

Pig production in Poland in the 20th century: History and future prospects

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Summary

The article is based on a comparative analysis of statistical data on the size and structure of pig herds in Poland in the period of 1930-1989. It focuses on the economic situation and agricultural policies after World War I and World War II and the problems due to war damage and the communist economic system imposed by the Soviet Union. Polish pig breeding was successful in the postwar periods in terms of the development of breeding material for noble pig breeds: Polish Large White, Polish Landrace, Złotnicka White, Złotnicka spotted, and Puławska. This article shows the long-term prospects of pig breeding trends in Poland and their implications for present pig production. It also shows that Poland has unique opportunities and conditions for rebuilding and development of pig herds and can compete on the global market.

Keywords: history of breeding, pigs, rebuilding of Polish pig herds

During the twentieth century, there were two main periods in which rebuilding of the pig stock was critically required: after 1918 and after 1945. A common feature of these periods was the need for a comprehensive reconstruction of the Polish state, along with its economy, agriculture, and industry. Extensive war losses and widespread destruction of the means of production in both agriculture and industry necessitated a quick and comprehensive rebuilding of pig herds to meet the nutritional needs of the population. These factors depended on the condition of the state, fodder production possibilities, and the structure of the economy, which was radically changed in both of those periods, albeit more so in the latter.

In both of those periods, pig breeding was not the priority, even if it was still important. From 1918 through 1939, the reconstruction of the livestock was more spontaneous and decentralized, subject to state control only to a very limited extent, as the economy was still regulated as a free market. However, the structure of agriculture after 1945 was modeled on the centrally planned economy of the Soviet Union, with rigid and overbearing state control and central planning. Both fodder production and animal breeding were

almost completely controlled by the state in a centrally planned socialist economy and in what was allowed to survive in the smallholding peasant economy (10).

In 1948, under pressure from the USSR, all socialist countries, including Poland, made changes in agricultural policy, and the main direction was collectivization. The economy was orientated toward the elimination of small-scale production and the reduction of individual farming. Individual burdens on farmers were increased (compulsory food supplies, free labour for villagers to maintain drainage facilities and roads, progressive taxes, compulsory insurance). They did not have access to agricultural machinery and equipment, which is increasingly used in socialised agriculture. This meant a significant economic deterioration in the situation of individual farmers, lack of access to modern technologies, and farming in a traditional manner. Statistically, the pig production on individual farms significantly exceeded that on cooperative farms. However, this did not correlate with the amount of state funding for breeding on individual farms, as the importance of the peasant economy was marginalised. The disposal of agricultural products and the access to feed depended on the market situation. In addition, an element of the

link between agriculture and the centrally planned economy was contractual agreements with individual farmers specifying the state's purchase of quantities of products. Due to the lack of an effective agricultural policy and the absence of market regulations, ad hoc measures were implemented to ensure increased production (especially of commodities) (23).

The entire economy was controlled by the state and was seen to be subservient to state policies, according to the Marxist model (22). Despite the fact that state farms (PGR) were privileged and allotted much larger average areas, most of the pigs were bred in fragmented and underfunded smallholding farms owned by the peasants. Farming conditions also changed from a cheap and undemanding hut system to a closed cycle. Despite difficult conditions caused by ineffective agricultural policies, the pig breeding sector expanded and throughout the period of the People's Polish Republic became the basis of meat production (25, 38).

The purpose of the article is to analyze the reconstruction and development of the pig population in Poland in the years from 1918 to the beginning of the political transformation in 1989. The article is based on a retrospective analysis of statistical data on the size and structure of pig herds in Poland in the period 1930-1989.

Pigs in Poland in the Interwar Period

As a result of World War I, pig production in some voivodeships decreased below 30% of the prewar output (18). However, due to encouraging performance parameters, i.e. the large number of piglets during the

rearing period and the ease of feeding, small farms started to rebuild their herds. In Poland in the interwar period, the leading field of production/breeding was cattle, followed by pigs, then horses, sheep and goats (Fig. 1).

Pig breeding was subjected to great fluctuations, although the differences were not significant compared to the pre-war situation. In 1927 the central voivodeships recorded significant growth of the pigs' population by 150%, in the eastern voivodeships – an increase of 25%, in the western voivodeships – a decrease of 6%, and in the southern voivodeships – a decrease of 22% (12).

However, in 1927 compared to 1921, there was an increase in number of animal heads, on average in Poland by 22.4% (36). At that time, the largest number of farms breeding pigs were located in the Poznań (91.7%) and Pomorskie (87.8%) voivodeships, and the smallest – in Kielce, Vilnius, Nowogrodzkie and Stanisławowskie voivodeships (34). The low pig population was caused by the extensive type of farming, unfavorable natural and economic conditions (including infertile soils, low yields, and general poverty), inadequate climatic conditions, and low agricultural culture, as well as a lack of knowledge in the field of breeding. The low population resulted from the division of farms and the overpopulation of villages where the staple food was cereals, potatoes, and milk, which resulted in a lack of fodder for pigs. In the interwar period, three breeds of pigs were bred in Poland: the domestic breed, upgraded pigs, and thoroughbred pigs of noble breeds based on imports from England and Germany. In the eastern

