

Tadeusz Janicki (*Adam Mickiewicz University, Poznań, Poland*)

<https://orcid.org/0000-0001-7009-6181>

wyki@amu.edu.pl

AGRICULTURE AND THE ENVIRONMENT IN POLAND IN THE YEARS 1944–2004: AN OUTLINE

Abstract: Among the many studies on the history of Polish countryside and agriculture after 1945, there are no studies analyzing in a broader scope the issue of the relationship between agricultural production and the natural environment, despite the close connection between this sector of the economy and natural resources. The negative impact of agricultural intensification based on chemicalization and mechanization of agriculture on the condition of the natural environment is also omitted (or treated marginally). This text is an attempt to fill this gap. Its subject is the problem of the impact of agriculture on the natural environment in Poland in the years 1944–2004, i.e. in the period from the end of the war to Poland's accession to the European Union. The basic research questions concern the directions of agricultural policy in the above period and selected methods of agricultural intensification and their impact on the environment, with particular emphasis on artificial fertilization and chemical plant protection, agricultural mechanization and agricultural land improvement. Due to the lack of space, the description of the above problems is a synthetic sketch concerning selected issues that await in-depth research. However, existing research shows that the degree of environmental threat depends on the level of fertilization and use of plant protection products, the degree of mechanization and dissemination of monocultures, and the level of drainage. Therefore, in Poland it occurred with varying intensity, greater in large-scale farming areas and less in the case of small and extensive family farms.

Keywords: agriculture, environment, agricultural policy, Polish People's Republic, chemicalization of agriculture, mechanization of agriculture

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INTRODUCTION

The history of Polish countryside and agriculture after 1945 has been a subject of many scientific studies, but the issue of the relationship between agricultural production and the natural environment was usually omitted or treated marginally.

However, food production takes place using natural resources, such as soil, water and air, and it transforms the landscape with its biodiversity. The above relation is reciprocal, which is, among others, shaped by the economic and environmental policies of a given place and time. The mechanisms and effects of interactions between the mentioned factors constitute an important research problem.

The basic problem and goal of the agricultural policy in post-war Poland was to feed the rapidly growing population. That is why the communists, who in the years 1944–1947 gained full power in Poland, strove for the entire period of their rule to increase agricultural production, as it was a condition for legitimizing their power and maintaining social peace. They intended to achieve their goal through the intensification of agricultural production based on the chemicalization of agriculture (chemical fertilizers and chemical pesticides), breeding new varieties of crops and breeds of farm animals, as well as mechanization reducing labor inputs. This concept, referred to as the industrialization of agricultural production in conjunction with the collectivization of peasant farms, was to lead to the creation of large-scale cooperatives and state farms, producing food on a mass scale using the latest achievements of agro-technical knowledge.

The communists did not manage to fully implement the above scenario because they had to withdraw from the collectivization of agriculture, but their paradigm of increasing food production by intensifying agricultural production was in force until the end of their rule in 1989. At this stage, nature was considered one of the production goods, a free good, available in an unlimited and free quantity. At the same time, for the vast majority of the discussed period, the fact that intensive agricultural activity may pose a threat to the above-mentioned natural resources, and then to the health of rural residents and food consumers, was not taken into account or neglected.

The subject of this article is the problem of the impact of agriculture on the natural environment in Poland in the years 1944–2004, i.e. from the beginning of the so-called People's Republic of Poland until Poland joins the

European Union. The basic research questions concern selected methods of agricultural intensification and their impact on the environment, with particular emphasis on artificial fertilization and chemical plant protection, agricultural mechanization and agricultural land improvement, considered in the context of the directions of agricultural policy implemented in the above period. Due to the lack of space, the description of the above problems is a synthetic sketch based on the literature and statistical data, focusing on the most important problems and trends, which, however, require further, in-depth research.

When discussing the above topics, it should be remembered that immediately after World War II, Poland was an agricultural and industrial country, where most of the population lived in the countryside. Polish agriculture in this period was characterized by: low productivity, highly fragmented agricultural structure and large regional differentiation in terms of the structure of agricultural land and productivity, as well as the dual nature of ownership relations. In addition to small-scale peasant farming, which after the land reform had at its disposal about 80% of agricultural land, there were economically ineffective large-scale State Farms [Państwowe Gospodarstwa Rolne, PGR] and agricultural production cooperatives [Rolnicze Spółdzielnie Produkcyjne, RSP] managing the remaining 20%.

