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LONG-TERM TRANSFORMATIONS OF AGRICULTURAL PRODUCTION IN POLAND. SELECTED ISSUES

Abstract: The main goal of this essay is to analyze some of the characteristics of agricultural production in Poland during the transition period. In this study only selected features of the general situation of agricultural production in Poland in the period of 1946-2010 were analyzed, with particular emphasis on the changes taking place in the period of 1990-2010. The review of changes in the size of production for selected (*ca.* 30) categories of agricultural products that occurred in Poland during the past 60-year period. The presented trends, in fact clearly point to a continuation of current trends in the transformation of the long-term restructuring of Polish agriculture.

Key words: Long-term transformations, agricultural production, crop production, livestock production.

Introduction

The main goal of this essay is to analyze some of the characteristics of agricultural production in Poland during the transition period. However, the article is also an attempt to show this issue as a part of the long-term changes taking place in the discussed field¹. The analysis of the transformation of selected elements of the socio-economic situation in Poland during the past fifty years has led the author to the

¹ Using this method is possible by keeping the initial part of the Annals of Statistics GUS, an almost unchanged system, in the form of a time series, compilations „The most important data socio-economic situation of the country „and” Important information about the socio-economic situation in the country *per capita*”. The data in the above time series are compiled by the CSO to ensure comparability – of course with some exceptions, which is usually recorded in the relevant notes. In this study, it is assumed the credibility of these “historical data”. Even potential “inconsistencies” in the information from the communist period would not be able to change the general tenor of 60-year trends analyzed here, in the form of the material facts. What’s more, if these “inaccuracies” had occurred, they would consist of over-sized subjects, which would strengthen further in the development of a thesis presenting the long-term nature of contemporary transformations in farming production in Poland.

conclusion that some important features of the contemporary problems of development cannot be satisfactorily evaluated without reference to the long-term trends. This concerns in particular the processes of socio-economic transformation of rural areas and agriculture in Poland.

Most commonly found are the analysis of the ongoing developments in agriculture and in rural areas. In particular, such analyzes are conducted based on the current statistical data and the results of the last three agricultural censuses, *i.e.* 1996, 2002 and 2010, that have already taken place in the new political system conditions. These analyzes are having an irreplaceable, high educational value. They allow to identify in detail the changes in the organization and in the size and structure of agricultural production. In addition, they contain a rich set of information on the socio-economic transformation of rural areas in Poland.

The accuracy of these studies is their advantage, but also a limitation. By focusing on the specific, but also a short-term analysis it is hard to assess whether the changes occurring since 1989 in the Polish agriculture and rural areas are mainly due to the programmable transformations in the aforementioned development policy field, or rather the policy reacts to long-term trends in the process of civilization development.

In this study only selected features of the general situation of agricultural production in Poland in the period of 1946-2010 were analyzed, with particular emphasis on the changes taking place in the period of 1990-2010. Such an approach to the problem has shown that the vast majority of “transformational” conversions of agricultural production are in most cases concentrated in time and, as a result of that, sharpened in scale and scope, a continuation of the long-term transformation of the agricultural industry. So there is reason to believe that, to a great extent, the rural and agricultural transformation in Poland under the new political conditions after 1989 are a stage of general social-economic transformations considered in a historical perspective.

The issues concerned with the general subject matter of the transformation processes occurring in agriculture and rural areas are the subject of study on the part of many scientific institutions in Poland and have been discussed extensively in numerous publications [see: Bański 2007, 2010; Józwiak *et al.* 2011; Krasowicz 2002, pp. 11-31; Kulikowski 2009, pp. 141-155; Michna *et al.* 2011; Rosner 2005; Drygas, Rosner 2008; Tomczak 2001].

This paper has a contributory character and cannot be the basis for formulating proposals for the total transformation of agriculture and rural areas in Poland. The contemporary and constantly increasing complexity of socio-economic structures make it necessary to identify the generalized and principal features of the socio-economic life of the country’s agriculture and rural areas.

1. Transformations in crop production

During the years 1946-2010 a constant reduction of agricultural area was taking place (see Fig. 1). This process, in the conditions of a centrally administered economy, proceeded in a very slow manner. A period of accelerated reduction of farmland took place in the years 1999-2003, under the new political system and after the stabilization of the socio-economic situation of the country. After that period there was a slowdown of the decline in the area of agricultural land in Poland. This may be in part associated with the Polish membership of the EU and the emergence of capabilities to receive direct payments from the ownership of agricultural land “kept in good agricultural practices”. This proves that the realities of the market economy and the functioning of Poland in the EU structures did not result in a mass withdrawal of agricultural land out of production, but rather a stabilization in this area. This is all the more striking (as we shall see later) since this period is, in most areas of agricultural production, including crop production, characterized by increasing productivity.

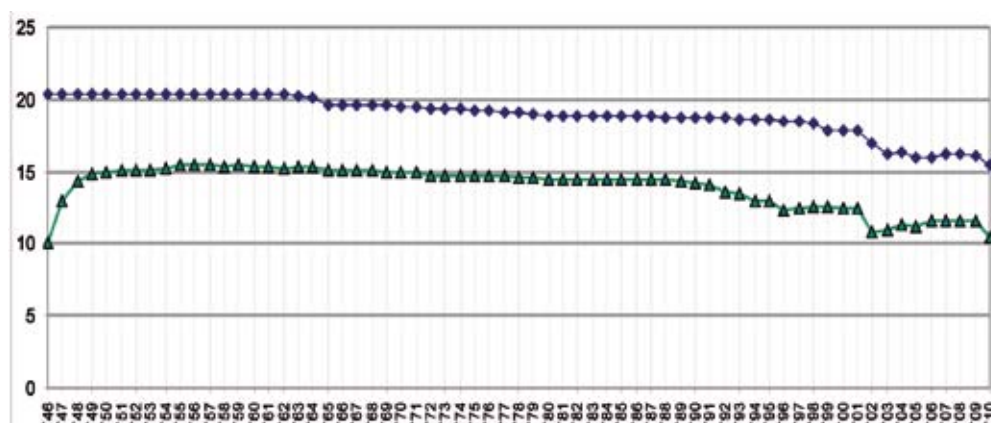


Figure 1. Agricultural area and the total crop in the years 1946-2010 (in million ha)

Source: Scientific description and system based on: Basic statistics of Poland, GUS, Warsaw 1991, and “important data on socio-economic situation of the country” and “Important information about the situation country’s socio-economic *per capita*” in GUS Statistical Yearbooks and Yearbooks The Polish Central Statistical Office statistics of the respective years (Figs. 1-20).

Similarly, the method of agricultural land usage has changed also in a rather slow fashion. The period of 1946-2010 can be divided into several stages of development of the total crop area in Poland. By the mid-50’s, in the oppressive forms of the command-distribution system, there was a significant increase in the crop area. Since the end of the 50’s until the early 90’s that area was gradually decreasing. The first half of the 90’s resulted in a significant decrease of the acreage. However, between 1996-2001 it stabilized at the level of 12-13 million hectares and in the period of 2003-2009

a slow growth followed, up until its reduction in 2010. These processes are shown in Fig. 1. The visible abrupt reduction of crops area in 1996, 2002 and 2010 seem to stem not from the actual process, but rather from the adding to the data of current statistics the results of the agricultural censuses from the respective years – obtained using a different methodology. Although these data (2002 – 10.8 million hectares, 2010, 10.4 million ha) deviate from the information from the current statistics, they fall within the area of the general trend of change described here. It shows that the transition process, including the principles of the EU's agricultural policies, do did? not lead to a sustained and rapid reduction of the crop acreage in Poland. The changes visible after 1990 in this area can be explained rather by abandoning the practice of the least suitable agricultural areas administrative-like maintenance.