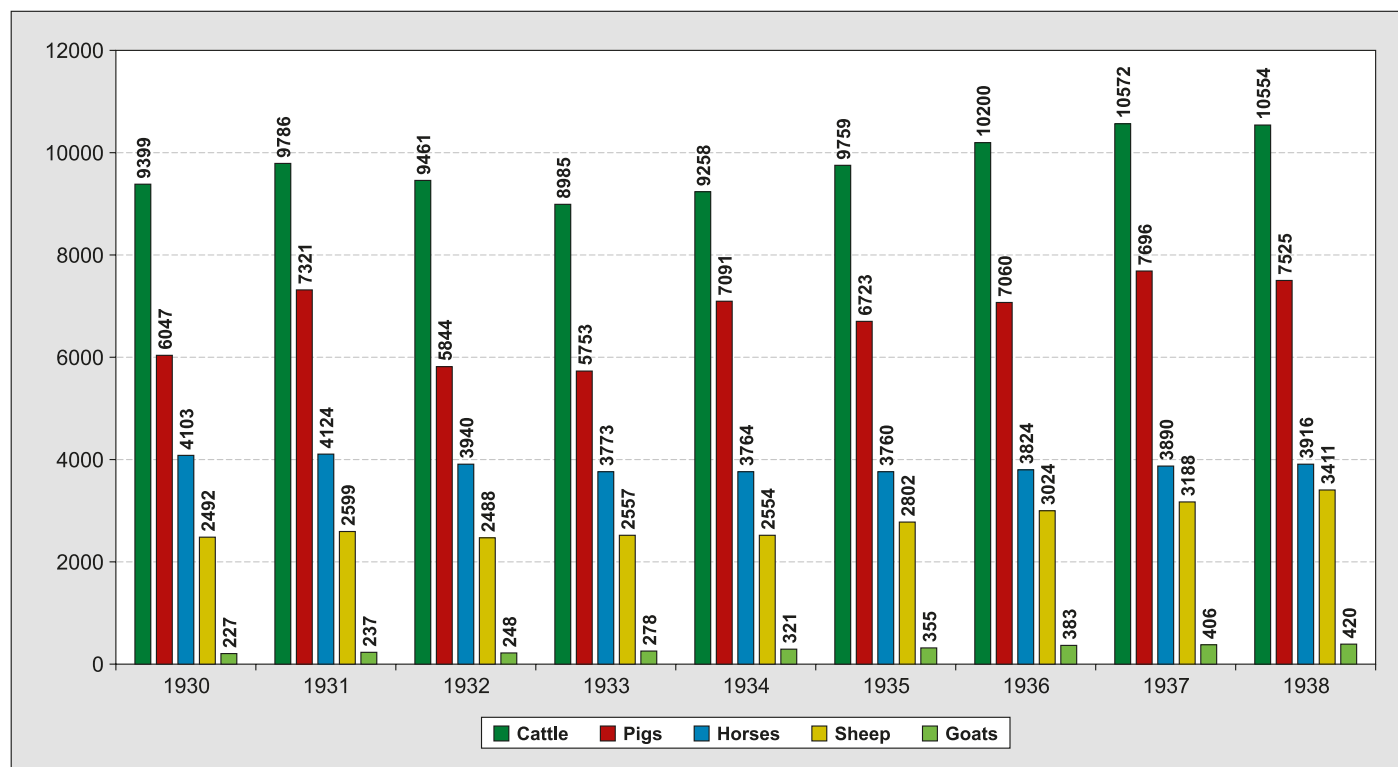


Fig. 1. Farm animals in Poland in the years 1930-1938 in thousands

borderlands of Poland, a large Polish long-eared pig and a small Polish sharp-eared pig were bred, less often a one-hoofed pig (17).

In farm breeding, there was no clear breeding direction and the herd replacement was achieved mostly by random crossbreeding of available pigs. The situation was different in experimental stations where breeding was performed through a planned cross-breeding plan. One of the most important nuclei of breeding centers was located in the Lubelskie voivodship, where the most popular type was white pigs crossbred with English Large White boars (7).

In 1926, at the Zootechnical Station in Borowina near Dęblin (National Research Institute of Agriculture in Puławy), the work on a new breed was initiated. The so-called Puławska (Gołębska) breed was designed. It was a result of the crossing of primitive short-eared, long-eared, and Berkshire pigs. The Puławska breed shows a gentle nature without signs of aggression toward other animals in the group, good health, and a tendency to fatten that resulted in faster-growing, early-maturing pigs with fatter, more succulent meat (58).

Also in 1926 Poland and the Baltic states found a sales niche and recognized advantages in a bacon export to Britain. Due to that fact, the Polish government gave financial support to the hog industries. The Netherlands and other countries, after analysis of the market situation, soon followed Poland. It resulted in a rapid fall in pork prices in Great Britain (47, 54).

In 1933, the British market was flooded by imported pork. To prevent financial loss for domestic producers, the British government imposed limits and a quota sys-

tem on imports as well as the Pig Marketing Scheme. The aim was to classify pig quality and use the Large White boar for crossbreeding with local British breeds. Animal health and welfare were improved, and bacon production became the main aim of British pig production (6, 47).

In 1933 Poland exported 40 083 tons of bacon to England. Due to the European market demand for a particular meat type, the process of selective breeding of the English Large White breed proceeded according to a specific goal (8). A very precise selection of animal material was used, allowing only for individuals showing better growth, late maturity, and a longer body to be bred. At the same time, only English Large White boars were utilized for breeding. In 1936 a separate breed was officially recognized by the Polish Ministry of Agriculture under the name Pomeranian Large White. Unfortunately, World War II ruined most of the breeding efforts (28).

The development of pig breeding in Poland was supposed to be stabilized by the Act of 1935 (13), as well as the constant development of veterinary services, which were organized almost immediately after the end of the war. Despite the generally fast pace of rebuilding of the global pig stock after World War I, the process was undeniably slower in Poland than in other countries. Even in the 1920s, production surpluses were exported to Austria, Czechoslovakia, and partly Germany. However, at the beginning of the 1930s, the rate of development of pig farming in Poland was 138.5%, while in other countries it was much larger (in Denmark – 382.7%, in Norway – 267%, in Sweden – 174.2%, Germany and Czechoslovakia – 150%, Austria – 148.2% and in Latvia 147.7%). In 1938 in Poland the structure of the herds was such that about half of the individuals were less than six months old (Fig. 2) (17, 48, 49).