The history of Polish agriculture in the years 1945–2004, analyzed in terms of the impact of agricultural policy and the main factors of agricultural production intensification on the natural environment, can be divided into three sub-periods:

- the period of post-war reconstruction 1945–1949
- the period of the economy of real socialism 1950–1989
- the period of systemic transformation involving the introduction of market mechanisms in agriculture 1990–2004.

After a relatively short period of post-war reconstruction, during which agricultural reform was implemented to strengthen peasant property and attempts were made to restore the pre-war level of agricultural production, there was an almost forty-year period of communists favoring state and cooperative large-scale farms and the modernization of agriculture based primarily on its chemicalization and mechanization. Despite numerous political breakthroughs and changes in agricultural policy, it was uniform from the point of view of the analyzed issues. It was characterized by the dominance of the production growth paradigm, treating

nature as a free good and an object of management, and failing to notice environmental threats resulting from agricultural production. The environmental protection legal acts appearing during this period focused on industrial pollution, and in the case of agriculture, only the problem of using land for non-agricultural purposes and restoring the character of agricultural lands in agriculturally degraded areas was noticed (Dz.U. 1971, No 27, item 249) The political breakthrough of 1989 brought a collapse in production and a sharp decline in the use of the most environmentally hazardous means of production, a change in the attitude towards private property in agriculture and the freezing of the agricultural structure despite the formal liquidation of state farms. This period ends with Poland's accession to the European Union, which resulted in the implementation of new concepts regarding the relationship between agriculture and nature, but their discussion goes beyond the scope of this study.

Numerous works have been published in Poland dealing with the impact of agriculture on the natural environment, but the vast majority of them are the result of research by biologists and ecologists, geographers and chemists. Among the mentioned works, the studies by W. Sobczak, P. Ilnicki, S. Kozłowski, and S.K. Wiąckowski, which comprehensively analyze environmental changes caused by the development of agriculture. They devote a lot of space to the classification of environmental threats from agriculture, changes caused by the development of agriculture in fauna, flora and rural landscape, and threats resulting from the intensification of agricultural production for humans (Kozłowski, 1991; Wiąckowski, 1992; Ilnicki, 2004; Sobczak, 2013).

So far, the issue of the impact of agriculture on the environment has not been a subject of in a separate monograph analyzing it from a historical point of view, taking into account socio-political and cultural conditions. Both representatives of socio-economic history and environmental history, which has been developing more and more rapidly in recent years, have so far ignored the above issue (or treated it marginally) and focused on nature perceived as the context of human fate and environmental pollution caused by industry. Among the works focused on various aspects of environmental history (environmental history as a research approach, landscape and its anthropogenization, forest anthropology, ecology and others), the articles by M. Praczyk (2015; 2020), A.A. Konczal (2017), K. Ćwiek-Rogalska (2017), T. Samojlik (2019), A. Izdebski (2013; 2014) and J. Kieniewicz (2014).

In turn, among the works discussing the problem of exploitation and degradation of the natural environment in Poland after 1944, from the point of view of socio-economic history, the following works deserve special attention: A. Delorme (1995): *Antyekologiczna spuścizna totalitaryzmu. Polityka – gospodarka – środowisko naturalne* [*Anti-ecological legacy of totalitarianism: Politics – economy – natural environment*], and collective works edited by T. Głowiński and M. Zawadka (2016) entitled *Od systemu żarowego do ekorozwoju. Ochrona i wykorzystanie zasobów środowiska naturalnego na ziemiach polskich – aspekt historyczny* [*From the glow system to eco-development. Protection and use of natural environmental resources in Polish lands – historical aspect*] and *Od regaliów po dobro narodowe. Ochrona i wykorzystanie zasobów środowiska naturalnego na ziemiach polskich – aspekt historyczny* [*From regalia to national wealth. Protection and use of natural environmental resources in Polish lands - historical aspect*]. Both works are the result of a scientific conference organized in 2016 as part of the Wrocław Meetings with Economic History and contain articles on, among others, natural resources, natural conditions of economic development, as well as pollution and environmental protection, with particular emphasis on the period of the Polish People's Republic.