The observed gradual decrease of the total sown area in Poland (with elements of stabilization after 2002) took place under the strong, long-term transformation of the structure of these crops – see Fig. 2:

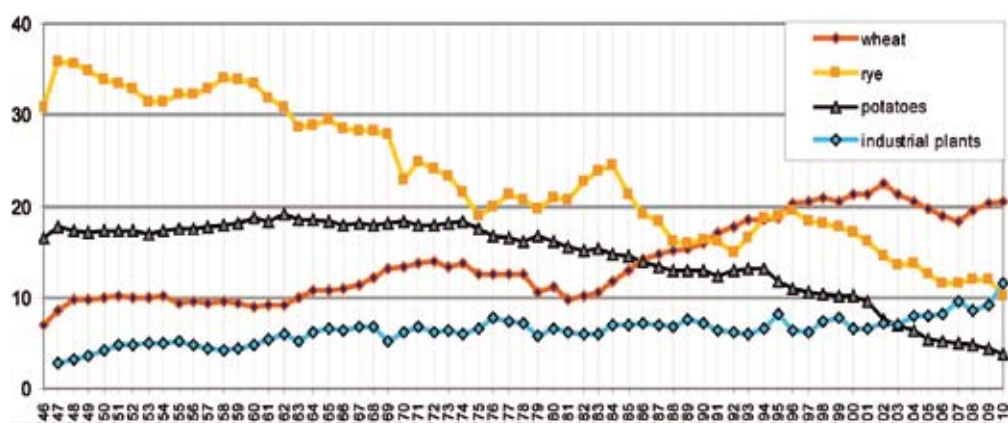


Figure 2. Sown area of wheat, rye, potatoes and industrial plants in Poland in the years 1946-2010 (in % of total crop)

Grain in total decreased its share in the total area sown until the mid-70's, with a subsequent increase in that area until 2002 and a minimal drop in 2003-2010.

Throughout the period 1946-2010 followed, with many hesitations, a steady decline in the share of the rye crop and a steady increase in the share of the wheat crop. These two types of grain were equal in terms of acreage at the beginning of the turn of 89/90. In 2010, the area occupied by wheat (20.5%) is more than twice that of the rye? crop (10.2%).

Participation of the surface occupied by potatoes was on the highest stable level (about 18-19%) in the years 1946-1974. Starting from the mid-70's, the hectare share significantly decreased, but the process was not apparently influenced by the transition period.

Throughout the 1946-2010 period discussed here, there was a growing share of the surface occupied by industrial crops – from about 3-4% to 8-10%. A particularly strong growth was recorded here in 2010 (up 12%), which can be primarily associated with the administrative rulings relating to bio liquid fuel components. In 2010, the share of the area was already significantly higher than the acreage of rye, and three times higher than the potato growing area.



Figure 3. Sown area of sugar beet in Poland in the years 1946-2010 (in % of total crop)

In terms of the occupied area, a rather ambiguous situation occurs in the case of the cultivation of sugar beet. Its share of the total crops decreased sharply in 1996-2001, remained stable in 2002-2005, decreased again in 2006-2008, and began to grow in 2009 and 2010 – see Fig. 3. These changes were probably caused by the quite ineptly led agricultural quota system policy, including sugar within the EU. That in turn caused perturbations related to both the market and the changes in the production of raw materials as well as processing. Such situations may serve as a negative example, the effects of the deep, inconsistent, and most importantly, ill-prepared administrative interference in market mechanisms.

The acreage changes do not translate directly into harvests, which are the end-effects of crop production, because modern technical and technological progress leads to an apparent increase in yields. Figures 4 and 5 show the changes in the total basic cereal crops, as well as wheat, rye, and potatoes and sugar beet in Poland in the years 1946-2010. In terms of cereals in general, as well as the wheat and sugar beet yield, they show a clear increase in the period after 1990 – when the point of reference here are the relatively high yields of the late 80's, and not a collapse in the early 90's. In the case of cereals, in total there is an increase of approximately 30dt/ha to 35 dt/ha of wheat from approx. 37dt/ha to 43dt/ha and sugar beet from approx. 340 dt/ha to 480-

500 dt/ha. It should be emphasized that such progress is not recorded in the yields of “declining crops” such as wheat and potatoes [see more: Arseniuk *et al* 2004, pp. 1-20; Arseniuk, Oleksiak 2009, pp. 293-305].

This may indicate less effort on breeding and research work on the improvement of “non-prospective” crop plants. These observations refer to the long-term trends, there is, of course, the presence of numerous annual fluctuations in the level of these phenomena – see Figs. 4 and 5.

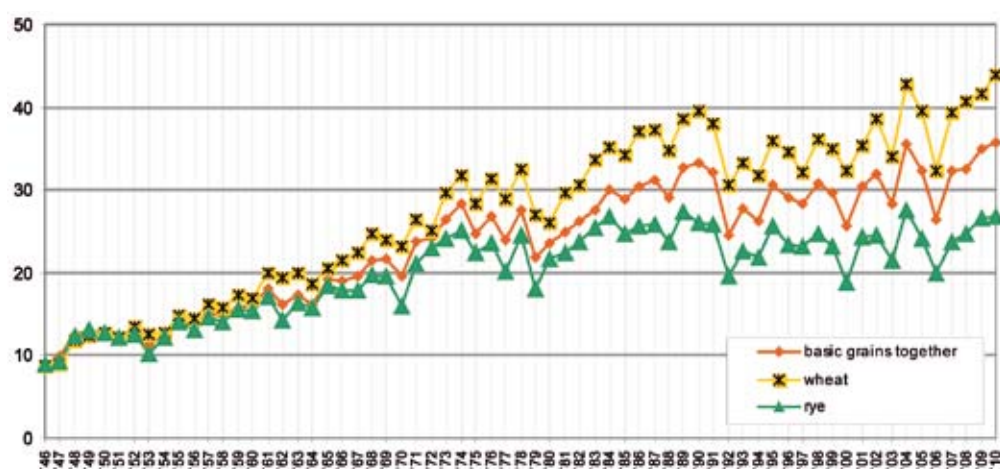


Figure 4. Average yields of basic grains together and: yields of wheat and rye in Poland in the years 1946-2010 (in dt per 1 ha)

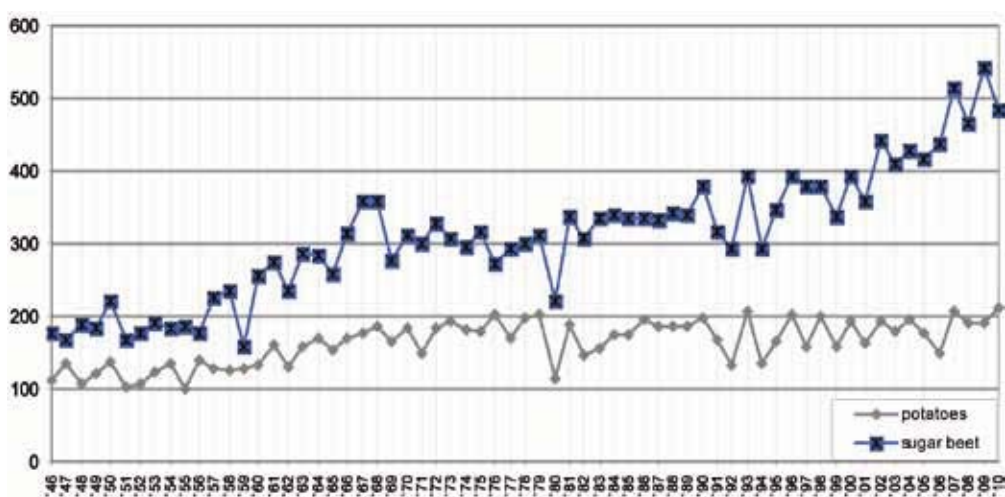


Figure 5. Yields of potatoes and sugar beet in Poland in the years 1946-2010 (in dt per 1 ha)

Further in the current paper, essential data are shown concerning the dynamics of the changes in crop production with a specific reference to:

- cereals (total), potatoes, sugar beet;
- grain of cereals (wheat, rye, barley, oats, triticale, cereal mixed, buckwheat, millet and maize);
- grain production of pulses (consumer and feed);
- selected industrial plants (oilseeds, as well as flax straw, tobacco and hop), feed root plants;
- ground field vegetables and vegetables cultivated under glass or accessible cover, as well as tree fruit and berries.

