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THE FOOD SECURITY AND SAFETY IN THE CASE OF PORK PRODUCTION IN POLAND

Magdalena Kozera-Kowalska✉

Uniwersytet Przyrodniczy w Poznaniu

Abstract. The purpose of the research study is to present the principles of pork production in Poland especially in the context of national food security and safety. The article presents a synthetic view of the Polish pig sector situation after the UE integration. The author highlights the problems of pig producers as the basic element of the food chain. The study was based on the data of national statistics, industry reports, and national and international literature review related to the issue of pig market problems in Poland. In this paper, the importance of exogenous and endogenous factors and their implications for the pig supply chain in Poland and the role of it in the high and constantly improving level of food safety in the country was also emphasized.

Keywords: food self-sufficiency in Poland, food safety, supply chain of pigs and pork

INTRODUCTION

When analyzing the theoretical and practical constraints for the development of the Polish agriculture in the European and global context, special focus is laid on the need to redefine the role of this industry sector. Rather than be limited to supplying food, it should mainly become a place to live for today's society and future generations (Wilkin, 2007). Steps taken to ensure a sustained development, described by the "environment, society, economy" triad, have resulted in adding two important topics to the ongoing discussions, i.e. ensuring food security which is likely to be perturbed due to more stringent environmental requirements and restrictions imposed on the industrial agricultural production; and ensuring the safety of food which, due to apparently less restrictive guidelines, may lose some of its health properties. In Poland, these issues seem particularly important in respect to production of pork which is among the products of strategic importance to food security[1].

The purpose of this paper is an attempt to assess the first stage of the pork supply chain in Poland (i.e. pig holdings) in the context of potential threats that affect or are likely to affect both the food safety level and the undermining of the national food security in the area of meat supply. This paper summarizes the condition of the Polish pork sector after EU integration in the broad context of economic and social transformations. Specific focus is put on the importance of pig production in Poland from the perspective of securing food self-sufficiency for the country. This paper is a retrospective analysis performed with the use of national public statistical data (originating from the Central Statistical Office, i.e. Agricultural Censuses and Agricultural Yearbooks), industry reports (from the Institute of Agricultural and Food Economics, the National Research Institute), and reviews of literature related to the Polish pig market.

[1] These include the following plant products: cereals, vegetables, fruits and potatoes; and the following animal products: meat (beef, pork and poultry), eggs and milk. Cf. Pawołek, 2015, p. 67–77.

✉dr inż. Magdalena Kozera-Kowalska, Katedra Ekonomiki Przedsiębiorstw Agrobiznesu, Uniwersytet Przyrodniczy w Poznaniu, Ul. Wojska Polskiego 28, 60-637 Poznań, Poland, e-mail: mkozera@up.poznan.pl

CONDITION OF THE PIG PRODUCTION SECTOR IN POLAND

Both in the in the pre-accession period and in immediately subsequent years (2004–2007), the pig production sector in Poland was believed to be the leading and key sector for the national meat production. Although a consistent reduction of the pig population was recorded, and despite the warnings from the scientific community, it was considered to be a secondary or negligible problem because of the abundance of meat in stores. As a consequence, after 2007 which is believed to be an extremely dramatic period for the Polish pork sector, a steep decline of production volumes was experienced (cf. Szymańska, 2014).

The reasons for the reduction of the sow population, and for the resulting decrease of pig production volumes in Poland, were analyzed in detail by Pejsak (2012), Stańko (2012), Blicharski and Hammermeister (2012), Stępień (2014) and many others. Issues emphasized by these authors include the unfavorable patterns of pig production which continues to be dominated by small herds with limited market competitiveness. According to these papers, holdings able to face competition are those with several hundred, or even from 2 to 3 thousand pigs (Pejsak, 2012). Note that while these production volumes are classified as large on a national basis, they are still lagging far behind the industrialized countries or even behind production corporations from the Netherlands, Germany, Belgium and Austria. Not to mention the farming model adopted in the US, Canada or Russia against which the Polish holdings should be able to compete.

The European agriculture model favors farms (as opposed to large holdings) and adopts a number of assumptions which include livestock production with the smallest possible environmental impact. It promotes progressing towards sustainable production activities so as to ensure human and animal welfare and to preserve the natural environment (Zegar, 2012; Krasowicz, 2008). What is also pointed out is that the aforesaid model would enable assigning the costs of environmental restoration to specific manufacturers and, thus, would encourage them to extend their environmental protection efforts (Gołaś and Kozera, 2004). However, this is rather an idealistic concept which, due to limited national and EU funds dedicated to the support of pig production (in Poland and elsewhere), turns out to have a restricting effect on the efficient competition of the European agriculture sector on the increasingly liberalized global agri-food market.