In relation to the period of the Polish People's Republic, historians are particularly interested in the problem of environmental pollution and its negative health and social effects (Dulewicz, 2016; Jarosz, 2016; 2017; Szpak, 2016). Particularly noteworthy are the texts by D. Jarosz, who in a comprehensive way (taking into account political and social economic conditions) discusses the problem of water and air pollution in subsequent periods of the Polish People's Republic, the actions of the authorities related to this problem, as well as ecological disasters and the birth of ecological awareness (Jarosz, 2016; 2017). Unfortunately, it ignores the problem of the impact of agriculture on the environment, which appears only to a small extent in Dulewicz's work (Dulewicz, 2016).

POST-WAR RECONSTRUCTION 1945–1949

As a result of the German occupation, the fighting in 1945 and the stationing of the Red Army, Polish agriculture was severely damaged. The areas where the fighting took place were particularly severely devastated. Many fields, especially in the western and northern territories, were mined. In some districts of Lower Silesia, the degree of mining in 1945 ranged from

50-80%. As a result, in the Wrocław Voivodeship 1/3 of arable land was unsuitable for cultivation (Straszak-Chandoha, 2021: 79).

Throughout Poland, as a result of direct military operations, approximately 467,000 rural farms were destroyed (at a level exceeding 15% of the pre-war condition), and the value of these losses amounted to PLN 2.5 billion pre-war (Jeziński and Leszczyńska, 2003: 419). Compared to the pre-war state (1938), the number of farm animals at the end of 1945 was: horses 40%, cattle 33%, and pigs 17%. Crop yields have decreased by 30% to 50%. Even at the beginning of 1947, over 3 million hectares of arable land lay fallow (Roszkowski, 2007: 170; Jeziński and Leszczyńska, 2003: 419).

Natural succession of plants took place in the areas excluded from cultivation, and a large number of fallow trees favored the occurrence of violent rodent plagues in Poland in 1946, 1948, 1949, 1952, 1955. A danger to the agricultural production was also posed by the invasion of the potato beetle, the May beetle and other insects (Dziurzyński, 1983: 183; Łach, 1993: 196; Skobelski, 2007: 97; Kurowska 2021: 67–68; Janicka, 2020: 64–65).

At this stage, the most important activities were to prepare the land for cultivation, and only then to improve its quality. Individual farmers and state institutions primarily aimed at eliminating the fallow lands and sowing as much area as possible. It was connected with the necessity to remove wild plants and other obstacles from the fields.

The problem of fallow land primarily concerned the so-called recovered lands where natural plant succession occurred to the greatest extent. For economic and propaganda reasons, the communists attached great importance to their liquidation and achieved success in this field. At the end of 1949, fallow lands constituted only 10% of the arable land area in the recovered lands, but they were very unevenly distributed (most of them were located in Western Pomerania and the least in the Opole region). In the authorities' plans, state farms were to play a large role in eliminating fallow lands, but they struggled with many problems, including labor shortages (Kostrowicka et al., 1984: 493; Łach, 1993: 186; Skobelski, 2007: 98; Machalek, 2021: 259–262).

During the period in question, large-scale drainage works were also undertaken, symbolized by the drainage of Żuławy Wiślane, flooded by the retreating German troops in 1945. "Operation Żuławy", aimed at draining the polder depression areas in the Vistula Delta, was started in April 1945. In the following years, flood embankments were repaired, drainage ditches were cleared and pumping stations were launched. Ultimately, the

drainage of Żuławy Wiślane and the restoration of its agricultural economy were completed in 1949 (Cebulak, 2010: 24–26). At the turn of the 1940s and 1950s, nature was a barrier to the development of agriculture, and the rhetoric of fighting nature appeared in the propaganda, which was an obstacle on the way to greater food production.

At the same time, nature and agricultural land constituting part of it were perceived as one of the production goods that, through technical progress, including, among others, machinery, chemicalization of agriculture and biological progress, had to be used as best as possible to increase the level of food production and avert the threat of famine, which was still present in the post-war period (Bankowska, 2018: 815; Gończyński-Jussis, 2016: 131–132).

THE PERIOD OF THE ECONOMY OF REAL SOCIALISM 1950–1989

After the end of the post-war reconstruction period, the communists, striving to increase food production to legitimize their power, intended to implement a top-down program of intensification of agricultural production based on the chemicalization of agriculture, agrotechnical progress and widespread mechanization of work, as well as the reconstruction of the agrarian structure through the collectivization of peasant farms (Jeziński and Leszczyńska, 1994: 230–231; Jarosz, 1998: 15–21; 266–273).