The changes in the general area and the crop structure in conjunction with the above changes of yielding, naturally led to fundamental changes in the structure of the harvest – see Figs. 6-11:

Under a large annual fluctuation in the yield per hectare, the potato crop in Poland gradually increased between 1946-1970 and remained stable at the highest level by the end of the 70's. In the 80's and 90's there was a steady, clear fall in the harvest of potatoes. A slowdown in the trend occurred only in 2002 [see more: Lewandowski, Mieszkowski 2008, pp. 106-113; Mańkowski 2009, pp. 10-12; Nowacki 2009, pp. 71- 94].

The general harvest of sugar beet had been growing in Poland until the early 70's and remained at a similar level to the mid-90's. In the second half of the 90's we saw a significant drop in this area, and then a stabilization of the size of the harvest with a small downward trend after 2007 [see more: Siódmiak 2009, pp. 37-39].

Generally, there was a significant increase in cereal crop production noted in the years 1950-1990; however, that upward trend was occasionally interrupted by seasonal declines. In the transition period, the highest level of cereal crop production that was achieved earlier remained essentially stable. During the two-decade period 1990-2010 there occurred overall significant, manifold decreases in crop production for cereals, however, there were also marked increases, *e.g.*, up to the level of 30 million tons. In particular, there is a clearly visible increase in cereal production, with a simultaneous decrease in potato crop production and a stabilization in the production of sugar beet, *cf.* Fig. 6.

Fig. 7 shows in detail the changes in the structure of the cereal crop production (*i.e.*, wheat, rye, barley, oats, triticale, cereal mixed, buckwheat, millet and maize) in Poland in the 1950-2010 period [see more: Arseniuk *et al.* 2007, pp. 27-34; Grabiński, Podolska 2009, pp. 55-70]:

Throughout the researched period the wheat harvest gradually increased. It reached its peak in the early 90's (9.3 million tons) and remained at a similar level to 2010. The total wheat harvest today (2010 – 9.4 million tons) is higher than the harvest of potatoes (8.2 million tons), while in the 70's it accounted for less than that 10% of this volume.

The rye harvest in Poland increased until approx. the 60's and remained at a relatively high level until the mid-80's. After that period, there was a decline of this type of production lasting until the end of the 90's. At that time, there had been some slowing of this trend. The rye crop size caught up with the wheat harvest in the mid-80's, but in 2010 it accounted for only about 30% of the aforementioned size[see more: Grabiński 2007, pp. 15-16].

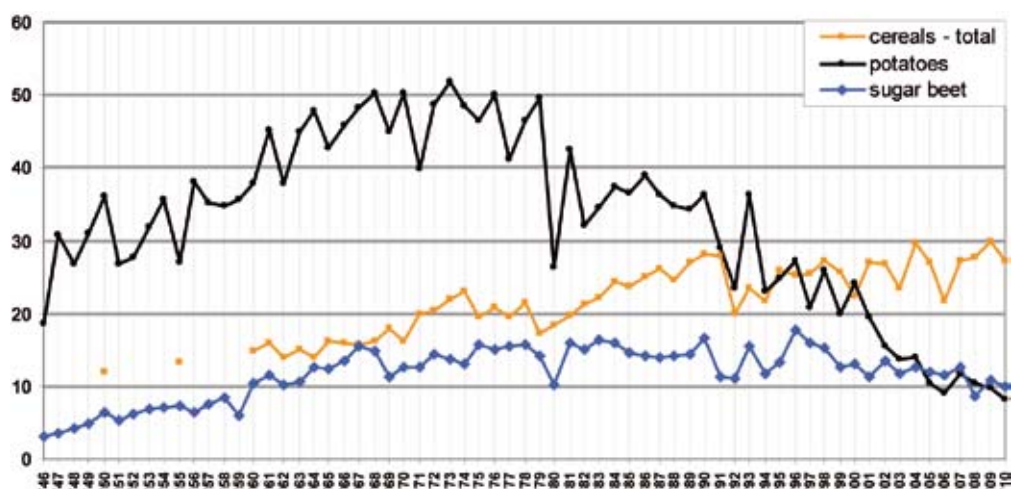


Figure 6. Harvest: cereals (total), potatoes and sugar beet in Poland in the years 1946-2010 (in million tonnes)

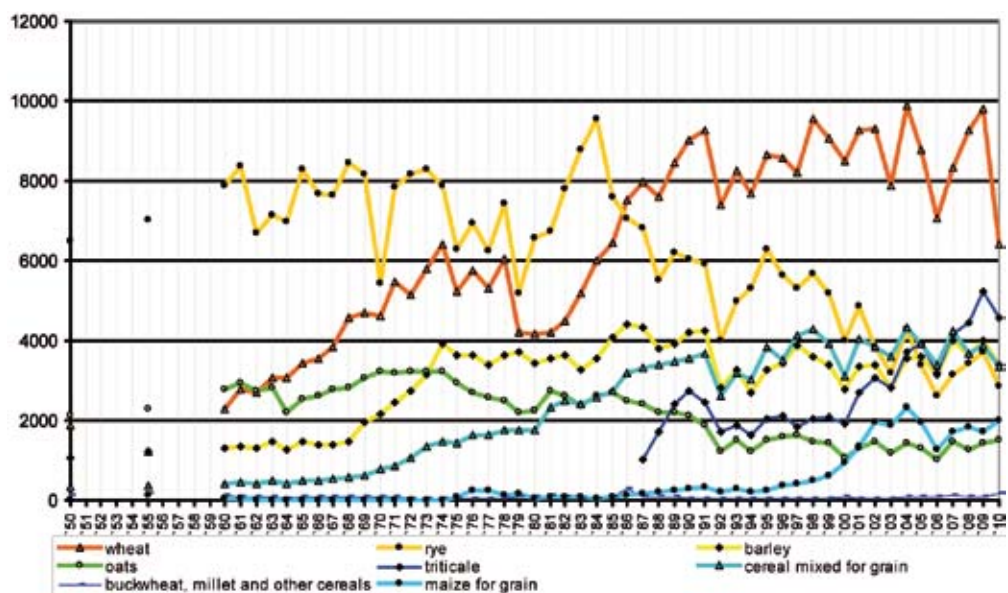


Figure 7. Structure of cereal production in Poland in the years 1950-2010 (in thous. tons)

Barley production increased markedly from the 1950s until the first half of the 1970s, and later on it remained stable at the level then achieved until the end of the period discussed here. Naturally, in that field of agricultural production there was a discernible decline in barley crop production at the turn of 1980s and 1990s, as well as numerous annual fluctuations in the level of the phenomenon here described.

Oats production remained at a high level, constantly being marked by an upward trend, from the 1950s until the first half of the 1970s. After this period the oats crop production began to significantly decline – this process lasted until the beginning of the 1990s, and only then oats crop output maintained the stable level achieved at that time [see more: Sułek 2007, pp. 13-14].

Triticale production, which has been recorded since the 1980s, was at a stable level until the turn of 20th and 21st centuries. In the 2000-2010 decade, triticale crop output increased 1.5 times – from 2.7 million tons up to 4.6 million tons. A similar situation occurred with regard to the production of mixed cereal. Its increase was particularly significant from the beginning of the 1970s until the end of 1990s, and then its level was stabilized at the level then achieved [see more: Jaśkiewicz 2007, pp. 11-12].

Buckwheat and millet harvest production, which started to be recorded in the late 1980s, remained more or less at a constant level until the late 1990s. Following that period, its production increased 1.5 times in the first decade of the 21st century.