In addition to a disadvantageous structural situation, comparable to that of the national agriculture as a whole, the pig farming and pork production sector experiences an excessively slow natural concentration process which means increasing the herd size and intensifying the production. According to studies by Ziętara et al. (2014), in the period from 1996 to 2012, the number of pig holdings decreased by around 40% (in absolute values, the number of holdings decreased by more than 830,000). In the absence of effective support, the pace of this process (justified by transformations in the national economy) remained unchanged after Poland joined the EU and after Common Agricultural Policy tools were deployed in the agriculture sector. From 2002 to 2010, the number of pig holdings decreased by 360,000 (nearly 47.7%) and continued to decrease by 137,000 (34.5%) in the subsequent period, i.e. from 2010 to 2012. As a consequence, in 2012, there were 260,000 pig holdings in Poland (Ziętara et al., 2014).

Such an important reduction of the number of holdings is considered to be disadvantageous for both the current and future functioning of the Polish pork sector which, despite many years of unfavorable operating conditions, demonstrates good performance in terms of both production and breeding. There are many reasons behind this process and just as many ways of interpreting them. One of the primary reasons (of a strictly economic nature) is the profitability of pork production which keeps decreasing for many years both in Poland and in other European countries.

From the economic point of view, the reduced number of holdings reflects the way pork manufacturers adjusted their operations to market conditions, and especially to the enhanced competition (on a national, intra-EU and international basis). This means the so-called invisible hand of the market is active and eliminates weaker companies in order for the released market space to be managed by stronger ones. As a result of liberalization, the agricultural market becomes highly competitive, making the aforesaid process a reality which is less and less contested both by economists and practitioners. In Poland, as a consequence of these forced market adjustments, the production of pork meat is on a decrease (Table 1).

Table 1. Number of animals and pig production in Poland (in selected years)
Tabela 1. Liczba zwierząt oraz produkcja trzody chlewnej w Polsce (w wybranych latach)

Pig production Produkcja trzody chlewnej	Years – Lata				
	2005	2010	2011	2012	2013
in 1000 heads w 1000 szt.	22 737	19 745	19 675	17 228	15 593
in 1000 tonnes (in live weight) w 1000 ton (w wadze żywej)	2 540	2 388	2 405	2 222	2 059
in 1000 tonnes (in post-slaughter weight) w 1000 ton (w wadze poubojowej ciepłej)	1 981	1 863	1 876	1 733	1 606

Source: GUS, 2014, tab. 141, p. 227.
Źródło: GUS, 2014, tab. 141, s. 227.

Some national pig breeding hubs become more and more apparent and demonstrate an increased production intensity, which is consistent with the sustainability principles. However, the production development stage should be considered insufficient. Production hubs are being created in the north-west and central-west regions, i.e. in voivodeships specializing in pork production: Wielkopolskie, Kujawsko-pomorskie and Mazowieckie voivodeships. In the recent years, Łódź and Pomorskie voivodeships have joined this group. According to analyses performed by the Institute of Agricultural and Food Economics – the National Research Institute, these regions experienced an important increase of the concentration degree of pork production (determined as the share of holdings with more than 200 pigs) in the 2002–2010 period (based on Agricultural Censuses data), moving from 22.8% (in 2002) to 47.1% (in 2010) (Ziętara et al., 2014). This is still below the production concentration levels in such countries as Germany, Denmark or the Netherlands where the share of herds above 200 pigs is beyond 95.1%, 99.7% and 99.3%, respectively. Note also that in these countries, the number of pig holdings is by far lower, ranging from approximately 60,000 in Germany (the relatively greatest population) to 5,000 in Denmark and 7,000 in the Netherlands. In Poland, the degree of production concentration in the largest holdings is increasing compared to the entire population of pig holdings. However, this is a slow process. As shown by experience from the past two years, this transformation is necessary in order to slow down the downward trend, restore stability in the sector and, subsequently, create favorable conditions for the development. One thing that needs to be clarified is the risk for the natural environment: a matter subject to only embryonic rules. This is the living environment for manufacturers as well as for other inhabitants of small towns and rural areas. That problem should become an area of particular interest to the agricultural and social policy of the state. The measures deployed should include financial support disbursed not only from the national budget but also from the EU budget.