Collectivize the Polish countryside, which reached its apogee in the years 1950–1953. As part of it, the communists intended to subordinate the peasants, raise funds for the development of industry through the mechanism of the so-called internal colonization and to carry out revolutionary changes in the agrarian structure and methods of agricultural production, which was to be based on chemicalization and mechanization (Jeziński and Leszczyńska, 1994: 230–231; Machałek, 2013; 70–74).

Collectivization met with widespread resistance from the peasants and led to a sharp decline in food production and a food crisis. As a result, in 1956 the communist authorities withdrew from it and accepted the dualistic structure of Polish agriculture, which was dominated by small peasant farms (with about 80% of arable land), but until the end of the Polish People's Republic they favored large-scale state farms and cooperatives (Jeziński and Leszczyńska, 1994: 230–231). At the same time, they faced

a difficult dilemma of how to increase the productivity of Polish agriculture and ensure food supply for the rapidly growing population, while preventing the economic strengthening of the private sector in agriculture. The communists, without giving up the idea of collectivization of agriculture, realized that they could no longer resort to the methods used in 1949–1956. Therefore, in the early 1960s, the concept of “PGRization” (nationalization) of agriculture appeared, which provided for the gradual takeover of individual farms by State Agricultural Farms and their favoring in terms of supplies of production means and machinery. The above concept was implemented until the end of the Polish People’s Republic (Kłopot, 2011: 97; Machałek, 2012: 381–382).

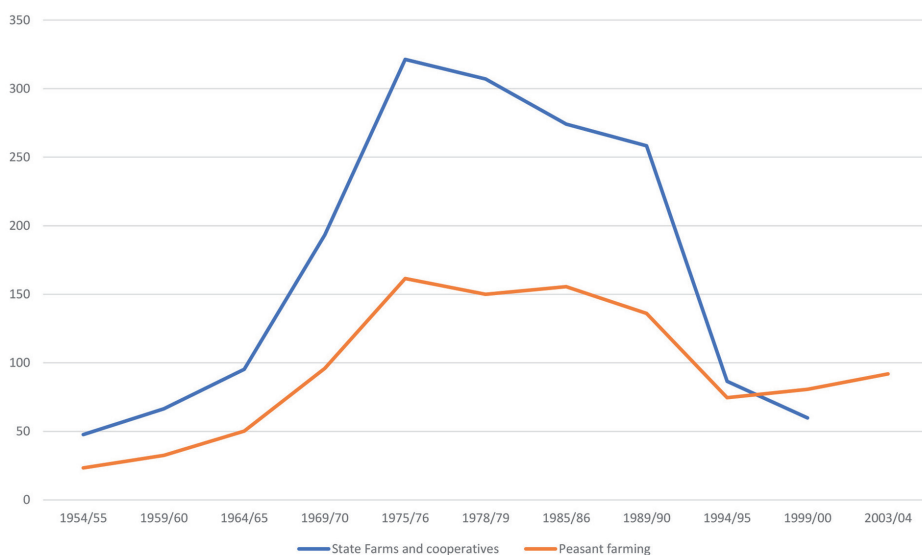
As a result, in the 1960s and 1970s, the area of State Agricultural Farms (PGRs) systematically increased (especially in the western and northern territories), with the creation of larger and larger fields, the use of increasing amounts of artificial fertilizers and plant protection products per unit of area, and the massive use of agricultural tractors and farms. Other machines and field trees were eliminated particularly intensively. All this had a clearly negative impact on the natural environment. (Rudnicki, 1995: 30; Kłopot, 2011: 102; Bankowska, 2018: 815).

In accordance with the adopted concept of agricultural production intensification, from the 1950s, great emphasis was placed on the increase in the use of artificial fertilizers and chemical plant protection products, agricultural mechanization and melioration. According to the communist plans, the abundant use of mineral fertilizers and artificial fertilizers was to ensure a rapid increase in crop yields. Therefore, starting from the 1950s, the increase in their use was intensively promoted along with the wider use of chemical plant protection products than before. In the eastern and southern areas of Poland, which, unlike Greater Poland, had no previous experience with the use of artificial fertilizers on a mass scale, an obligation to purchase and use artificial fertilizers was even introduced. It was an element of the so-called agrominimum, under which a set of agrotechnical and zootechnical activities applicable to all farmers was established for each village (Woś, 1987: 73; Kłopot, 2011: 101).