The most spectacular increase in crop production is noted in the case of maize for grain. It constituted, until the first half of the 1980s, an insignificant percentage of the cereal crop production. Beginning in the turn of 1980s and 1990s, a marked increase is noted in the maize crop output; however, a qualitative change in this respect occurred as late as in the period following the year 2000. In total, in the years 1990-2010, maize grain production increased ca. tenfold from approx. 200,000 tons to approx 2000,000,000 tons [see more: Dubas, Michalski 2002, pp. 115-123; Kisiel 2002, pp. 22-24].

Just a brief general review of the changes in the structure of the cereal crop yields seems to indicate clearly that in the halfcentury 1960-2010, i.e., the period thoroughly discussed here in the paper (*cf.* Fig. 7), a phenomenon took place in Poland consisting in a steady decrease in the level of crop production of the less productive traditional, basic cereal varieties (*eg.*, rye, oats, barley), with a simultaneous, often very rapid, growth in interest toward the cultivation of triticale, mixed cereal and corn maize [see more: Kisiel 1999, pp. 167-175; Łopaciuk *et al.* 2008].

In Poland in the years 1950-2010, changes in the crop production of pulses as well as of industrial plants proceeded differently than in the case of the above-mentioned cereals (*cf.* Fig. 8):

The most dynamic changes were concerned with the pulses crop production for fodder. It reached its peak in the 1960s. In the 1970s its crop production started to decline rapidly, and then to rise abruptly in the 1980s. At that time, the pulses crop production even exceeded the peak level reached in the 1960s. The first half of the 1990s

brought another abrupt decline in its production. In the fifteen-year period 1995-2010, the output of pulses for feed was stabilized at the level noted in the mid-1970s (ca. 300,000 tons). A similar dramatic decline in pulses production occurred with regard to the crop yield of flax straw. It reached its peak in the 1960s, and then started to decline in the 1970s and 1980s, only to experience a complete slump in its production after 1990 (*cf.* Fig. 8).

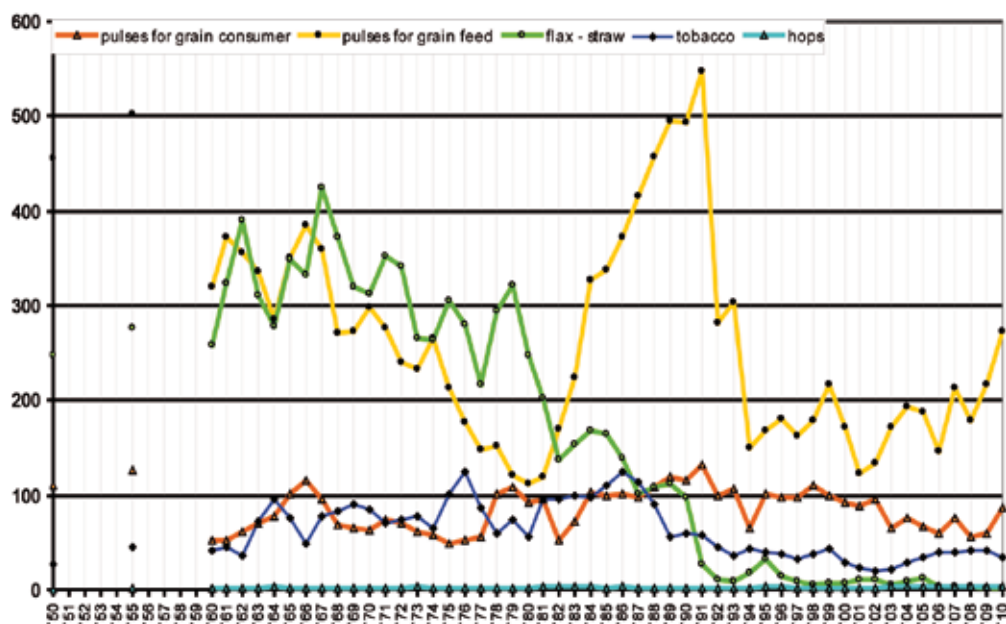


Figure 8. Production of pulses and of selected industrial plants in Poland in the years 1950-2010 (in thous. tons)

The pulses crop production for human consumption (consumer pulses) was at a relatively stable level: it fluctuated with seasonal falls and rises, but in the long period under study there were no sudden changes. Some decline in the pulses crop production occurred only as late since 2003. As regards tobacco crop production, its dynamics was slightly different – since it remained at a stable level until the early 1990s [see more: Fordoński, Łapińska 1997, p. 409; Gawłowska, Świącicki 2007, pp. 505-513; Podleśny, Książak 2009, pp. 111- 132]. Following this period, As regards tobacco crop production, it saw a steep decrease by more than 50-60% [see more: Doroszevska 2009, pp. 147-160; Dwornikiewicz 2004, pp. 214-218]. To date, despite the commonly known changes affecting the demand for this agricultural raw material, no dramatic decline in its crop output was noted – *cf.* Fig. 8.

The hop crop, production of which, since 1990, has remained at a level only slightly higher than in the 1960s and 1970s, can serve as an example of the unutilized

potential in Poland. Despite the fact that a new pattern of beer consumption has been established in Polish society, it has not brought with it a significant increase in demand for this raw agricultural material that is necessary in the production of slightly alcoholic beverages, which seems to be a result of global processes of internationalization that influenced also this branch of agri-food industry [see more: Dwornikiewicz 2008, pp. 22-23; Dwornikiewicz 2009, pp. 133-145] – *cf.* Fig. 8.

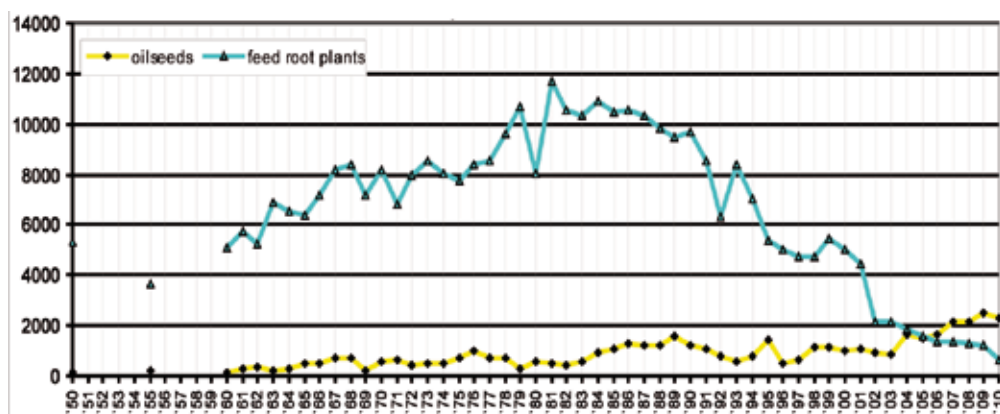


Figure 9. Production of oilseeds and feed root plants in Poland in the years 1950-2010

Fig. 9 shows the changes in the level of production concerning oilseeds and feed root plants in the 1950-2010 period. In the 60-year period under discussion here, as far as feed root plants are concerned, two sub-periods are clearly discernible. In the 1960-1989 two-decade period, their level of production increased from *ca.* 5,000 tons to more than 10,000 tons, whereas throughout the next 30 years it decreased tenfold. This process went on particularly dynamically in the first half of the 1990s [see more: Borowiecki 2003, pp. 15-20; Książak, Staniak 2009, pp. 95-109]. A different situation took place in the case of oilseeds. Their production remained at a level of several-hundred tons until the mid-1980s, and then it started its rapid decline. In the 1990s the production of the plants in question increased, being stabilized at a level of 1 million tons, and later on at the end of the first decade of the 21st century the level of oil plants crop production already exceeded 2 million tons [see more: Arseniuk, Oleksiak 2006, pp. 11-18; Bartkowiak-Broda 2008, pp. 16-21]. As can be seen in the case of the above-mentioned crop plants, their level of production does not only reveal the antithetical directions of the changes, but also performs differently under the varying socio-economic conditions in the period of the transitions in Poland in the latter half of the 20th century.