First postwar years

The first task after World War II was the reconstruction of livestock herds. Postwar conditions were not conducive to this: mined agricultural land, a plague of mice and Colorado potato beetle, and a lack of artificial fertilizers, building materials, and agricultural tools. Farms were destroyed and looted. The pig stock in 1946, compared to 1938, decreased almost four times (Fig. 1). The number of cattle decreased by 2.3 times,

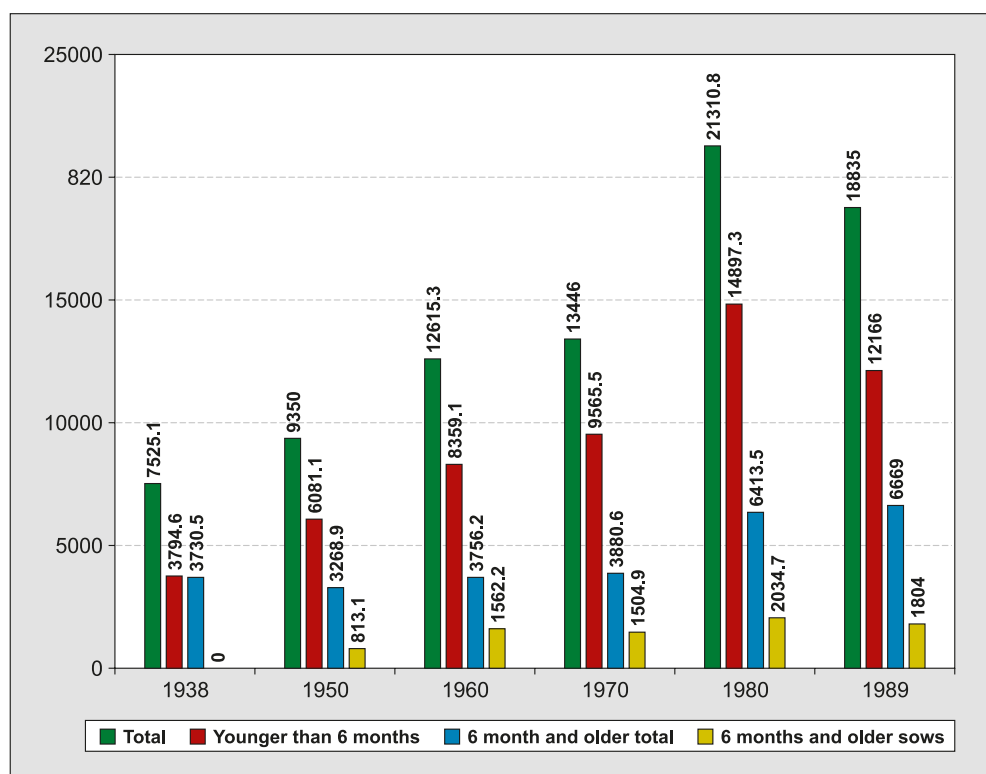


Fig. 2. The structure of the pig herd in Poland in the years 1938-1989 in thousands

sheep 2.7 times, and horses – 1.8 times. There were 46.4 pigs per 100 ha of agricultural land in 1938, and only 13.1 in 1946. However, this number doubled in the following year. In total, there were 4.7 million pigs in Poland, which means 23 pigs per 100 ha of agricultural land. In 1948 there were already 5.1 million animals (25 animals per 100 ha of agricultural land), and in 1949 there were 6.12 million (11, 32).

Despite the increase in the pig population, progress was still insufficient for the nutritional needs of the populace (31, 50).

The main meat-type herds in Poland after 1945 were Polish Large White pigs, which made up about 60% of the population in Poland at that time. The distinction of 4 utility types were introduced by Prof. Kielanowski (meat, meat and fat, lard, and slanina). Three utility types: meat (fattening pigs to weight over 120 kg, including bacon type to less than 90 kg), fat and meat (120-160 kg), and lard type (over 160 kg) has not been present since the mid-1970s. In less agriculturally developed regions, the Polish Landrace breed was bred (about 20% of the population). The increased social demand for meat products shaped the direction of breeding for meat utility type pigs (16).

The Złotnicka White and Spotted breeds were created in the years 1946-1949 when Prof. Stefan Alexandrowicz conducted research on primitive pigs in the Olsztyn province. For his research, he purchased 5 boars and 18 gilts brought by evacuees from the vicinity of Vilnius and Nowogródek to the areas of the province of Olsztyn. They were crossbreeds of primitive long-eared and short-eared pigs with a predominance of the former and perhaps an admixture of English Large Whites. These animals were placed at the Agricultural Experimental Station which belonged to the Agricultural University of Poznań. Initially, the purchased animal material was highly varied in terms of conformation and color. In the initial population of pigs of the Złotnicka breeds, black-and-white and white-spotted pigs were predominant, but there were also black, grey, red, and striped pigs. In the course of the breeding program, based on rational selection of animal material and individual selection for mating, two varieties of Złotnicka pigs were developed: white with meat type and spotted with meat and lard type (2, 4, 40, 41).