In general, thanks to the import and subsequent expansion of the chemical industry, until 1989 the consumption of artificial fertilizers increased systematically, but in a very uneven manner. In a socialized economy (PGR – State Agricultural Farms, and RSP – Agricultural Production Cooperatives), fertilization in the pure NPK component in kg per 1 ha was approximately twice as high as on individual farms (for example, in

1969/1970, the consumption of NPK in kg per 1 ha of agricultural land in State Agricultural Farms amounted to 206.6 kg and on individual farms 108.3 kg). (*Rocznik Statystyczny Rolnictwa i Gospodarki Żywnościowej*, 1978: 136–137) Differences in fertilization per 1 ha between the PRG and individual farms in the years 1954–2000 are presented in Figure 1.

Figure 1: The consumption of artificial fertilizers in state-owned farms and cooperatives as well as on peasant farming of agricultural land in the years 1954–2000 [in kilograms per ha]



Source: *Rolniczy Rocznik Statystyczny 1945–1965* (1966: 266–267); *Rocznik Statystyczny Rolnictwa i Gospodarki Żywnościowej* (1978: 136–137); *Rocznik Statystyczny Rolnictwa* (1982: 165; 1993: 121–122; 2001: 106–107); *Rocznik Statystyczny Rzeczypospolitej Polskiej* (2005: 473).

However, the obtained increase in production was lower than expected, because the effectiveness of the use of artificial fertilizers was reduced by irregular deliveries and often late in relation to the vegetation cycles of plants, as well as by the irrational supply structure and regionally low agricultural culture. On the one hand, fields in State Agricultural Farms and Agricultural Production Cooperatives were overfertilized (i.e. excessive doses of fertilizers were used in relation to the plants' needs), and on the other hand, there was often a shortage of fertilizers in the private sector or reluctance to use them in regions not accustomed to intensive fertilization. The sharp decline in fertilization in state-owned farms after 1990, apart from the sharp increase in the prices of artificial fertilizers, resulted from the decision to liquidate State Agricultural Farms in 1991 (Gorzelać,

1980: 138–139; *Rocznik Statystyczny Rolnictwa i Gospodarki Żywnościowej*, 1978: 136–137, *Rocznik Statystyczny Rolnictwa*, 1982, 1999, 2001; Straszak-Chandoha and Merta-Staszczak, 2016: 272–273; Straszak-Chandoha, 2022: 376–378; Dz.U. 1991, No 107, item 464).

In the times of the Polish People's Republic, great emphasis was also placed on the use of chemical plant protection products, which were intended to reduce losses caused by insects, diseases and weeds. From the 1950s to the 1970s, the use of plant protection products increased from 45,000 tons to approximately 60,000 tons per year. Initially, over 90% of the products used were insecticides. Over time, the use of herbicides increased. The structure of herbicides used also changed, as the use of insecticides gradually decreased and the supply of herbicides increased (Merta-Staszczak et al., 2017: 267–268).

Overfertilization of arable land in State Agricultural Farms and Agricultural Production Cooperatives and intensive use of chemical plant protection products (including DDT, pesticides and herbicides) led to a decline in the population of soil microorganisms (bacteria and actinomycetes) and a significant decline in the number of pollinating insects. Moreover, since the 1950s, due to the use of chemical plant protection products and changes in the agrarian structure and landscape (consolidation of fields, removal of mid-field vegetation, ditches and ponds), the disappearance of plant and animal species once common in agricultural habitats and rural areas, including partridges, quails and gray hare. With each decade, the negative impact of chemical substances on the environment has been increasing due to their durability, accumulation in the soil and tissues of living organisms, movement over long distances, and toxicity to humans and animals (Łoginow, 1979: 190–199; Wiąckowski, 1992: 65–67; Gorlach, 2002; Ilnicki, 2004: 274–275; Mazur, 2008: 95–96; Głodowska and Gałązka, 2018: 10–11).

As a result, with the chemicalization of agriculture in the 1960s and 1970s, there were cases of soil, air and water pollution. However, in the first two cases, they were island-type and appeared where the above-mentioned means of production were used particularly intensively, that is mainly in state-owned farms and cooperatives. Pollution of surface and ground waters with nitrates, phosphates and chlorides as well as residues of chemical plant protection products was much more common and dangerous already in the 1970s. It not only led to the deterioration of drinking water quality indicators, but also caused eutrophication of

waters and, consequently, adverse changes in the entire ecosystem, including the reduction of biodiversity (Kozłowski, 1991: 80–83, 120–121; Wiackowski, 1992; Ilnicki, 2004: 316–321; Sobczak, 2013: 76–80, Pajewski, 2016: 194).