PORK PRODUCTION AND THE NATIONAL FOOD SECURITY

“Food security” is a term intuitively known to people from nearly all around the world. Today’s farmers, and agricultural and economic politicians became aware of this issue at the beginning of 1970s in the military context, with reference to the description of the economic and political dependencies of countries (classified as capable or incapable of manufacturing sufficient quantities of food on their own) (Mikuła, 2012). According to the conclusions made at the World Food Conference of 1974, food security means the availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices. This term is sometimes enhanced with nutritional values and food preferences to reflect the reinforced health- and environment-oriented efforts which are made all around the world and are diversified in function of the cultural area, tradition or prosperity (Pawołek, 2015). In practice, food security means a situation where households may actually access food as needed for all members, and are not at the risk of losing that access (Malinowska, 2012). In more general terms, food security is conditioned by the physical and economical availability of food, and by its health properties (absence of diseases and pollutions, reasonable nutrition etc.).

The deepening decline of the Polish pork production sector may result in a slowly growing issue of securing the physical availability of pork meat in the entire supply chain, i.e. from the manufacturer through to the final consumer. When considering this matter, the available meat resources are summarized and balanced with the demand expressed (in the first place) by the consumption. This summary takes into account the meat stocks and the production volume plus import, minus export, and minus the (estimated) deficiencies and losses recorded in the manufacturing plants and during trade operations (GUS, 2014). The production volume itself is calculated by adding the volume of purchased livestock and the quantity of animals slaughtered on farms. To determine the extent of meeting the national food security needs, a summary is used which specifies the domestic production on the revenue side and the consumption on the outflows side. Any differences are recorded as a surplus or deficit. In the case of the Polish pork sector, this summary demonstrates a deficit in the domestic production from the 2008/2009 marketing year at a level ranging from around 7% to over 17% (Table 2).

The deficits of pork meat are the reason for analyzing the so-called food self-sufficiency in respect to pork production. Pork is among the three meats, in addition to poultry and beef, considered to be strategic agriculture products. Self-sufficiency used to be a term referring mostly to closed, autarkic economies isolated from

Table 2. Production and domestic consumption of meat overall and pig meat in cooled weight in the years 2006–2010
Tabela 2. Produkcja i zużycie krajowe mięsa ogółem oraz mięsa wieprzowego w wadze mięsa i mięsa wieprzowego w latach 2006–2010

Specification Wyszczególnienie	Years – Lata				
	2005	2010	2011	2012	2013
Meat total in cooled weight (in 1000 tones) Mięso ogółem w wadze schłodzonej (w tys. ton)					
Production – Produkcja	2 927	3 327	3 400	3 455	3 848
Consumption – Spożycie	2 553	2 690	2 698	2 591	2 458
Export – Eksport	668	1 346	1 476	1 681	1 865
Import	300	649	723	733	734
Losses – Ubytki	47	51	53	52	51
Surplus/deficit – Nadwyżka/deficyt	+24	+12	+0,1	+4,7	–4,6
Pork in cooled weight (in 1000 tones) Mięso wieprzowe w wadze schłodzonej (w tys. ton)					
Produkcja – Production	1 596	1 516	1 544	1 463	1 415
Consumption – Spożycie	1 578	1 661	1 628	1 619	1 626
Exports – Eksport	294	498	566	652	774
Import	203	553	622	625	640
Losses – Ubytki	124	129	164	139	135
Surplus/deficit – Nadwyżka/deficyt	+12	+13	+0,7	+14	–1,1

Źródło: opracowanie na podstawie GUS, 2014, s. 325 i 328.
Source: on study on the base of GUS, 2014, p. 325 and 328.

the other ones (either naturally or by coercion), particularly in respect of trade. However, today's studies, rather than focusing on the historic index which describes the degree of satisfying the population's food demand with domestic production, analyze the economic and physical availability of food on the domestic market, whatever the origin of the food may be (domestic production or import) (Leśkiewicz, 2012). Defined as above, food self-sufficiency is related to an efficiency level of the food supply chain. This means a relationship with the efficiency of the manufacturers' link and, primarily, with the efficiency of the processing and distribution links (cf. Grębowiec, 2012). In that context, some problems emerge on the Polish pork meat market (the horizontal and vertical integration issues, attempts to create clusters on the pig market etc.). As regards pork production, the estimated level of national self-sufficiency is not only following a clear downward trend (if analyzed in the long term, i.e. from 2002 to 2013) but also proves to be variable in shorter (4- or 5-year) periods (Fig. 1). The first of the depicted time intervals is the period from 2002 to 2005 where the pork meat supply on the domestic market (in spite of concerns involved in joining the EU) was kept at a level above 100. In the next period, i.e. from 2006 to 2009, that index dropped dramatically to a mere 86%. Afterwards, i.e. from 2010 to 2013, the self-sufficiency index remained at a stable level of 92%, which is the average value in the entire period under review.