As regards the level of production of vegetables, tree fruits and berries, observed in Poland in the years 1960-2010, it must be admitted that it was quite a phenomenon (*cf.* Figs. 10 and 11). When looking at the data concerning these items, drawn from

the 50-year period, it can be stated, putting it very simplistically, that the above-mentioned agricultural plant production, essentially, reveals a steady overall upward trend. Naturally, it can be easily seen that there were annual or several-year fluctuations (sometimes of very significant nature). However, with a few minor exceptions (*e.g.*, in the case of gooseberry production), the analyzed production data do not reveal any clear relationships with the periodization of the socio-economic and political transformations in Poland, nor, indirectly, with the forced or spontaneous changes going on in the patterns of food consumption, resulting from these newly emerging realities. As was already mentioned, the size of the total vegetable and ground vegetable production increased steadily since the beginning of the period in question until the 1990s. In the last two-decade period, there occurred a stabilization in this regard. Since the beginning of the 1980s, there was a clearly discernible successive growth in the production of vegetables cultivated under cover (from *ca.* 200,000 to more than 700,000 tons). A similar dynamics of changes is shown by the production of tree fruits and berries – *cf.* Fig. 10. One can even risk an assertion that the most stable segment of agricultural production is horticulture and vegetable growing [see more: Juszczak *et al.*, <http://www.horticulture.pl/index.php/marketarticle/prop/id/11>; Matyka 2009, pp. 161-166; Nosecka, <http://www.agroinfo.org.pl/files/?id-plik=616>; Nosecka *et al.*, <http://www.horticulture.pl/index.php/marketarticle/prop/id/15>; Pizło 2001].

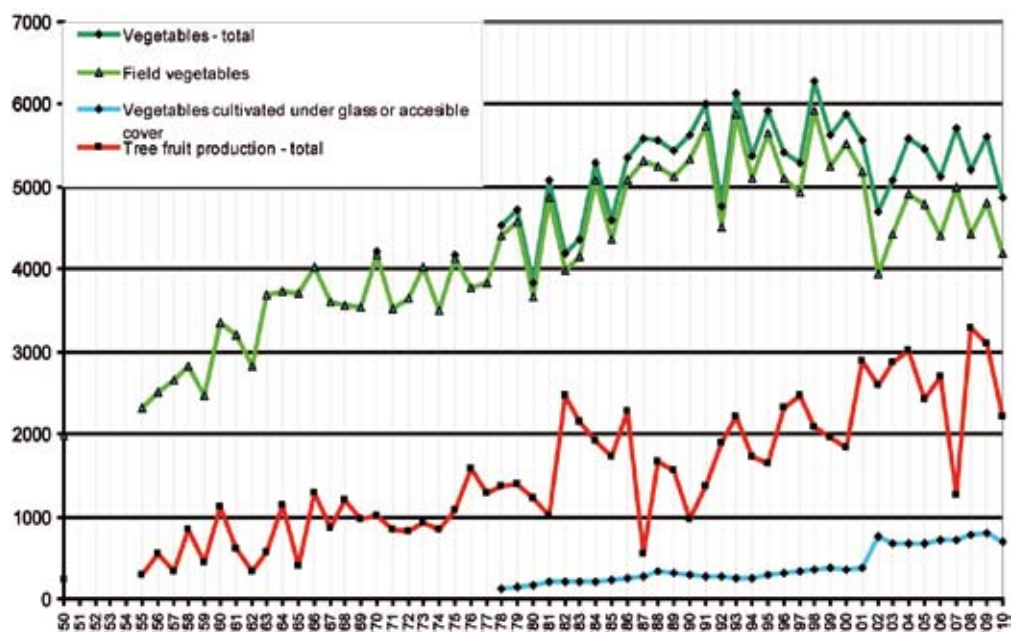


Figure 10. Production of vegetables and tree fruit in Poland in the years 1950-2010 (in thous. tons)

It must be stressed that the above-mentioned changes in the level of agricultural plant production were brought about under the impact of numerous natural, technical and technological, as well as socio-economic factors. It seems that in the short period under observation we can talk about the domination of natural determinant factors, whereas in the long-term aspect, the economic factors of agricultural production turn out to be of critical importance. Since these elements accumulate in themselves the impact of social (patterns of food consumption), as well as technical and technological (progress in agri-food production and the processing sector) [see more: Klepacki 2002, pp. 7-14; Krasowicz 2006, pp. 187-192; Krasowicz *et al.* 2009, pp. 27-54].

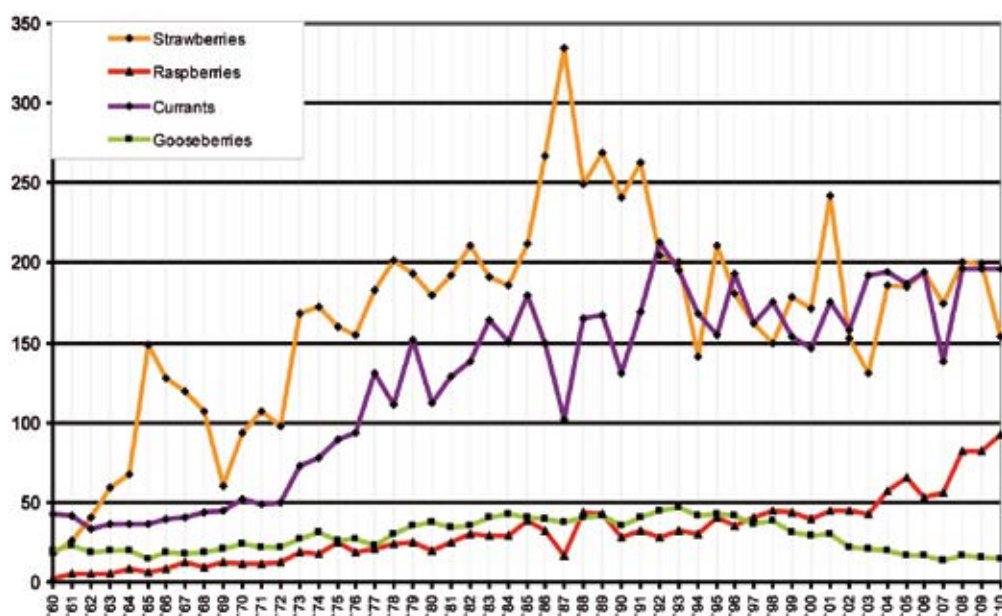


Figure 11. Production of berries in Poland in the years 1950-2010 (in thous. tons)

The extent and structure of crop production can also be analyzed in relation to the country's population. Figure 12 shows the harvest in kg per 1 inhabitant: the four basic cereal grains combined and wheat, rye, barley and oats in Poland in the years 1946-2010. Annual data are available for the years 1970-2010. It is clear that in the last forty years, the aggregate size of the four basic cereals harvest ranged from 500-600 kg *per capita*. In fact, after 1990 the aforementioned level showed a lowering of the fluctuations in the annual quantities than in the previous decades, with a marked, upward trend in harvests. Structure of *per capita* grain harvest clearly indicates an increase in wheat production, which has remained at a similar level since the late 80's. At the same time, the harvest of rye and oats decreased by about half and the barley crops have remained at a similar level throughout the period. The present structure of grain

production shows a clear “exchange” assortment between wheat and rye. In the case of the changes in the size and structure of cereal *per capita* there are clear long-term trends in the context of the transformation. Figure 13 shows the size of the harvests of potatoes and sugar beet in Poland in the years 1946-2010 *per capita*, with annual data for the period of 1970-2010. There, one can see the basically constant tendency to reduce the harvest of potatoes (with a slowdown after 2005). In the case of sugar beet, a more or less constant level of *per capita* collections were recorded in the years 1970-1996, with a clear but slow decline in the subsequent years.

