retardants and growth regulator had ca. 3.5% share (0.6 thousand t), insecticides and miticides – 4.8% (0.81 thousand t) and fungicides, bactericides and grain treatment agents - ca. 24.7% (4.2 thousand t). The national supplies were based on herbicides with production reaching 11.5 thousand t (67.6%).

Compared to the same period in 2017, the production of domestic plant protection agents dropped by over 18%, while the structure of changes was varied – the fungicide production increased by 15.3%, whereas herbicide production decreased by 23.9%. The 'other' agent category (mainly slug pellets) increased strongly from negligible in 2017 to 15.6 t in 2018.

The import structure was also dominated by herbicides (slightly more than a half of imported agents) – in commodity mass 24.3 thousand t. The second biggest import volume was the one of fungicides – 15,6 thousand t (32.3%), followed by insecticides – 4.6 thousand t (9.5%) and growth regulators – 2.0 thousand t (4.1%).

Compared to the previous year, more fungicides (12.3%) and insecticides (5.7%) and less herbicides (12.7 %) were imported. The total pesticide import decreased by 4.4% in relation to 2017.

Tablica 26. Zestawienie wyników badania zużycia środków ochrony roślin
Table 26. Summary of results of the survey on consumption of plant protection products

2012	2013	2014	2015	2016	2017	2018
w kg/ha in kg/ha						
żyto – 0,3 rye	jęczmień jary – 0,6 spring barley	owies – 0,5 oat	mieszanki zbożowe – 0,5 cereal mixed	pszenżyto ozime – 0,8 winter triticale	ogórek gruntowy – 3,9 field cucumber	jabłoń – 10,5 apple tree
ziemniaki –1,9 potatoes	rzepak ozimy – 2,0 winter rape	pszenica jara – 0,7 spring wheat	Jęczmień ozimy – 1,1 winter barley	kukurydza – 0,8 maize	ogórek pod osłonami – 3,0 cucumber under glass	jęczmień jary 0,6 spring barley
kapusta głowiasta – 1,1 head cabbage	burak ćwikłowy – 0,8 beetroot	porzeczka – 1,7 currant	czereśnie – 2,1 sweet cherry trees	burak cukrowy – 2,7 sugar beet	pomidor gruntowy – 7,2 field tomatoes	malina 1,33 raspberry
jabłoń –10,5 apple	malina – 2,0 raspberry	śliwa – 2,4 plum		cebula – 4,6 onion	pomidor pod osłonami – 2,6 tomatoes under glass	rzepak ozimy 1,74 winter rape
truskawki – 2,5 strawberries	wiśnia – 5,4 sour cherry trees	burak pastewny – 0,9 fodder beet		marchew – 1,7 carrot	pszenica ozima – 1,3 winter wheat	wiśnia 5,6 sour cherry
				grusza – 6,1 pear	truskawka – 2,7 strawberry	
					ziemniaki – 3,5 potatoess	
					żyto – 0,3 rye	

The consumption of plant protection agents for specific types of crops varies significantly. In general, the highest amounts per surface unit are used in orchards and vegetable plantations. In 2018, the consumption of plant protection products in active substance per 1 ha of apple was 10.464 kg/ha. The total mass of active substances was 1.53 thousand ton, out of which 94.6% were fungicides, mainly agents containing captan, sulphur and different forms of copper. The share of herbicides and insecticides in the total consumption was not high and amounted to 2.9% and 2.4% respectively.

The use of plant protection products for cherries in orchards has also been examined. The consumption of active substance was almost twice lower than for apple and amounted to 5.602 kg/ha. According to the treatment records, 134 ton of various substances were used but for an area almost 6 times smaller than in the case of apple. Here too, the majority (94%) of agents used were fungicides and herbicides. Among fungicides, preparations based on captan and copper dominated.

In 2018, the research covered also spring barley. On over 0.5 million barley cultivation area, ca. 350 t of various substances were used, resulting in an average consumption of 0.621 kg per 1 ha.