This process is strongly correlated both with the periodicity of pig production and with the adverse developments in the Polish pig production sector, as discussed earlier in this paper. Impact is also exerted by consumption-related demand factors, i.e. changes of nutrition preferences (which include deliberately shifting from pork to poultry and fish) and prices (Salejda et al., 2013). However, according to methodology guidelines for creating balance sheets in the agriculture sector, the import volume should be taken into account when calculating the domestic market meat supply index. In that case, despite the shortage of Polish pork meat, that index would be significantly higher, reaching a level comparable to other EU countries, i.e. around 120%, as confirmed by Baer-Nawrocka (2013) and other studies. On one hand, this situation meets the sustainability paradigm (lower volumes of national production will improve the security of the natural environment). On the other, it shows a threat which results in eliminating the Polish pork from the market on a more or less permanent basis. Although frequently mentioned, the ethnocentrism of the Poles remains at an average level and does not seem to be able to stop the aforesaid process (Zabrocki, 2014).

It has been more than a decade since Poland has entered the structures of the EU market. During this period, the conditions of agri-food trading have changed within the EU and beyond. In addition to the declining production profitability related to the ever greater liberalization of the agri-food trade, the entire European pig and pork market was strongly influenced by the political turmoil with multiple consequences for the economy. Such consequences, which are relevant from the domestic production perspective, include consecutive embargoes on pork meat from countries actually or potentially affected by the African swine fever (ASF). Such prohibitions foreclosed the enormous and eager markets of Russia and of Eurasian Economic Union countries. Pork producers from Poland, Lithuania and Estonia were the most affected by this situation. Bringing an end to pork meat exports to the Russian market resulted in moving some of the volume exported from Poland to the internal EU market, to the frustration of French, German and Danish farmers.

Paradoxically, the disruption of pork meat exports from Poland did not result in increasing the pork supply on the domestic market. Furthermore, from 2007 to 2012, approximately 13–14% of the industry's demand for pork meat was additionally imported from other countries, including Germany, Denmark and Belgium. In value terms, the imported volumes represented, respectively, 38.0%, 26.3% and 9.7% of the total Polish pork meat import (Rynek mięsa..., 2011). The reasons for this are the consequences of changes in ownership structure of meat establishments in Poland which is dominated by German, Danish and Belgian capital, and this is what prejudges the decision on the preferred sources of supply.

PORK MEAT PRODUCTION IN THE CONTEXT OF FOOD SAFETY

The Russian embargo on the Polish pork meat revealed a highly relevant aspect of the national food security: the safety of food (considered in the context of physical quality and health properties). The pig market was affected by a biological factor, i.e. the ASF virus risk.

In the case of pork meat production, such threats are definitely more numerous, and each of them directly or indirectly affects the economic standing of domestic pig producers. Examples include the classical swine fever (CSF), foot-and-mouth disease, Aujeszky's disease and ASF (Białek et al., 2012), the occurrence of which (and, as a consequence, the related remedies) result in a temporary restriction of access to pork meat on the market. In such situations, the temporary reduction of supply usually coincides with a limited demand from consumers concerned about their own health (cf. Osek, 2008).

Due to a series of legal regulations, including the amended Act on Safety of Food and Nutrition of January 8, 2010 and multiple EU regulations, Polish consumers do not suffer, in practice, from the adverse developments in the food chain (especially in the food supply chain). Note however that the aforesaid threats occur at each link of the food chain. At the production stage (in holdings), they include biological (zoo-sanitary and phytosanitary) risks related to animals themselves and to feedstuffs forming the nutritional basis for the animals, as well as risks related to the condition of farm buildings etc. Drugs and vitamin preparations (and more) may also pose a threat (especially if originating from a non-validated source). At the transport and processing stage, many threats result from the poor quality of transport means and storage facilities, as well as from negligence of, or non-compliance with, standards and requirements for each stage of food processing and packaging. At the distribution and marketing stage, new problems occur due to improper warehousing and storage, non-compliance with expiry dates etc. (Gołaś and Kozera, 2004).