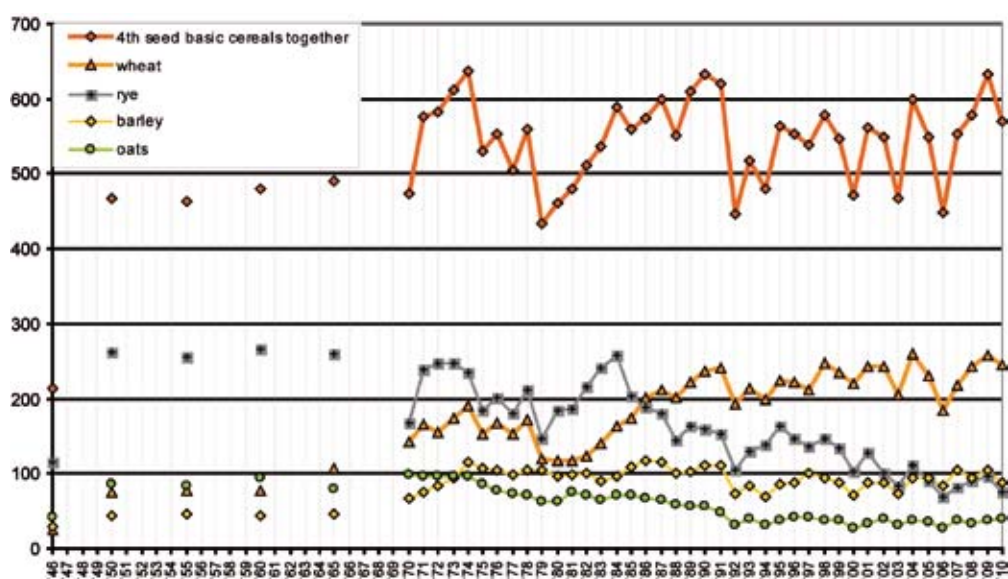


Figure 12. Harvest in kg per 1 inhabitant: 4th seed basic cereals together and wheat, rye, barley, oats in Poland in the years 1946-2010

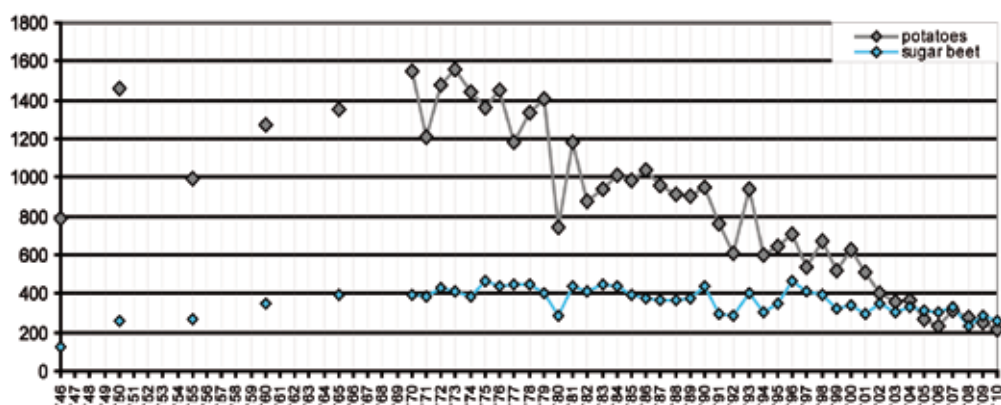


Figure 13. Harvest in kg per 1 inhabitant: potatoes and sugar beet in Poland in the years 1946-2010

The presented time series show that, despite the presence of many annual, or even several years of harvest level fluctuations, the long-term “restructuring” trends are clearly visible in the area of plant production. The period of political transformation in Poland after 1989 seems to be not so much a “creator” of these trends, but rather the “accelerator”. Rather, it is a period of accelerated change, revealing a severe form as a reaction to the delays due to the nature of the mechanisms of the fusing character of the centrally administered economy period. In the process of “restructuring transformation”, as everyone knows, there are many errors and inconsistencies. They are also often very severe in social and economic terms, both for the producers and consumers of agricultural products. It is difficult, however, to say with full responsibility that this period of transformation in Poland creates new artificial structures in agricultural production because, as demonstrated above, the changes in this respect are long-term in nature. Transformations in livestock production.

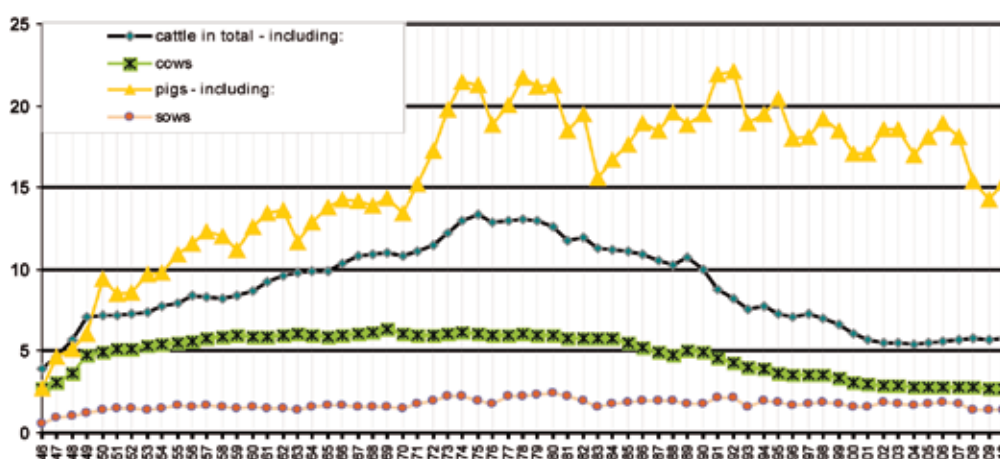


Figure 14. The number of animals: cattle in total, including cows and pigs, including sows in Poland in the years 1946-2010 (in million units)

2. Transformation in livestock production

Even clearer changes took place in the main directions of livestock production in Poland and they were also long-term in nature. Figure 15 shows the size of the livestock populations in Poland in the years 1946-2010. There one can clearly see that the highest level of increase in population occurred in pigs. It grew at the fastest rate in the years 1946-1974 and remained at the highest level (with some variations) until the early 80's. After the downturn in 1982, the pig population has been rebuilt reaching a maximum in the early 90's and since then there has been a downward trend – see Fig. 14. Even more pronounced changes affect the total cattle population. It also showed

a marked increase in the period 1946-1975, and is clearly decreasing by the year 2002. In the first decade of the twenty-first century it begins to slightly increase. Similar, although less severe, was the rhythm of the cow population.

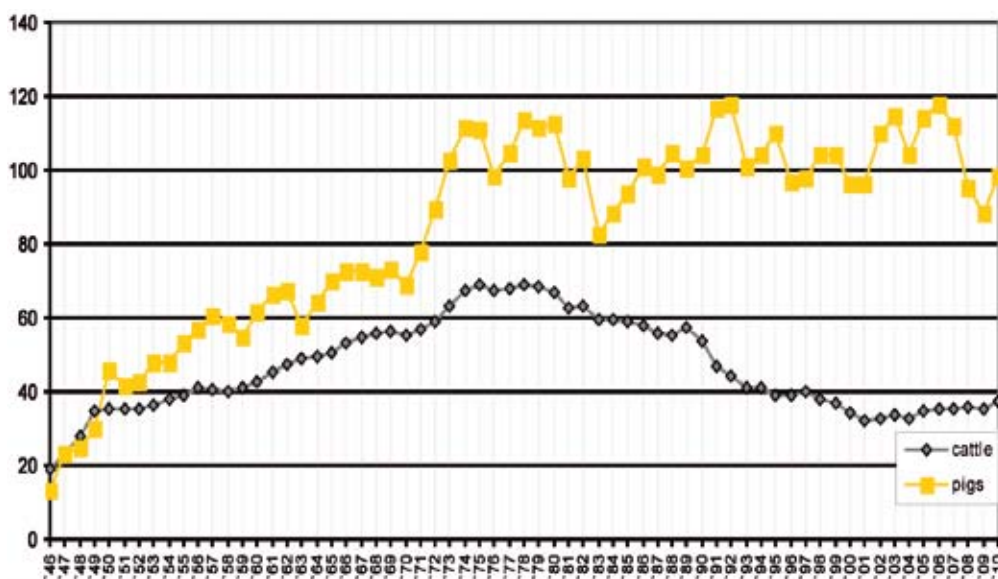


Figure 15. Cast of cattle and pigs in Poland in the years 1946-2010 (units per 100 hectares of agricultural land)