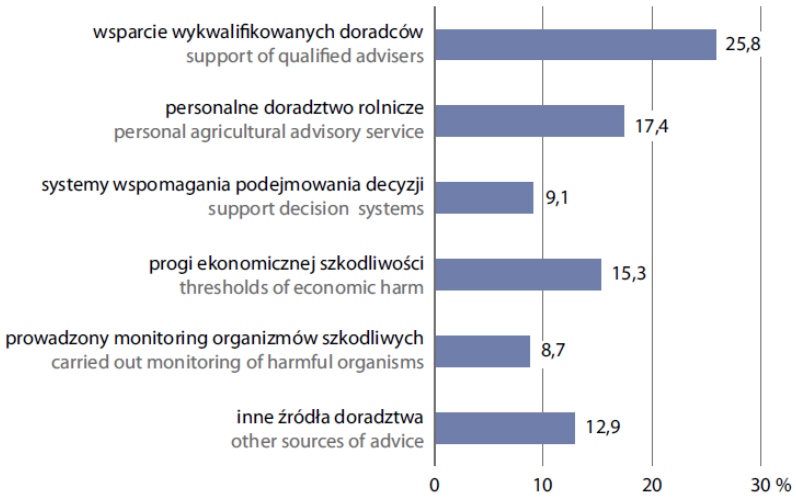
The plant protection product structure consisted of herbicides (77.3%), fungicides (18%) and growth regulators preventing crop lodging (2.7%). Among herbicides preparations containing MCPA dominated.

A crop that is very important economically and also relevant with respect to chemical protection of plants in Poland is winter rape. Rape cultivation is getting harder and harder due to withdrawal of certain active substances from the market (by EC decision), e.g. neonicotinoide-based agents. The substitutes used are not equally effective and make rape cultivation more complicated with more treatments needed and higher costs. The growing costs of cultivation are a consequence of the need to apply foliar treatments. The average use of plant protection agents per rape plantation in 2018 was 1.739 kg/ha. On the area of ca. 0.87 million ha 1,5 thousand t of various active ingredients were used with dominating quantities of herbicides (53% average consumption: 0,922 kg/ha), fungicides (26% – 0.452 kg/ha) and insecticides (16.3% - 0.284 kg/ha). Among herbicides, most frequently used were products on the base of metazachlor and among insecticides – preparations containing organic phosphorus.

The last crop examined during that edition of the study was raspberry. The average consumption of active substances in raspberry cultivation was 1.333 kg/ha. In the protection of the crop, among pesticides the highest volume share (80%) was the one of fungicides (mainly dithiocarbamate-based and pyrimidine-based) and 16% - herbicides.

Wykres 23. Gospodarstwa korzystające ze wsparcia w podejmowaniu decyzji o konieczności zastosowania środków ochrony roślin w 2019 r.

Chart 23. Farms benefiting from a support in making decisions on the necessity of using plant protection products in 2019



2.4. Organic farms

After Poland's accession to the EU, organic farming has developed dynamically in the country. During the years 2004–2013 the number of farms applying organic production measures (certified production and transformation towards organic farming) and organic agricultural area increased seven-fold. Since 2014 a downwards trend has been observed.

The majority of farms (over 88%) used organic production methods in crop production exclusively, others used them in mixed production (crops and animals).

In 2018, the number of farms applying organic production methods equalled 19.2 thousand and was 5.2% lower than in 2017 and 27.8% lower than in 2013 – the record year in organic farming (26.6 thousand).