Despite so many threats at each stage of the distribution chain of pig and pork meat (considered to be the key source of meat supply for Polish consumers), it may be concluded that the safety of food manufactured in Poland is maintained at a very high level. This is confirmed by the increasing interest of EU consumers in purchasing Polish healthy and tasty food. Also, the Poland's accession to the EU market structures had an undeniable impact on this situation. As estimated by Grębowiec (2012), the number of quality management systems in Polish agri-food enterprises has substantially increased since 2004 (Grębowiec, 2012). The Global Food Security Index describes the food security in specific countries, and is calculated for 109 countries of the world by DuPont, a consulting company, in cooperation with the Economist Intelligence Unit (EIU) and with an international scientists team. The following is assessed in order to calculate the index: price, availability, quality and safety of food (Global…, 2014). For several years now, Poland has been among the top-ranked countries, and has moved up from the 30th to the 26th rank during the last three years (2014). Nutrition standards and the farmers' access to finance were among the highly rated features. Appreciation was expressed for the commitment to improve food safety, supported both by the fertilizers and chemicals industry and by the administrative authorities (legislative action), as well as for the large involvement of the scientific community, business representatives and farmers themselves in the creation of a network of safe relationships in the food supply chain. And it does not mean that no further efforts will be made in that area.

However, compared to countries like Germany (ranked 8th) in terms of food safety, Poland has still a lot to do. All the more since the Poland's biggest weakness turned out to be the low level of state budget spending on R&D in the area of food manufacturing and processing. This emphasizes the role to be played in the food safety area not only by manufacturers themselves but also by research and scientific institutions supported with adequate funding from the government.

RECAPITULATION AND CONCLUSIONS

In Poland, pig production has been considered for many years to be the dominant sector of animal production while providing some kind of stability guarantee for the domestic meat market. Today, it still plays an important role, especially if analyzed in the broad context of ensuring the food security and food self-sufficiency for the country. According to the summary review of the first link in the pork meat supply chain, that market is experiencing a rapid transformation which is not always and not fully beneficial to the domestic food market. An example is the Poland's accession to the EU and the coverage of the aid scheme for the domestic agriculture sector which provided very limited funds to pork meat producers. Despite the lack of dedicated aid for pork production, Poland experienced changes both in the farming structure (reduced number of holdings) and as regards improvements to the production technology and ensuring quality standards for meat production. In Poland, due to unfavorable external conditions, including without limitation the decreasing production profitability, the pork meat production volumes have dropped. However, it did not undermine the country's food security which means a situation where households may actually (physically) access food as needed for all members, and are not at the risk of losing that access. The actual availability of pork meat (in terms of prices and physical access) to potential domestic consumers in the open, competitive market era is satisfactory. Another issue is the source of origin of the meat (domestic production or import). Management economics leaves less and less room for market patriotism which becomes a costly option. In Poland, this is reflected by the changes of ownership capital structure in meat companies. As the supply of Polish meat is decreasing, the industry wants to satisfy its demand with supplementary quantities imported from abroad, usually from the country of origin of the capital. While this situation emphasizes the importance of external trade as a source of meat supply, it also demonstrates the capital globalization process. Furthermore, what needs to be noted in the context of food market liberalization, is the sensitivity of the pork meat market to food safety issues. In the last years, the Polish pork production sector has been affected the most by phytosanitary and zoo-sanitary threats which were among the reasons for the Russian embargo on Polish meat. However, these threats have not impacted the quality of pork meat offered on a domestic and international basis. Another thing that needs to be considered when analyzing the country's food security are the changes of transnational nature which affect the EU market and the globalizing worldwide market. They cannot be ignored in the efforts to achieve the country's food security. When facing such changes, it is important to provide support for both the production and the processing of pork meat, as well as for the collaborating research and scientific institutions committed to improve the quality, health properties and efficiency of pork meat production in Poland.

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BEZPIECZEŃSTWO ŻYWNOŚCIOWE I ŻYWNOŚCI W POLSCE NA PRZYKŁADZIE PRODUKCJI ŻYWCA WIEPRZOWEGO

Streszczenie. W opracowaniu podjęto problem zmian w produkcji wieprzowiny w Polsce. Rozważano go w kontekście bezpieczeństwa żywnościowego kraju oraz bezpieczeństwa żywności. W artykule dokonano syntetycznej prezentacji sytuacji polskiego sektora wieprzowiny po integracji z UE. Wskazano na sytuację producentów trzody chlewnej jako podstawowego ogniwa łańcucha żywności. Badania oparto na danych krajowej statystyki publicznej, raportach branżowych krajowych i zagranicznych oraz przeglądzie literatury związanej z zagadnieniem problemów sektora produkcji trzody chlewnej w Polsce. Podkreślono znaczenie czynników zarówno o charakterze egzogenicznym, jak i endogenicznym, a także wskazano na potencjalnie nowe potrzeby w zakresie wsparcia bezpieczeństwa żywności i życia mieszkańców obszarów wiejskich w Polsce.

Słowa kluczowe: samowystarczalność żywnościowa w Polsce, krajowy łańcuch dostaw trzody chlewnej i wieprzowiny, bezpieczeństwo żywności

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