

LAND CONSOLIDATION IN POLAND: CONTEMPORARY BARRIERS TO SUSTAINABLE RURAL DEVELOPMENT

Bartosz Mickiewicz^{1*}, Katsiaryna Volkava¹

Received 05.03.2026. | Send to review 30.03.2026. | Accepted 07.08.2026.

Original Article



¹ The University College of Professional Education in Wrocław, Poland

***Corresponding Author:**
 Bartosz Mickiewicz

Email:
bartosz.mickiewicz@wskz.pl

JEL Classification:
 Q15, Q18, R52

Doi: 10.61432/CPNE0401333m

UDK: 332.2/.6:005.591.5(475)

ABSTRACT

Land consolidation represents a critical instrument for rural development, designed to rectify fragmented land ownership and enhance agricultural productivity. This study examines the evolution and implementation of land consolidation policies in Poland across consecutive European Union programming periods: 2004–2006, 2007–2013, 2014–2020, and the current 2021–2027 framework under the Common Agricultural Policy (CAP) Strategic Plan. The analysis reveals a progressive increase in both financial allocation and project scale, with the 2021–2027 perspective allocating EUR 376.5 million—a significant rise compared to previous periods. By the first quarter of 2026, 154 projects covering 112.4 thousand hectares had been approved under the current framework, demonstrating improved implementation dynamics attributable to digitalization and streamlined administrative procedures. A key development is the strengthened environmental component, which integrates consolidation with climate adaptation, water retention, soil protection, and biodiversity conservation, thereby aligning with European Green Deal objectives. Spatial analysis confirms persistent concentration of consolidation activities in south-eastern and central Poland, where land fragmentation remains most severe. Despite progress, challenges persist, including lengthy administrative procedures (averaging 3–4 years) and the complexity of obtaining landowner consents. The findings underscore that while land consolidation in Poland has evolved into a more efficient and environmentally integrated tool, the scale of intervention remains insufficient relative to historical fragmentation levels, necessitating continued support and procedural refinement in future programming periods.

Keywords: *land consolidation, rural development, agrarian structure, Common Agricultural Policy, sustainable development, Poland*

1. INTRODUCTION

Rural development through land consolidation has been implemented in many European countries, including Germany, the Netherlands, France, Belgium, Luxembourg, Austria, Switzerland, as well as Finland, Norway, and Sweden. The underlying demand for land consolidation was similar across all these states, stemming from the need to correct unfavorable land divisions and promote appropriate land use without altering ownership status. Depending on the country, differences existed in the objectives and procedures of consolidation,

shaped by historical conditions, culture, tradition, and legal systems. The common initiative of land consolidation in various countries aimed to adapt proven solutions and functions developed in Europe regarding land amalgamation processes ([Sabates-Wheeler, 2002](#)).

Land consolidation is not regulated by a single European act but is based on the legislation of individual member states. The primary goal of consolidation is to improve production factors through land exchange to achieve a shape that meets users' needs. Beyond the function of land exchange, efforts are made to improve road networks, enable agricultural land drainage, enhance landscape architecture, protect the environment, and manage rural areas more efficiently. The consolidation procedure involves administrative decisions, which in most countries are issued by administrative bodies. Landowners within the consolidation area typically form associations that, depending on the country, hold a stronger or weaker position in the project implementation process. In countries such as France, Germany, or the Netherlands, these associations possess significant legislative powers and can participate in valuation, planning, and project execution ([Pašakarnis, Malienė, 2010](#)).

Land consolidation in all these countries constitutes one of the most important economic and agricultural instruments, comprehensively improving the organization of agricultural production areas. Its aim is to transform a layout of fragmented, excessively elongated, or checkerboard-like plots into as large and regular areas as possible. The necessity for consolidation is indicated by detailed analyses of parameters determining the need for land amalgamation, which are conducted during the development of management plans. Comprehensive land consolidation is perceived as an activity closely linked to post-consolidation development processes ([Seisenbekov et al., 2026](#)). According to the principle of equivalence, participants in consolidation or exchange receive new land of equal estimated value in return for their previously held land ([Vitikainen, 2004](#)).