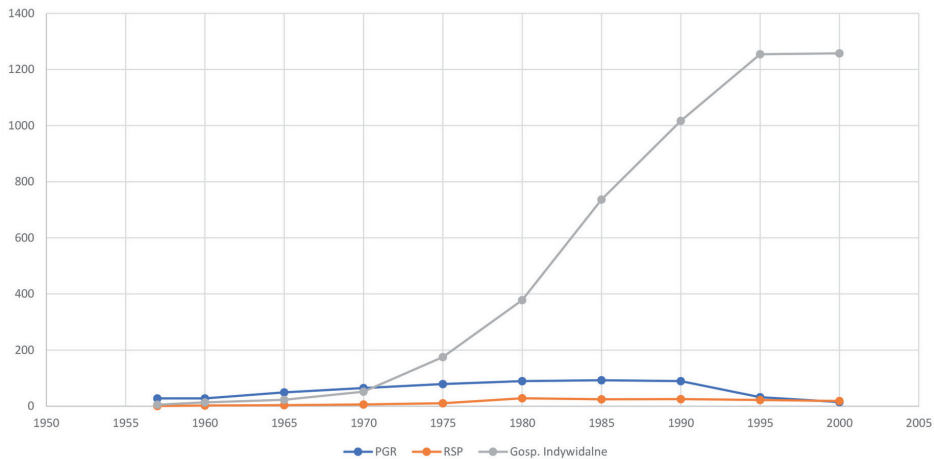
A common threat to surface water was improper storage and management of slurry, especially from large breeding farms established in the 1970s. Often, waste from breeding facilities was discharged directly to meadows from where it flowed into nearby rivers. Water contamination also frequently occurred on individual farms, mainly due to the penetration of liquid manure into surface waters and further into unprotected wells (Ilnicki, 2004: 284–296; Dulewicz, 2016: 369–370; Głodowska and Gałązka, 2018: 8–9).

The problem of the negative impact of agricultural chemicalization on the environment and food products was noticed and written about as early as the 1970s, but information about the associated threats gained wider social resonance in the 1980s, during the weakening of the communist power and the censorship that served them. In the early 1990s, the State Inspection of Environmental Protection, estimated that chemical poisoning of soil and vegetation occurred in 10–15% of the country's area (of which approximately 10% was agricultural land). Although environmental pollution was still associated mainly with urbanized areas, from then on the negative impact of chemicalization of agriculture on nature and human health was no longer questioned (Bieroń, 1980; Maciejewski, 1981; Przeździecki, 1984; Reszel, 1989; Bankowska 2018: 823).

Another factor in the intensification of production was mechanization, the symbol of which in the times of the Polish People's Republic were tractors. Their number has been systematically growing since the end of the 1950s (see Figure 2), but the new ones were almost exclusively transferred to the state-owned farms and cooperatives. As a result, in the individual economy, the degree of mechanization was low, and until the end of the 1970s horses constituted the main part of the draft force.

The breakthrough moment in terms of mechanization of draft power in individual agriculture was the 1970s and 1980s. During this period, the number of tractors in the private sector increased from 51.6 thousand in 1970 to 378 thousand in 1980 and 1,016.7 thousand in 1990 (Grala, 2020: 120–121; *Rocznik Statystyczny Rolnictwa*, 1982: 130; 1993: 114; 2001: 102).

Figure 2: The number of tractors in Poland in years, with the division into state-owned farms and cooperatives as well as on peasant farming [in thousands]



Source: *Rolniczy Rocznik Statystyczny 1945–1965* (1966: 249, 251); Gorzelak (1980: 208), *Rocznik Statystyczny* (1976: 279); *Rocznik Statystyczny Rolnictwa* (1982: 130; 1993: 114; 2001: 102).

In addition to tractors, which were the most important element in the process of mechanization of agricultural production, a number of other machines were delivered to the countryside, from plows to combine harvesters. Their effective use required long and wide fields of regular shapes. In conditions of domination by live draft force, there was no need to create crop rotation fields with an area of over 10 ha. Therefore, in the mid-20th century, on large state and cooperative farms, the size of crop rotation fields most often ranged from 10 to 25 ha. However, starting in the 1970s, due to the influence of mechanization, in the conglomerates of state-owned agricultural farms established at that time, actions were initiated to increase the area of crop rotation fields from 50 to 150 ha, and a gradual transition from multi-rotation to monocultures began. Similar processes occurred in the 1990s on large private farms (Ilnicki, 2004: 167–174).