The breeding programs of Polish meat breeds that were based on Large White pigs imported from England and Sweden started again in 1947 thanks to the United Nations Relief and Rehabilitation Administration (UNRRA) help program. Breeding work on the improvement of pigs was carried out in Ciołków (Gostyń, Poznań Voivodeship) by W. Krautforst. It was a work of great importance as he bred an elite herd of high-production meat-type pigs by crossing pigs of the English Large White breed with white sharp-eared pigs (27). Breeding work also took place in other centers

including Pawłowice, Kołuda Wielka, and Rossocha. As a result of the selection and crossing of the English Large White with the white sharp-eared breed, it was gradually transformed from fat and meat into meat type. Therefore, in 1951 at a conference in Kraków, whose participants were representatives of the Ministry of Agriculture and the Institute of Animal Production, a resolution was passed to combine the two breeds under the name Large White (39). However, it was only under the regulation of the Minister of Agriculture from 2 August 1956 (14) and two subtypes have been distinguished for which separate books were created: subtype a, called „bacon type” and subtype b, called „ham type” (37). On 27 December 1962 the Minister of Agriculture introduced the name Polish Large White (15).

By the end of the 1940s, the average human diet was based mainly on potatoes and bread, while meat and meat products, sugar, and sweets were luxury products consumed occasionally (11). The increase in the size of agricultural production (especially in the non-socialized sector) depended on the crops of cereals and potatoes, as well as industrial feed resources. There were also changes in agricultural policy. The state authorities attempted to increase the production of products of animal origin starting in 1949 with a program called „Action H” (52).

As part of it, funds were directed to private and state farms to increase the base of food, rationalize and improve the quality of breeding stock, and improve animal trade. Profitable purchase prices and relief in land tax were also passed, which had a positive impact on the reconstruction of this part of agriculture (29).

The entire economy, including agriculture, was subordinated to the rigors of the socialist economy. This meant that the development and its directions were determined by the state through investment and credit policies, as well as the supply of production means and regulating the demand for food through control of employment and wages (23). Between 1949 and 1957, Poland, like other socialist countries, sharply reduced economic contacts with the West on Stalin's orders. The structure of Polish exports was dominated by raw materials, whose export was to ensure the purchase of the necessary technical equipment for the Polish industry (26).

One of the most important instruments was the contracting system developed after 1956 which covered almost the entire production of industrial plants and the purchase of live pigs from individual farms. The size of the pig herd depended on the variable phenomenon of the so-called „pig cycles” as a result of the price volatility of live pigs and feed (59). Price instability caused changes in the profitability of production and changes in its structure. A temporary change in the direction of economic policy (so-called Gomulka's thaw) resulted in pig cycles being present. However, due to

the specific period of the centrally planned economy, this factor did not have a significant impact on the size of the farm in the period 1945-1989 (51).

The production of fattened pigs, both in individual farms and in large-area state farms, was usually carried out in closed cycles. Three types of production were distinguished during that time: the traditional (farm), indoor or „factory” system (where pigs were kept indoors for most of their lives), and outdoors (where most of the time the animals were kept outdoors). Due to the large fluctuations in the economy, solutions were introduced to reduce production costs. According to the Soviet model, rearing pigs in huts was introduced to farms. It was a cheap method that did not require additional investments in the construction and maintenance of livestock buildings. As a result, the growth rate was similar to that in fattening houses, while a reduced number of influenza cases were observed. There is a lack of comprehensive data on hut production in the 1950s, but, for example Centrala Mięsna in Koszalin ran a hut rearing about 3,000 animals (42).

Since the 1950s

The agrarian structure was diversified in Poland from the beginning of the 1950s. It was caused mainly by the creation of large-area State Agricultural Farms (PGRs), subordinate to central planning, according to the Soviet model (9). The main goal of their formation was to increase plant and animal production, albeit as these farms were usually poorly managed, ineffective, and not subjected to the real needs of the market, their stated goals mostly failed. Despite significant financial and material expenditures, as well as numerous privileges and political favors, financial losses were a constant feature of these farms. The second form

was cooperative production as a form of collectivization of agriculture, often introduced by force. These cooperatives occupied a share of agricultural land of below 10% of the total land. The third form was the individual farms. These small holdings were usually fragmented, underfunded, and suffered from constant shortages of production means, as well as various forms of institutional oppression. Pig production developed in all three forms of farms, although individual farms were the leading segment among them. In 1950, they owned 93.7% of all pigs, 5.9% were owned by state farms, and only 0.4% by cooperatives (Fig. 3) (45).

It should also be remembered that agriculture (especially individual farming) has been burdened with many different administrative difficulties and contingents: financial (land tax) and material. The latter included forced deliveries of agricultural products. It was particularly difficult to comply with for underinvested individual farms, where enforcement was strict.

Farmers were obliged to provide the state with of basic supplies new agricultural products at almost symbolic prices, which do not represent the real value of these products. For example, the state paid peasants PLN 37.50 for 1 q of wheat, and PLN 9 for 1 q of potatoes. Livestock prices were similarly low (PLN 1.25-2.0 per 1 kg). Compared to the free market prices of wheat (PLN 1,779/1 q) and potatoes (PLN 191/1 q) in December 1945, we see that peasants were paid only 2.1% of the free market price of wheat and 4.7% of the price of potatoes for compulsory deliveries. According to Winiewska (1961) – in the years 1944/45 and 1945/46, obligatory supplies of grain amounted to 1,358.6 thousand tons, and potato supplies 1,692.2 thousand tons (56).