Despite the extensive implementation of land consolidation across Europe, the effectiveness of these policies varies considerably across member states, and the transferability of successful models to countries with different historical trajectories remains a subject of scholarly debate. Poland presents a particularly relevant case study due to its unique historical path—characterized by post-1944 land reform that parceled out large estates and persistent resistance to agricultural collectivization—which created a distinct fragmentation pattern unlike that found in Western European countries. This study addresses a gap in the existing literature by providing a systematic longitudinal assessment of land consolidation implementation across four successive EU programming periods, examining not only quantitative progress but also procedural challenges and the integration of environmental objectives

2. SUBJECT, AIM, AND SCOPE OF THE STUDY

Consolidation works in Poland were regulated by the 1982 Act on Land Consolidation and Exchange. The aim of land consolidation was to create more favorable farming conditions in agriculture by improving the area structure of agricultural holdings, rationally shaping land layout, adjusting property boundaries to the water drainage system, constructing roads, and adapting land relief.

The primary aim of the study was to identify and compare activities across four indicated programming periods (2004–2006, 2007–2013, 2014–2020, and 2021–2027). Specifically, the study addresses three research questions: (1) What are the implementation dynamics and spatial patterns of land consolidation across successive EU programming periods? (2) How has the integration of environmental and climate objectives evolved within consolidation interventions? and (3) What are the key procedural barriers limiting the effectiveness of consolidation efforts, and how might these be addressed through policy reforms?

The authors assumed that Poland belongs to the countries characterized by the highest level

of land fragmentation due to the historical context of implemented land reforms, traditions resulting from inheritance and succession, socio-economic policies, and other factors. For this reason, agriculture bears specific economic costs that hinder competitiveness in the common European agricultural market. The nationwide research was based on Rural Development Programmes, reporting data from the Agency for Restructuring and Modernisation of Agriculture (ARMA), results from the Central Statistical Office (CSO), and other documents. The methodological approach employed in this study is primarily descriptive-analytical, utilizing secondary analysis of official institutional data. Data sources include: (1) Rural Development Programme documents for each programming period, (2) ARMA implementation reports and ex-post evaluations, (3) CSO agricultural statistics, (4) Ministry of Agriculture and Rural Development strategic documents, and (5) implementing regulations and legal acts governing land consolidation procedures. The analysis employs quantitative indicators (number of projects, area covered, financial allocations, completion rates) supplemented by qualitative assessment of procedural frameworks and policy innovations. While this approach allows for systematic comparison across programming periods, it is subject to certain limitations, including variations in data reporting methodologies across periods and the absence of systematic micro-level data on farm-level outcomes. These limitations are addressed in the discussion section

3. LAND CONSOLIDATION IN THE SECTORAL OPERATIONAL PROGRAMME 2004–2006

The Sectoral Operational Programme “Restructuring and modernisation of the food sector and rural development” outlined the strategy and directions for agricultural and rural development. The “Land consolidation” measure was implemented in areas characterized by significant land fragmentation. Support for the consolidation procedure aimed to improve land layout in individual agricultural holdings. By reducing the number of plots per holding, improvements in management efficiency were expected through reduced transport costs and the facilitated mechanization of field cultivation. Furthermore, within the consolidation project, works related to post-consolidation development were carried out, taking into account natural environment protection requirements. Financial support under this measure aimed to improve the area structure of farms, reduce the number of plots per farm, allocate equivalent land to farmers at a short distance from the farmstead, and delineate and construct functional access roads to land, adapted to the agricultural equipment used ([ARMA Regulations, 2004](#)).

Activities related to land consolidation fell within the responsibilities of staff delegated to marshal offices. However, beneficiaries were county heads (*starostowie*), responsible for preparing the complex procedure of obtaining farmers’ consent to commence consolidation works. Consolidation works could be initiated upon application by owners of agricultural holdings located within the planned consolidation area, whose total area exceeded half of the planned consolidation area. Consolidation procedures could also be initiated ex officio, after obtaining the opinion of the village council and socio-professional farmers’ organizations active in the area. According to the ex-post evaluation data of the Sectoral Operational Programme 2004–2006, consolidation procedures were not undertaken in four voivodeships (Kuyavian-Pomeranian, Warmian-Masurian, Malopolska, and West Pomeranian) due to a lack of interest from potential beneficiaries. A total of 45 applications were submitted by county heads, of which 32 (71.1%) were approved for implementation in twelve voivodeships. On average, 154 agricultural holdings participated in one project. Nationwide, few projects were implemented, but they were extensive in terms of the number of participating farmers. The total area covered by the consolidation process in all implemented projects was 20.4 thousand ha of agricultural land. The Programme specified that as a result of

launching land consolidation projects, the agrarian structure would improve over an area exceeding 42.0 thousand ha, and this target was achieved at 49%. Areas subject to consolidation were located in one or several villages or their parts. When relocation of land constituting parts of agricultural holdings was necessary for rational land layout, it occurred through mutual exchange ([Ex-post Evaluation, 2009](#)).