Figure 15 shows the relationship between the bovine and swine populations and the area of usable land. There you can see that from the early 70's, the pig density oscillates around the level of 100 units per 100 ha, while the total density of cattle during this period decreased from about 70 to less than 40 per 100 ha. These changes are only seemingly unequivocal in meaning, as indicated by the analysis of the structure of animal production. It is shown in Fig. 16. There one can clearly see that the total amount of meat produced in Poland remained at a similar level from the mid-70's to mid-90's, then began to increase, reaching an unprecedented level in 2010. These changes were caused by a small increase in the production of pork, a slight decrease in the beef and the rapid increase in the poultry meat production. The production of this type of meat between 1996 and 2010 increased almost threefold. It can be concluded that the entire general increase of livestock production in the form of meat recorded during the period of transformation, Polish agriculture owes to poultry production. These transformations are associated with the changes in food consumption patterns due to health reasons.

Figure 17 shows the size of the production of cow's milk and hen's eggs during 1946-2010. There one can see rapid growth in milk production until the mid-70's, the

stabilization of this size to 1990, the decline in the first half of the 90'th and finally stabilization of the last fifteen years. In the production of chicken eggs, in general, there was the upward trend of the periodic slowdown in the 80's and the collapse in the first half of the 90's.

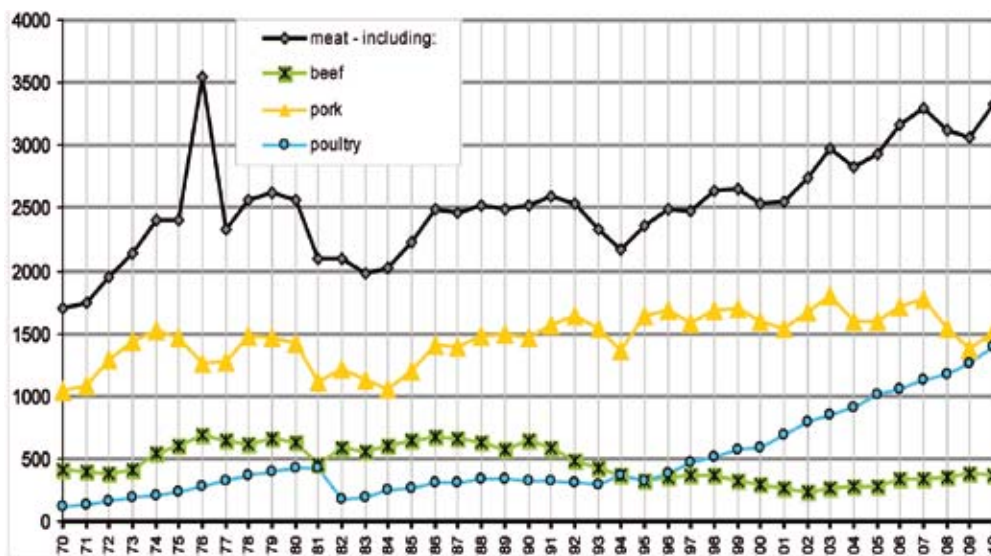


Figure 16. The structure of animal production in general and meat including beef, pork, poultry in Poland in the years 1970-2010 (in thousands tons)

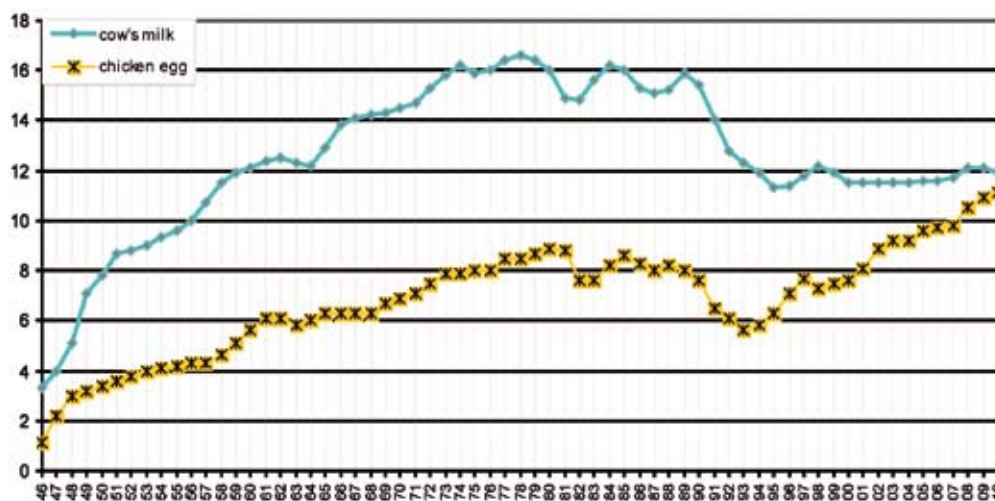


Figure 17. Cow's milk production (in billion liters) and chicken egg production (in billion pieces) in Poland in the years 1946-2010

Figure 18 shows the size of production of animals for slaughter and meat in the years 1946-2010 *per capita* (with specific expression for annual for the period 1970-2010). There one can see clearly that within the centrally administered economy, there was the ‘wave’ in the so calculated production of meat, around the level of about 80 kg *per capita*, with a marked decline of this magnitude in the years 1980-1986 and 1992-1994. Starting from the mid-90’s there has been a marked reduction in volatility in this area with a clear upward trend in this figure. In fact, after 2005, the size of the production *per capita* reached a level not seen before in the country [see more: Krupiński 2009, pp. 319-327; Brodzińska, *Perspektywy rozwoju...*; Jasiorowski 2006; Rycombel 2004; Ziętara 2006, pp. 300-305].

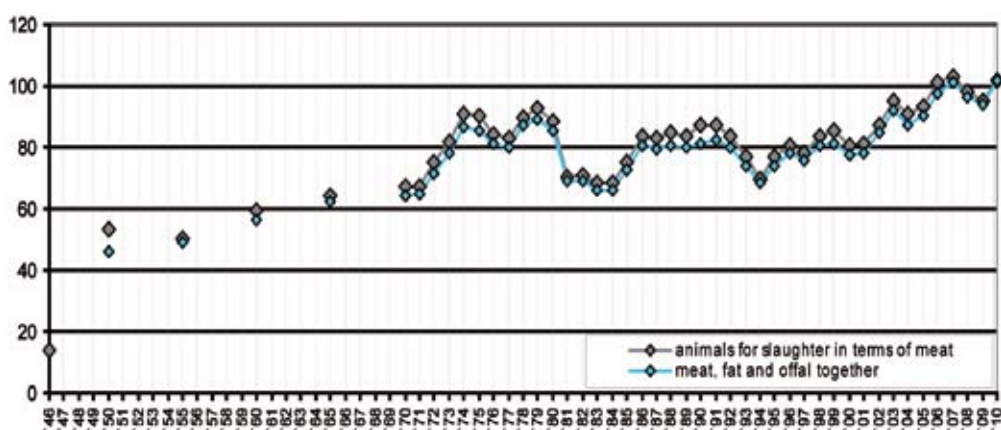


Figure 18. Production of 1 kg per capita: animals for slaughter in terms of meat and meat, fat and offal together in Poland in the years 1946-2010

The changes in the size and structure of livestock also indicate the occurrence of long-term trends in the art of transformation. Moreover, in the period after the stabilization of the socio-economic structures in Poland in the mid-90’s, it can be said that the new political conditions were more favorable for the transformation in the field [see Kwasek 2012].