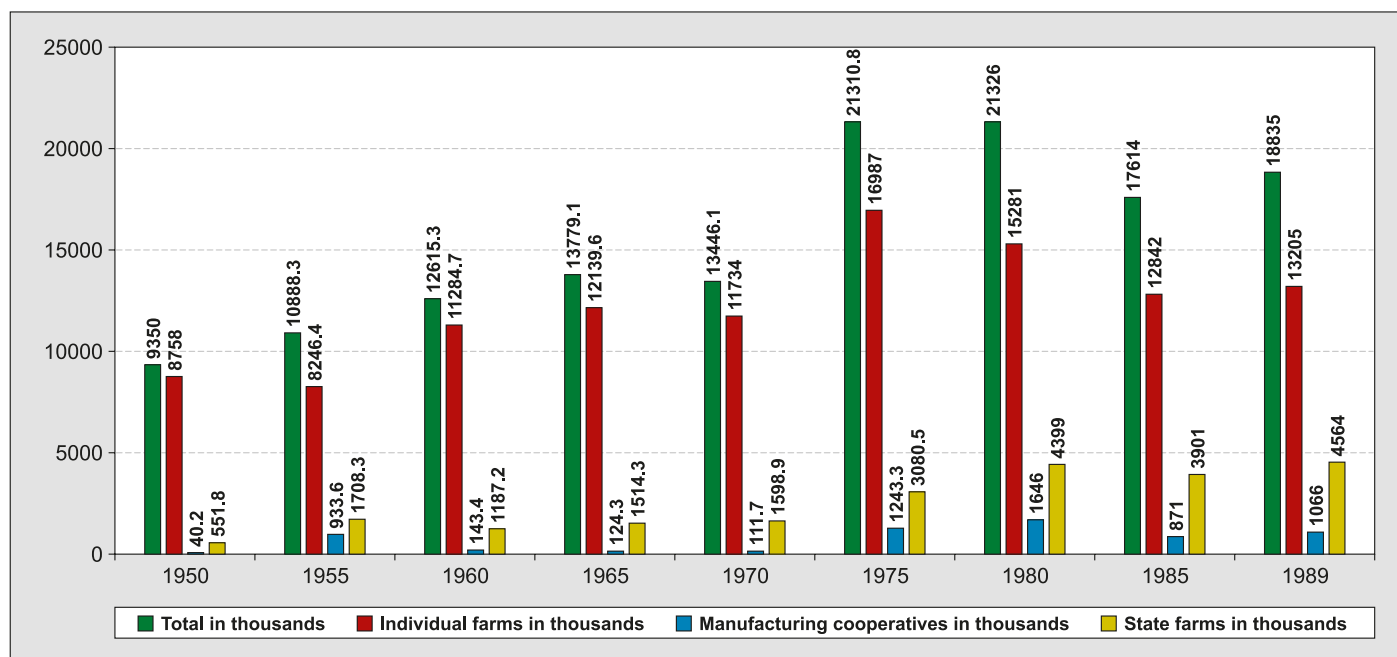


Fig. 3. Pigs in rural farms in Poland in the years 1950-1989 in thousands

Production cooperatives and state farms were treated leniently in this respect. No less than 70% of the amount of obligatory deliveries of slaughtered animals consisted of pigs, and the rest consisted of cattle or sheep (35). During this period, the size of the herds was the greatest in the following Voivodeships: Poznań (in western Poland) with 14.7% (861,000 heads) of the total number of pigs in Poland, Warszawa (in central and eastern Poland) – 10.7% (628,000 heads), Lublin (in the southwestern part of Poland) – 10.3%. (604,000 heads) and Bydgoszcz (in the northern part of Poland) – 9.4% (550,000 heads). In 1950, 65% of the total herds were animals under six months of age. Among the remaining 35% of the animals were half-year old and older. Of the 35% the 25% of them were sows. These areas formed the basis for the development of Polish pig development (19).

In the mid-1950s there was a certain economic revival associated with the growth of agricultural production. Credit assistance, material supplies, and the development of mechanization expedited increased production of foodstuffs. There has been a noticeable increase in the size of the herds as well. In total, 10,888.3 thousand animals were kept in Poland. Pigs constituted 75.7% on individual farms, 8.6% on production cooperatives, and 15.7% on state farms. In the 1960s, despite the administrative preference for cattle breeding, the growth of pig stocks was also observed. It was the result of a favorable relationship between pig prices and feed costs (59). This was also influenced by the new agricultural policy announced in 1957, which allowed for the reduction of mandatory supply standards (mainly individual farms benefited), increased the purchase prices of agricultural products (contract price, purchase price of piglets, cash bonuses for litters were introduced for litters of piglets and rearing of sows), and increased the supply of means of production and credits for the agricultural sector.

In 1960 individual farms owned 89.5% of all herds, state farms 9.4%, and production cooperatives – 1.1%. In 1965 it was respectively: 88.1%, 11% and 0.9%. In 1965 the commercial production of individual farms amounted to 92% of live pig deliveries, 85% of live beef deliveries, 77% of milk deliveries, 95% of eggs and poultry deliveries and 80% of wool deliveries (20). During this period, the importance of the Podlasie-Mazowieckie breeding region increased, especially concerning lard fattening and lard and meat fattening based on potatoes and also for further development of breeding. The dominant type of pig was transformed into meat-type animals (3). The size of herds in the given regions of Poland changed: in this respect, the Warszawa Voivodeship dominated – 12.7% (1607.6 thousand animals), Poznań – 12% (1510.7) and Lublin (1284.9 thousand animals). The fewest pigs were bred in Szczecin (north-western part of Poland) – 1.9% (246,600 heads), Katowice (southern part of Poland)

– 2.6% (328,000 heads) and Gdańsk (northwestern part of Poland) – 2.9% (365,000 heads). The general structure of herds also changed: in 1960, 66.3% of the animals were individuals under six months of age. Among the remaining ones, almost 34% were half-year-old and older, while 12.4% were sows (1). The decline in the proportion of sows and the reduction in their use in the herd was influenced by the general situation of agriculture in Poland at that time. In 1959, there was a significant crop failure, which adversely affected feed production. The state was reducing rural incomes in favour of obtaining the financial resources for industrialisation. Faced with shortages in production supplies, the economy again found itself in a phase of increasing favoritism towards the nationalized sector (30).