In the Sectoral Operational Programme 2004–2006, EUR 21.2 million was allocated for agricultural land consolidation, including EUR 17.0 million from EU funds and EUR 4.3 million from national support. A total of 31 projects were implemented under this measure, for which EU aid amounted to PLN 62.8 million (EUR 16.5 million), representing 77.8% of the EU funds earmarked for implementing this measure.

4. LAND CONSOLIDATION ISSUES IN THE RDP 2007–2013

Council Regulation (EC) of 2005 stated that to ensure sustainable rural development, efforts should focus on a limited number of basic objectives, mainly related to the competitiveness of the agricultural sector and diversification of activities in rural areas. Special support should be directed towards land management methods leading to appropriate land use practices consistent with the need to preserve the natural environment and landscape and to protect and improve the state of natural resources. Agricultural land consolidation was identified under the measure “Infrastructure related to the development and adaptation of agriculture and forestry” ([Council Regulation \(EC\), 2005](#)).

Under the RDP for 2007–2013, projects concerning consolidation works and post-consolidation development were implemented. Support was granted under the measure “Improving and developing infrastructure related to the development and adaptation of agriculture and forestry through land consolidation,” aiming to improve the area structure of individual agricultural holdings. It was expected that reducing the number of plots would improve management efficiency by lowering transport costs and facilitating field cultivation mechanization ([Mayorga-Abril et al., 2026](#)). Post-consolidation works, in turn, ensured each plot had access to technical infrastructure. These included the construction of necessary access roads to agricultural land owned by municipalities and the improvement of technical parameters of drainage facilities.

Land consolidation processes play a significant role in rural land management, rendering economic, social, and environmental functioning more efficient ([Alsharaideh et al., 2026](#)). Rural areas are still characterized by an unregulated and complex legal situation. In many cases, agricultural plots lack direct road access. Besides roads, the drainage system was also neglected, lacking maintenance and not adapted to farming realities. The defective spatial structure of farms also posed a certain obstacle to obtaining financial support in the form of direct payments for agricultural areas. The number of owners and ownership rights should not change during the land consolidation process. However, the consolidation process alters the layout of land boundaries. Each participant in the consolidation received land of equal estimated value in exchange for the land they held before consolidation. The decision approving the land consolidation project served as a legal title for disclosing the new property status in the land and mortgage register.

The measure was implemented under two schemes: Scheme I – Land consolidation and Scheme II – Agricultural water resources management. The measure under Scheme I aimed to improve the area structure of farms through consolidation works, delineation and construction of a functional network of access roads to agricultural and forest land and farm buildings, as well as the allocation of necessary land for technical and social infrastructure as part of consolidation works. It was expected that 346 projects would be launched, and the total area of land subject to consolidation would amount to 207 thou-

sand ha. In reality, the number of implemented consolidation projects was significantly lower than assumed. Most consolidation works, among the 109 decisions issued, were carried out in the Lublin Voivodeship – 39 (35.8%), Podlaskie – 13 (11.9%), Lower Silesian – 11 (10.1%), and Silesian – 9 (8.2%). These four voivodeships absorbed 70.4% (PLN 268.3 million) of the funds allocated for this purpose.

Table 1 presents a comparative summary of implementation metrics across the first three programming periods, illustrating the gradual expansion of consolidation activities.