At the same time, roads, mid-field trees and ditches were removed, which resulted in impoverishment of the landscape and ecological damage. It quickly turned out that large fields with one crop clearly deteriorate the living conditions of wild flora and fauna species and contribute to the reduction of their numbers. Moreover, intensive mechanization of agriculture contributed to soil erosion and changes in its structure (compaction) (Cofta, 1986: 15–16; Kopeć and Głąb, 2003; Ilnicki, 2004: 178; Sobczak, 2013: 93).

Over time, it turned out that the degree of environmental risk depends on the area under cultivation of a given plant, the level of fertilization and consumption of plant protection products, and the degree of mechanization of field work. The highest level of fertilization and pesticide use, as well as the most intensive mechanical cultivation, is used for large-scale cultivation of corn, potatoes, sugar beets, rapeseed and vegetables. Moreover, these crops also have the highest leaching of nutrients (nitrogen and phosphorus compounds) (Ilnicki 2004: 179; Sobczak, 2013: 114–121, 133–144). The move away from proper crop rotation, which began in the 1970s, also had negative environmental effects. This resulted initially from the production range imposed on state farms by the central authorities, and later from the diversified profitability of production of individual plants and groups of farm animals (Ilnicki, 2004: 180).

Melioration was also an activity aimed at increasing agricultural production in the period in question. In the years 1950–2004, over 6.6 million hectares of agricultural land were meliorated in Poland, of which about 70% was arable land and 30% was grassland. At the same time, thousands of kilometers of rivers were regulated and hundreds of kilometers of drainage canals were built (Gorzelać, 1980: 214, Hemmerling, 1990: 208–209; *Rocznik Statystyczny Rzeczypospolitej Polskiej*, 2005: 472).

Melioration turned out to be a factor that strongly degraded the natural environment. They caused disturbance of water conditions, resulting in soil drying, peat rotting, soil degradation and erosion, and the disappearance of many natural habitats for animals and plants, including swamps, peat bogs, floodplains, ponds and ponds, as well as ditches and mid-field trees. Already in the 1970s, the number of bird species in the drained areas decreased by an average of half, and such reptiles as the European pond turtle and Aesculapian snake were in the extinction phase (Jasnowska, 1995; Witkowski, 1995: 37; Radowan et al., 2004: 287; Gwiazdowicz, 2010: 3).

Melioration of valley areas led, first of all, to excessive reduction of surface and ground water levels, complete or partial elimination of ponds and oxbow lakes, interruption of peat-forming and sediment-forming processes and subsidence of peat bog surfaces, partial elimination of trees, shrubs and rushes, and conversion of grassland into arable land. In turn, melioration of arable land, primarily aimed at drainage, led to the drainage of ponds and small wetlands, deepening the network of drainage ditches, consolidation of fields and “organizing the agricultural production space” on large-scale farms (especially for the needs of

large-area rainwater farms), consisting in replacing ditches with pipelines and removal of trees, hedges, sod balks and artificial terraces (Kostuch, 1979; Ilnicki 2004: 371–372; Degórska, 2015: 32–33). A particularly drastic example of the harmful impact of drainage was the construction of the Wieprz-Krzna canal and the drainage of the Biebrza valley (Okruszko and Byczkowski, 1996: 40–41; Poleszuk 2002: 178–182; Gończyński-Jussis, 2016: 129).

As a result, melioration treatments, often carried out with the aim of maintaining proper water and air management in the soil, in fact most often led to the drainage of the area and the replacement of meadows with arable land and simplification (homogenization) of the landscape, resulting in a reduction in the biodiversity of ecosystems (Degórska, 2015: 141–142). Meanwhile, the structure of the landscape in which the crop is located has a significant impact on the diversity of biomass and animal numbers. Preserving a diverse landscape with areas and refuges where human pressure is not too great has a significant impact on the preservation of biodiversity throughout the agricultural landscape, even though intensive agricultural means are used in the fields. A frequently mentioned example of the positive role of a diversified landscape created by introducing mid-field trees is the area of the former estate of Dezydery Chłapowski in Turew (Karg and Ryszkowski, 1996: 24–25; Raszeja, 2010: 103–105; Cofta, 1986; Kujawa, 2006: 106–113).