In the last 10 years of the socialized economy, an increase in daily gains of 40-80 g was achieved. The fattening period was reduced by 7-8 days, and feed consumption per 1 kg of growth was reduced. In 1951, the consumption of Scandinavian units per 1 kg of increment was about 4.20 (5) and in 1964 it was 4.03. Feed consumption per 1 kg of growth was limited. Data from Pig Performance Testing Station shows that slaughter usefulness of the animals was improved. Mean carcass length in 1955 – 76.9 cm. and in 1964 – 80.1 cm., the thickness of the back fat on the shoulder in 1955 – 4.58 cm. and in 1964 – 4.14 cm., the thickness of the back fat on the back in 1955 – 2.54 cm. and in 1964 – 2.33 cm. and the thickness of the back fat on and on the cross in 1955 – 3.23 cm. and in 1964 – 3.32 (46).

The greatest improvement was achieved in the breeding of Żłotnicka White pigs, and the best result was recorded in the breeding of Polish Large White pigs. However, the following breeds were also retained: Polish Large White, Puławska, Żłotnicka White, and Żłotnicka Spotted (32). Problems with maintaining the upward trend appeared in 1969. This happened for numerous reasons: the decrease in the profitability of pig fattening compared to other animal products and fodder problems related to low yields. Especially at the end of the 1960s, there was a crop failure of potatoes and green fodder caused by drought, which resulted in a decrease in the number of pigs and cattle. The results of those agricultural problems had a negative impact on the supply chain and resulted in a reduction in foodstuffs exports, in particular meat. Increases in the prices of scarce meat, along with general shortages in the consumer market and other social and economic problems, were one of the sources of social discontent leading to tragically suppressed workers' strikes (33).

In the 1970s, the structure of agriculture was complex. Individual farms occupied 79% of the total agricultural land, socialized agriculture; state farms – 18.1% of agricultural land; and production cooperatives – 1.7% of agricultural land. Pigs were mainly

kept on smallholding individual farms and in 1970 individual farms kept 87.3% of the total number of pigs in Poland, state-owned farms 11.9%, and production cooperatives – 0.8%. However, in 1975 it was respectively: 79.7% (16,987 thousand pieces), 14.5% (3,080.5 thousand pieces), and 5.8%. However, on state farms that kept 10,000 pigs, about 50 people were employed (with the current intensification of production, there are fewer than 10 people employed on a farm of the same size nowadays). Despite the fact that state farms were more subsidized and received many state subsidies, they were less effective in breeding. This was a result of the overall condition of state farms, which were poorly managed, with wastefulness and irrationality of production prevalent (45).

The largest number of pigs were bred in the Poznań Voivodeship – 13.5% (1,818,000 heads), Warszawa – 13.3% (1,783,700 heads) and Lublin – 10.3% (1,391,400 heads). The lowest in Szczecin – 2.5% (330.9 thousand units), Zielona Góra (western Poland) – 2.7% (369.1 thousand units), and Opole (southwestern Poland) – 3.2% (426 thousand units). The share of piglets and weaners under six months increased to 71%. Among older animals, 39% were sows. In total, there was a 19.4% increase in agricultural production in the years 1971-1975, and the intensification of production was also visible in the size of the average pig herd (19, 20). By 1975 it almost doubled compared to 1970 (Fig. 2). This resulted mainly from the directions of agricultural policy, which aimed for an increase in animal production through the import of cereals and feed. Obligatory deliveries were abolished in 1971. There were new set purchase prices which increased the profitability of breeding/production. It also increased the supply of industrial feed and reduced the difficulty of obtaining investment credits. The size of domestic agricultural production and crops also benefited from favorable climatic conditions. The production boost was observed not only in individual farms but also in the socialized economy.

In the mid-1970s there was a surge in investment and consumption, based on foreign loans. As a result, national income grew (from 8.1% in 1971 to 10.4% in 1975). Poland purchased five technologies in 1972-1973 in the form of complete industrial farms with an innovative production method. This policy was combined with a growing debt and as early as 1976, the first effects of the deteriorating economic situation and economic imbalance (material intensity, energy intensity in production, faulty agricultural policy, faulty choice of production scale especially in livestock farms, delays in investments) were noted (30).

Poland purchased five technologies in the form of complete industrial farms between 1970 and 1973:

- according to “Gi-Gi” (Italy) technology: e.g. the farm in Kołbacz at the Zootechnical Experimental Department of the Institute of Zootechnics,

- according to “Agrokompleks” (Hungarian People’s Republic) technology: e.g. the farm of Kętrzyn Agricultural-Industrial Union,

- according to “Holz” technology (FRG): for example, the farm in the State Agricultural Farm Kadłubek near Trzcianka,

- according to “Emona” technology (Yugoslavia): e.g. State Agricultural Farm Bieganów,

- according to “Schmidt-Ankum” technology (FRG): e.g. State Agricultural Farm Graniczna.

A number of proprietary technologies have been developed in the country and put into practice as finished facilities. Such examples are the “Bydgoszcz”, “Poznań” and “Szczecin” technologies (55).