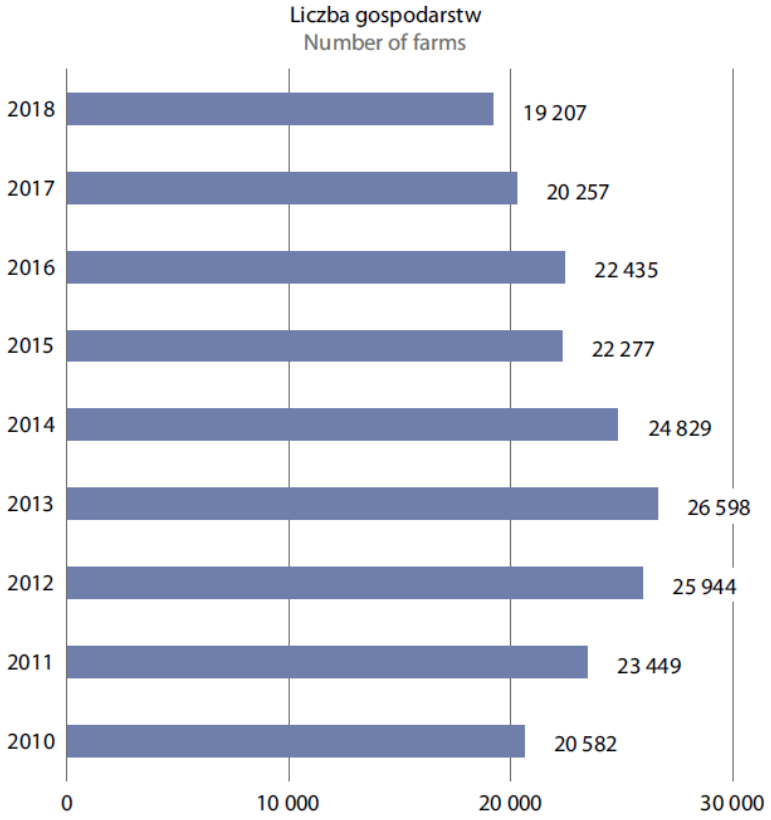
The organic agricultural area in 2018 was ca. 485 thousand ha and decreased by 2.1% in relation to 2017 and by 27.7% in comparison to 2013. In spite of the fact that the reduction in the number of farms was accompanied by the reduction in organic agricultural area, the mean area of such farms increased from 24.4 ha in 2017 to 25.2 ha in 2018. It should be noted, that farms using organic production methods have almost double average agricultural area, which in the case of all farms taken together was 10.3 ha in 2018.

In 2018, organic agricultural areas constituted 3.3% of the total utilised agricultural area of the country (0.1 percentage points less than in 2017).

In the territorial perspective, the highest share of organic agricultural area in the total utilised agricultural area was recorded in the zachodniopomorskie province (11.3%) and warmińsko-mazurskie province (11.0%) and the lowest in opolskie and kujawsko-pomorskie (0.7% each).

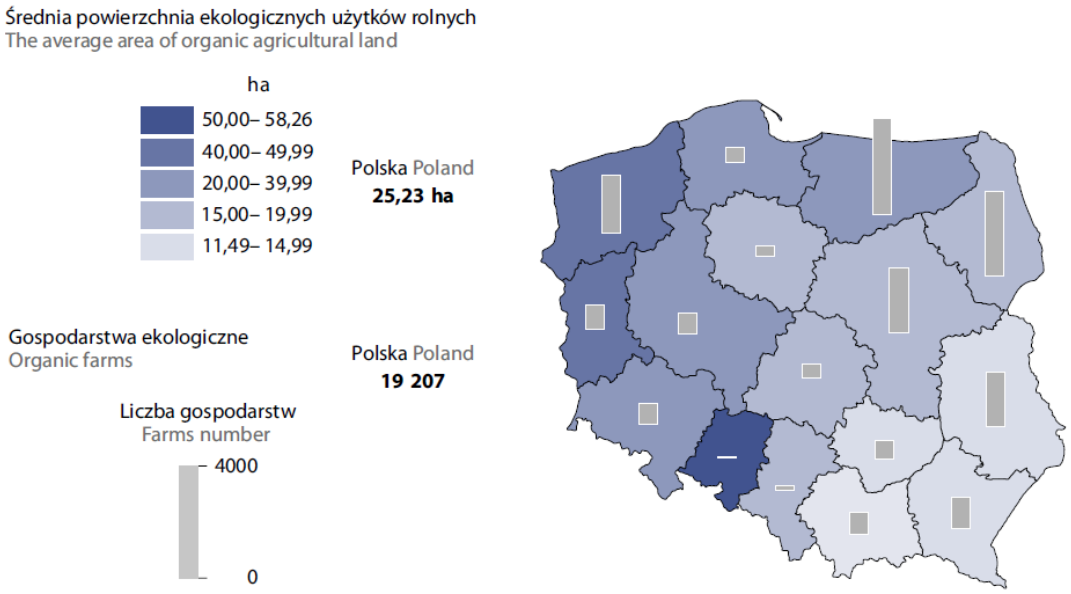
More than a half (nearly 56%) of all organic farms were located in w 4 provinces: warmińsko-mazurskie (17.7% of all organic farms), podlaskie (15.6%), mazowieckie (11.9%) and zachodniopomorskie (10.7%).