THE PERIOD OF SYSTEMIC TRANSFORMATION AFTER 1990

The transition from the real socialist economy to the free market, which started in 1989, also brought about a number of changes in the countryside and agriculture. A significant drop in demand for food on the internal market and its massive import from the West eliminated the problem of the constant food shortage, but at the same time led to a decline in agricultural prices and rural income. Already in 1990–1991, this resulted in a collapse of production and a radical reduction in the use of artificial fertilizers and plant protection products. Mineral fertilization decreased on average by 50%, and the consumption of plant protection products by more than 40% (Janicki, 2009: 259–260). In addition, in 1991, state-owned farms were liquidated, which contributed to the reduction or complete abandonment of production in many large-scale farms. As a result, after 1990, the agricultural production and the number of livestock decreased signifi-

cantly, and there appeared fallow lands and fallow land which in 2002 still covered 2.3 million hectares (Ilnicki, 2004: 177; Janicki, 2022: 361–363).

The decrease in the use of artificial fertilizers and chemical plant protection products, combined with intensive measures to improve the purity of water and air after 1990, resulted in a noticeable improvement in the condition of the environment, although it did not stop the eutrophication process. In turn, the appearance of fallow land led to the initiation of secondary succession towards forest lands. The decrease in the intensity or abandonment of the use of meadows in the river valleys as well as planned afforestation and activities aimed at diversifying the landscapes of large-area farms with such forms as meadows, ponds and tree coverings turned out to be particularly beneficial for the environment. Unfortunately, at the same time in some agricultural areas after 1990, there was a gradual simplification of crop rotation and the spread of monoculture cereal cultivation, which led to an increase in the use of pesticides and a reduction in the content of humus in the soil (Ilnicki, 2004: 180; Wiąckowski, 1992: 87).

Changes in social awareness and the launch of a support system for organic farms in 1999 and subsequent subsidies for organic farms under the Common Agricultural Policy (after Poland's accession to the EU) stimulated the development of this method of farming, however, compared to other forms of agricultural production, it still has marginal nature (Kowalska, 2015: 468–471; Bankowska, 2018: 826).

CONCLUSIONS

The paradigm of agricultural production growth, which dominated most of the analyzed period in agricultural policy, after 1990 was replaced by the paradigm of efficiency and profitability. However, in both cases, the way to their implementation was the intensification of agricultural production, which brought an increase in plant and animal production, but at the same time led to a reduction in biodiversity and deterioration of the landscape values of the countryside. Chemical water pollution and drainage turned out to be the processes that particularly degraded the agricultural environment in the discussed period. The negative effects of the changes taking place are evidenced by the decline in the population or the complete disappearance of many species of birds, amphibians and insects, including pollinators especially important for the biocenosis, recorded since the 1970s.

In the light of the presented data, it can be said that the degree of environmental risk depends on the level of fertilization and consumption of plant protection products, the degree of mechanization and dissemination of monocultures, and the level of drainage. Therefore, in Poland it occurred with different intensity, greater in the areas of large-scale agriculture and less in the case of small and extensive family farms. However, individual farms were not indifferent to the environment, as they also caused air and water pollution, resulting primarily from improper management of slurry and burning of plastic packaging.

After 1990, apart from the decline in biodiversity in agricultural areas, a second, contradictory process also emerged, related to the abandonment of farming in areas where agricultural production, under conditions of free market competition, became unprofitable. It leads to the initiation of secondary succession towards forest lands or prompts owners to abandon intensive farming or planned afforestation, which contributes to the restoration of biodiversity. After joining the EU, in the framework of sustainable agriculture, field plantings are also promoted and the creation of protection zones along rivers and water reservoirs. All this to restore the traditional agricultural landscape and the biodiversity it maintains.

In general, the problem of the relationship between agricultural policy, agriculture and the environment in post-war Poland, especially in the long term, is still waiting for in-depth study and the existing data collected by, among others, the State Environmental Monitoring to be used.

Tadeusz Janicki is an associate professor and the head of the Department of Economic History of the Faculty of History of the Adam Mickiewicz University in Poznań. Author of many works on the socio-economic history of Poland and Germany in the 19th and 20th centuries, with particular emphasis on the history of the countryside, agriculture and agricultural policy, the Nazi occupation of Polish lands, the political thought of the Polish peasant movement and the regional history of Wielkopolska.

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