Intensification of breeding and the related application of modern technologies were the main tasks set for agricultural workers and the veterinary service by the 24th CPSU Congress. The implementation of these plans would not have been possible without many factors; however, one important element was effective cooperation between the veterinary service and animal science. Scientific and practical problems concerning the control of infectious diseases have been dealt with by many institutions, in particular the following should be mentioned: Institutes of Infectious and Invasive Diseases at the Faculties of Veterinary Medicine in Lublin, Olsztyn, Warszawa and Wrocław, the Institute of Veterinary Medicine in Puławy and the Institutes of Veterinary Hygiene. Among the more important issues was the aspect of zoohygiene including: issues of the impact of environmental factors on physiological, health and production functions, technological and technical methods of optimizing conditions for maintaining animals in livestock buildings, evaluation of the impact of industrial contamination on animals, the use of natural mineral-organic additives and biostimulants in the prophylaxis of piglet rearing, methods of waste disposal (53, 57).

Large herd breeding was also developed in the socialized economy. Of the state’s total of 290 herds, approximately 180 maintained 4,500 breeding sows in total (43). Since 1972 the so-called industrial pig fattening was based on feed sourced from outside of their farms. In the second half of the 1970s and 1980s, a record number of pig herds was reached in Poland. In 1980, 70% were animals less than six months old, and among the older ones, almost 32% were sows (44). In the first half of the 1980s, a decrease from 21,326 animals in 1980 to 17,614 in 1985 was recorded. Some of the reasons were the decrease in the profitability of breeding, the deterioration of the supply of industrial feed, and the increase in their prices. Breeding was discontinued or limited by both individual farms and specialized farms, and so-called industrial pig fattening also declined. The reduction in the import of cereals and feed and the failure of the potato crop contributed to the further worsening of this situation. Hence, in the

entire national economy, there was a decrease in pigs per 100 ha of agricultural land on average, from 113 in 1980 to 94 in 1985. At that time, most pigs were kept in the following voivodeships: Szczecin 11.7% (359.4 in thousands), Słupsk (in northern Poland) – 6.9% (212.8 thousand), Zielona Góra 6% (185.3 thousand), Wrocław (south-western Poland) – 5.4% (167.6 in thousands), Poznań – 4.7% (144.9 in thousands). As of June 1, 1975, districts were abolished and 49 provinces were created in place of 17 provinces and 5 separate cities (Warszawa, Kraków, Łódź, Poznań, Wrocław), which affected the presentation of data (45).

Already in the second half of the 1980s, the herds began to increase again and the higher crops of cereals and potatoes had a significant impact on this. Potato harvests were the most important for individual farms, as they were the basis for the pig's diet. The return to the traditional way of feeding, including a smaller share of industrial feed and cereals, extended the fattening period by 30%. This resulted in a higher consumption of fodder and a decrease in the profitability of live pig production (16). In 1989 the population in the whole country slightly increased to 18,835,000 heads (101 heads per 100 ha of agricultural land). Whereas 70% of the total belonged to individual farms (93 animals per 100 ha of agricultural land), 24% to State Farms (130 animals per 100 ha of agricultural land) and 5.6% to production cooperatives (146 animals per 100 ha of agricultural land). The end of the 1980s was characterized by an increase in plant production, which resulted in a decrease in the share of breeding in global production and the resulting deterioration of the agricultural food offer. At that time, in comparison to 1980, the share of piglets and weaners under six months of age dropped to almost 65%. On the other hand, in the group of animals six months old and older, sows accounted for 27%. Data presented in Figure 2. At the end of the 1970s, there was an economic collapse, which resulted in mass social protests. In 1981, martial law was introduced, which resulted in a reduction in the number of pigs (21, 44, 60).

Export and breeding of pigs in selected countries in the years 1945-1989

The recovery of Polish pig herds was largely dependent on the import of breeding material. As early as 1947, 25 boars and 250 English Great White sows were imported from Great Britain. In the following years, small numbers of pigs were imported, albeit quite systematically, from Sweden and Great Britain. In the years 1947-1965, 357 boars and 689 sows were imported. A little later the import of white lop-eared pigs began, and the first 40 boars were imported from German Democratic Republic (GDR), followed by 85

Tab. 1. Export of breeding pigs from Poland in 1951-1964 in heads

Years	Polish Large White				Polish Landrace			
	buyer	boar	sow	total	buyer	boar	sow	total
1951	HPR	51	75	126	-	-	-	-
1958	HPR	13	5	18	PRB	21	43	64
	PRB	10	16	26				
1959	USSR	34	95	129	PRB	70	309	379
1960	PRB	1	90	91	PRB	42	146	188
					RSR	15	15	30
1961	HPR	7	38	45	Czechoslovakia	48	43	91
1962	GDR	1	0	1	Czechoslovakia	100	200	300
					Japan	3	9	12
1963	GDR	3	0	3	Czechoslovakia	44	268	312
					GDR	7	0	7
1964	PRB	64	94	158	GDR	20	63	83
	GDR	14	31	45	Czechoslovakia	54	231	285
Total		318	825	1143	Total	340	1328	1758