3. Consumption of selected agricultural products

A final summary of the effects of changes in both crop and livestock production in Poland, is the observation of the two groups of products’ consumption *per capita* – see Figs. 19 and 20.

In terms of the consumption of selected components of crop production it has been stated:

Over the period 1946-2010 there has been a strong decrease in the consumption of potatoes from about 250-300 kg per person per year to just over 100 kg. It is very symptomatic that the intake of the above, transiently increased in the most difficult initial phase of the transition period, *i.e.* in the early 90s.

Throughout the 1946-2010 period, the slow decrease of the grain consumption of the 4 basic cereals from 150-170 kg *per capita* per year to about 110 kg. The biggest changes took place in the early 70's (120-110 kg). In the later 30-year period 1980-2010, we see rather, a stabilization with a slight tendency to decrease.

The sugar intake significantly increased in the years 1946-1974 from less than 20 kg per person per year to more than 40 kg. This level of consumption remained, with minor variations, to the final year of the analysis, *i.e.* 2010.

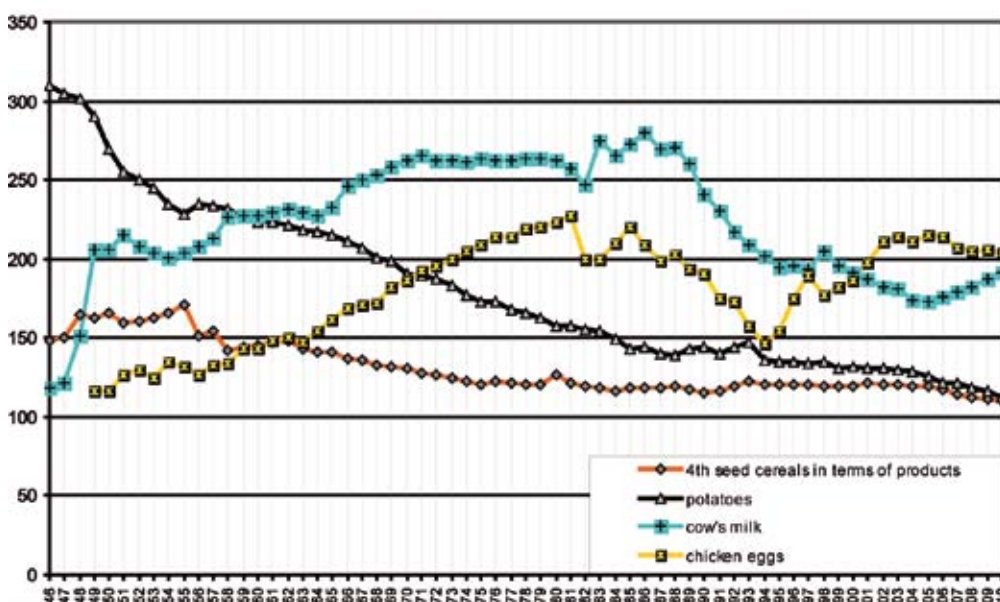


Figure 19. Ingestion (*per capita*): 4th seed cereals in terms of products (in kg), potato (kg), milk (kg), eggs (in units) in Poland in the years 1946-2010

In terms of selected components of livestock production it has been observed:

The initial (1946-1970) increase in the consumption of cow's milk (from about 200 to about 250 liters *per capita*), and then maintaining this level until the late 80's. Then a marked downward trend in this area, which lasted until the early years of the twenty-first century. Since 2005, the consumption of the product has begun to increase (from about 170 liters to 190 liters).

The level of chicken eggs consumption showed an increase lasting until the early 80's (from over 100 to more than 200 eggs *per capita*). Up to the mid-90's it

decreases to about 150 eggs, and then increased until 2000 reaching more than 200 eggs *per capita*. This level was maintained until the end of the period of observation.

The most spectacular changes occurred in the consumption of meat and offal. It rose in the period 1950-1980 from 30 kg to over 70 kg *per capita*. The first half of the 80's brought a decline of this size (to less than 60 kg). After this regression is the mid 90's growth and a stability in meat consumption at around 65-70 kg. Starting from the late 90's, the consumption of this product group increased until 2010, reaching the highest level of post-war Polish history of more than 74 kg per person.

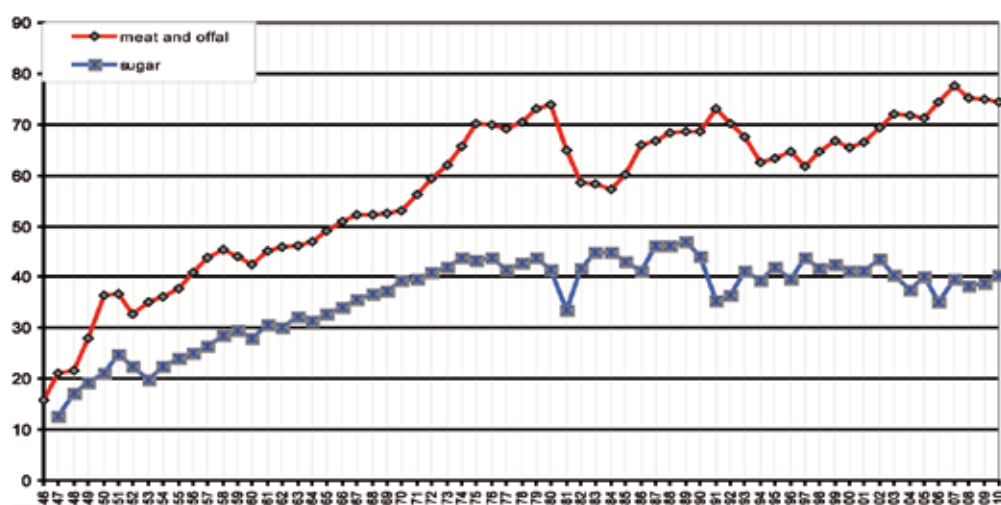


Figure 20. Ingestion (per capita): of meat and offal (in kg) and sugar (in kg) in Poland in the years 1946-2010

Agricultural production (both plant and animal), the length of the production cycle and dependence on unpredictable natural conditions, is clearly different from non-agricultural economic activities. Therefore, the processes of structural transformation of the production on the one hand must be calculated in the long perspective of time, while on the other can be individually more onerous for those directly affected than a similar change in the non-agricultural sector.

Conclusion

The review of changes in the size of production for selected (*ca.* 30) categories of agricultural products that occurred in Poland during the past 60-year period, presented in the current paper, indicates clearly that:

In agricultural production can be distinguished, from an economic aspect, similarly as in non-agricultural sectors, changes taking place in the so-called short-term

and long-term periods. These two differ essentially from one another not only in terms of causes but also in terms of possibilities for taking effective interventions in the areas that are the subject of the present discussion. It is of critical importance for the proper evaluation of the effectiveness of agricultural policy, both current and planned.

As has been proved, the universally known variability (primarily with regard to medium- and short-term periods) existing in agricultural production is of an extremely complex nature on account of the substitutability and complementarity of agricultural products. The aforementioned cycles with regard to the size of production for various agricultural products in Poland do not occur concurrently neither in terms of size nor in terms of direction of changes.

The presented trends, in fact clearly point to a continuation of current trends in the transformation of the long-term restructuring of Polish agriculture. In rural areas and in agriculture, there appears to be a basic analogy of the adjustment process of the non-agricultural sphere, there also exist: “industries”, “branches” declining and emerging, innovative, forward-looking production lines *etc.* As in the non-agricultural sectors of the economy, in agriculture, the adjustment process is onerous, difficult and not without disturbances or errors. But there is no alternative for the processes of change. Of course, these processes must be constantly monitored and adjusted, as the occurrence of events in the form of long-term trends, do not determine “all by itself” their objective necessity and positive character. Consideration of this issue however is beyond the scope of this study and should be subject to regular surveys conducted in the formulation of the medium-and long-term agricultural policy at both national and EU level.

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