Wykres 24. Ekologiczne gospodarstwa rolne
Chart 24. Organic agriculture farms



Źródło: dane Głównego Inspektoratu Jakości Handlowej Artykułów Rolno-Spożywczych.
Source: data from Main Inspectorate of Agri-Food Products Quality.

Mapa 3. Średnia powierzchnia ekologicznych użytków rolnych w 2018 r.
Map 3. The average area of organic agricultural land in 2018



Ź r ó d ł o: dane Głównego Inspektoratu Jakości Handlowej Artykułów Rolno-Spożywczych.
S o u r c e: data of the Main Inspectorate of Agricultural and Food Quality.

2.5. Concentration and regionalization of production

Soil and climate conditions and local traditions determine the regionalisation in agricultural production specialisation. In central, eastern and northern regions of Poland rye, mixed cereals and maize predominate. Orchards and berry fruit plantations are concentrated in mazowieckie province (grójecki region), lubelskie prvince, Sandomierz area and also in wielkopolskie and łódzkie provinces. Crops with greater soil and climate requirements are more often cultivated in the eastern-south and western part of the country as well as in Żuławy and Warmia. In these regions, intensive cereals dominate, mainly wheat, sugar beet and rape.

Dairy cattle breeding is concentrated, above all, in podlaskie, mazowieckie, warmińsko-mazurskie and wielkopolskie and pig breeding in wielkopolskie, kujawsko-pomorskie, mazowieckie and łódzkie provinces. Sheep breeding at a larger scale takes place in mountain regions (małopolskie and podkarpackie provinces).

The process of cattle farming concentration is confirmed by the development of large scale breeding farms with simultaneous decrease in the livestock kept on farms with only a few animals. The findings of a study on the cattle population conducted in December 2019 demonstrated that farms with over 20 cattle heads kept 83.1% of the national cattle stock (77.1% in December 2018). Farms with more than 100 animals kept 27.8% of the total cattle population (19.7% in December 2018).

One of the factors that limit cattle breeding concentration is the lack of possibility to extend the farm area and secure volume fodder. Similarly to the situation in pig breeding, increasing regionalisation in cattle breeding is also a fact. In December 2019, 51.5% of the cattle population were kept in three provinces that border each other: mazowieckie – 18.6%, wielkopolskie – 16.3% and podlaskie – 16.6%. The share in other provinces did not exceed 8%.

Results of the pig population study also provided evidence for gradual concentration and regionalisation of pig breeding. In December 2019, nearly a half of all pigs (50.2%) were kept in farms with 1,000 pigs or more. In the same group of farms, the pig population increased by 11.4% in relation to the same period of the previous year. Small-scale breeding farms (with up to 100 animals), kept 16.0% of the national pig stock. As a consequence of the requirements concerning biosecurity measures to prevent livestock from contracting ASF and low breeding profitability, the pig population in these farms dropped by 20.0% in relation to December 2018. In farms breeding 100–1,000 pigs and keeping 33.8% of the total pig population, the herd size increased by 1.6%

Mapa 4. Obsada trzody chlewnej i bydła w 2019 r
Map 4. Number of pigs and cattle in 2019

Stan w grudniu
As of December

Pogłowie bydła
Cattle stock

szt./100 ha
heads per100 ha

100

0

Polska Poland
43 szt/100 ha
heads per 100 ha

Pogłowie trzody chlewnej
Pigs stock

szt./100 ha
heads per100 ha

100

0

Polska Poland
76 szt/100 ha
heads per 100 ha