boars and 145 sows from Sweden. The rapid growth of livestock made it possible to launch exports to other socialist countries of that time, especially the Hungarian People's Republic (HPR), Czechoslovakia, and the People's Republic of Bulgaria (PRB), in the early 1950s. During almost 15 years, 1,143 Polish Large Whites (including 318 boars and 825 sows) and 1,758 Polish Landrace (including 340 boars and 1,328 sows) were exported. In 1965 exports were stopped (19). From the end of the 1940s to the 1950s an increase in the world's pig population by 76.4% was observed (Tab. 1). It was associated with an increased demand for animal products and meat consumption. Also in later years, the world's pig population has been steadily increasing. In 1970 it was 78.4% more than in 1949/1950, in 1980 166.1%, and 1989 182.9% (Tab. 2). USSR was the leader in Europe, whose share in world breeding amounted to 8.6%, Germany was second with 3.8% of world production, and in third place was Poland – 3.6%. The world leaders in pig production in this period were China with 24.8% of the total population, the USA with 23.4% and Brazil with 10.1%. In 1959/1960 the USSR increased its world share to 11.7%. Germany and Poland remained in second and third places, but their share on a global scale decreased to 3.3% and 2.8%, respectively. China increased its potential and its share was almost 15% higher than ten years earlier. On the other hand, the share of the USA decreased by over 10% (to 13%). The share of Brazil also declined slightly (to 10.3%). In 1970, the share of the USSR in Europe increased to 12.2%, but in the following years, it began to decline. In 1980, it was 10.8%, and in 1989, it was 10.6%. The other leaders from the Federal Republic of Germany and Poland found themselves in the same situation. The share of the Federal Republic of Germany in 1970

Tab. 2. Pig farming in selected countries in 1949-1989

Countries	1949/50		1959/60		1970		1980		1989	
	in thousand heads	share in the World in %	in thousand heads	share in the World in %	in thousand heads	share in the World in %	in thousand heads	share in the World in %	in thousand heads	share in the World in %
World	258227	100	455472	100	460596	100	687161	100	730426	100
Argentina	3000	1.2	3800	0.8	4250	0.9	3800	0.6	4200	0.6
Brasil	26059	10.1	46823	10.3	30846	6.7	34183	5.0	33200	4.5
PRB	1038	0.4	2266	0.5	1967	0.4	3830	0.6	4119	0.6
ChRLD	64006	24.8	180000	39.5	172510	37.5	313008	45.6	348954	47.8
Czechoslovakia	3802	1.5	5687	1.2	5037	1.1	7588	1.1	7384	1.0
Denmark	3235	1.3	6147	1.3	8361	1.8	9957	1.4	9105	1.2
Philippines	4078	1.6	6573	1.4	6456	1.4	7934	1.2	7775	1.1
France	6760	2.6	8357	1.8	10463	2.3	11446	1.7	12480	1.7
Spain	5709	2.2	.	.	6915	1.5	10715	1.6	16268	2.2
Holand	1860	0.7	2955	0.6	5650	1.2	10138	1.5	13700	1.9
India	3653	1.4	4932	1.1	4800	1.0	10000	1.5	10300	1.4
Japan	623	0.2	1918	0.4	6563	1.4	9998	1.5	11866	1.6
Yugoslavia	4287	1.7	6210	1.4	5544	1.2	7502	1.1	7396	1.0
Canada	5413	2.1	6051	1.3	6460	1.4	9688	1.4	10635	1.5
Mexico	6550	2.5	10205	2.2	10298	2.2	13222	1.9	14500	2.0
GDR	5705	2.2	8283	1.8	9237	2.0	12132	1.8	12464	1.7
FRG	9698	3.8	14876	3.3	19323	4.2	22374	3.3	22693	3.1
Poland	9350	3.6	12615	2.8	13446	2.9	21326	3.1	18835	2.6
Socialist Republic of Romania (RSR)	2197	0.9	4300	0.9	5972	1.3	10899	1.6	15400	2.1
USA	60502	23.4	59026	13.0	56655	12.3	67353	9.8	55499	7.6
HPR	5542	2.1	5356	1.2	5700	1.2	8355	1.2	8327	1.1
Great Britain	2986	1.2	5724	1.3	8088	1.8	7815	1.1	7626	1.0
USSR	22174	8.6	53368	11.7	56055	12.2	73898	10.8	77700	10.6

was 4.2%, and in the following years it was 3.3% (in 1980) and 3.1% (in 1989). Poland's share in world production in 1970 was 2.9%, in 1980 3.1%, and in 1989 2.6%. In the last 20 years of the analyzed period, the growing advantage of China was distinct. Despite a temporary drop to 37.5% in 1970, in the following years, the country achieved almost half of the world's production: 45.6% in 1980 and 47.8% in 1989. This marginalized the position of the USA, whose production since 1970 fell to 12.3%, 9.8% in 1980, and 7.6% in 1989 (44, 45).

Summary

Despite the devastation caused by World War I and II, the difficult economic situation, and the introduction of an ineffective centrally planned economy, the analysis of the perspective on the history of the reconstruction and development of pig husbandry in Poland shows that this country has an exceptional potential in this field. The intensification of breeding led to the creation of not only numerous herds but also research and development centers for individual breeds. With the right and favorable economic condi-

tions, Poland can not only take the role of a leader in breeding but also make a significant contribution to the development of scientific research. The breeding goal is to improve the production characteristics of pigs concerning fattening and breeding performance and to improve the adaptation of production results to the requirements of producers, breeders, and consumers.

Due to the course of history and the fact that a large number of farms remain at the semi-intensive level, we have a large potential for production, both for the production of pigs in fast-fattening (intensive) and sustainable production, including semi-intensive and ecological (many farms with an average number of herds).

Polish breeding was also successful in this field: for example, the development of breeding material in the 1950s and 1960s and the development of breeding of noble pig breeds: Polish Large White, Polish Landrace, Żłotnicka White, Żłotnicka Spotted and Puławska. Based on domestic breeds covered by the Program of Farm Animals Genetic Resources Conservation (Polish Large White, Polish Landrace, Żłotnicka White, Żłotnicka spotted, Puławska), there is a high demand

for meat with these breeds with organic farming and health-promoting parameters.

This study shows that Poland has unique opportunities and conditions for the reconstruction and development of pig herds according to sustainable production and animal welfare guidelines and can compete on the global market.

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