Table 1. Land Consolidation Implementation Across EU Programming Periods in Poland (2004–2026)

Indicator	2004–2006	2007–2013	2014–2020	2021–2027 (as of Q1 2026)
EU Programme	Sectoral Operational Programme	RDP 2007–2013	RDP 2014–2020	CAP Strategic Plan 2023–2027
Intervention Measure	Land consolidation	Infrastructure related to agriculture and forestry	Land consolidation	I.13. Land consolidation
EU Financial Allocation (EUR million)	17.0	n/a	139.0	376.5 (total public)
Total Financial Allocation (EUR million)	21.2	n/a	n/a	376.5 (including EUR 239.2 from EAFRD)
Projects Approved for Implementation	32	109	207	154 (as of Q1 2026)
Projects Completed (Finalized)	31	109	n/a	68 (as of Q1 2026)
Area Covered (thousand ha)	20.4	Not fully comparable	~145.0	112.4 (approved)
Area Completed (thousand ha)	20.4	Not fully comparable	~145.0	48.7 (completed)
Targeted Area (thousand ha)	42.0	207.0	n/a	n/a
Target Achievement (%)	49%	~53% (109 of 346 projects)	Exceeded projections	In progres
Average Participation (holdings per project)	154	n/a	n/a	n/a
Average Plot Reduction (%)	n/a	n/a	n/a	62% (preliminary)
Environmental Infrastructure Allocated (thousand ha)	n/a	n/a	n/a	1.2
Access Roads Built/ Modernized (km)	n/a	n/a	n/a	487
Water Relations Regulated (thousand ha)	n/a	n/a		

Source: Authors' compilation based on ARMA reports and ex-post evaluations (2009, 2016)

5. FINANCIAL PERSPECTIVE 2021–2027 AND IMPLEMENTATION STATUS

In the current European Union financial framework for 2021–2027, support for land consolidation has been incorporated into the Common Agricultural Policy Strategic Plan for

2023–2027, approved by the European Commission on August 31, 2022. The implementing instrument is intervention I.13. “Land consolidation,” which represents a continuation and development of actions undertaken in previous programming periods, alongside a significant strengthening of the environmental and climate components.

Legal Basis and Objectives of the Intervention

The legal basis for implementing land consolidation in the new perspective includes:

- Regulation (EU) 2021/2115 of the European Parliament and of the Council of 2 December 2021 establishing rules on support for strategic plans to be drawn up by Member States under the CAP (Strategic Plans Regulation),

- The Act of February 8, 2023, on the Strategic Plan for the Common Agricultural Policy for 2023–2027,
- The Regulation of the Minister of Agriculture and Rural Development of April 14, 2023, on detailed conditions and procedures for granting financial aid under intervention I.13. “Land consolidation.”

The main objective of the intervention remains the improvement of the area structure of agricultural holdings through:

1. Reduction of the number of plots per holding and improvement of their shape,
2. Reduction of distances between plots and the farmstead,
3. Equipping farms with necessary technical infrastructure (access roads, drainage facilities),
4. Rational shaping of property boundaries in relation to natural environment components.

A novelty compared to previous programming periods is the clear linkage of support with the objectives of the European Green Deal and the “Farm to Fork” strategy. Under the intervention, projects that contribute to the following are prioritized:

- Mitigation of and adaptation to climate change,
- Improvement of water management and increased retention,
- Protection of soil against erosion and degradation,
- Preservation of biodiversity and agricultural landscape features,
- Consideration of environmental protection requirements, including in Natura 2000 areas.

Land consolidation may be initiated:

- Upon application by the majority of owners of holdings located within the planned area, whose total area exceeds half of the consolidation area,
- Ex officio, after obtaining the opinion of the village council and socio-professional farmers’ organizations.

The beneficiary of support, similar to previous periods, is the county head (starosta) competent for the location of the land, who is responsible for carrying out the entire consolidation procedure and post-consolidation development works.

The co-financing level has been maintained at 100% of eligible costs. However, more differentiated maximum aid rates per hectare of land subject to consolidation have been introduced, taking into account:

- Regional diversity (lowland and mountain voivodeships),
- Project complexity level (including the scope of necessary infrastructure works),
- Specific environmental conditions (e.g., protected areas).

The maximum support amount per project is specified in the implementing regulation

and is subject to annual indexation.

6. RESOURCE ALLOCATION AND IMPLEMENTATION PROGRESS

In the Strategic Plan for 2023–2027, a total of EUR 376.5 million was allocated for intervention I.13. “Land consolidation” from public national and EU funds (including EUR 239.2 million from the EAFRD). This constitutes a significant increase in allocation compared to the previous perspective (EUR 139.0 million in RDP 2014–2020), reflecting the growing importance of this instrument in rural development policy.

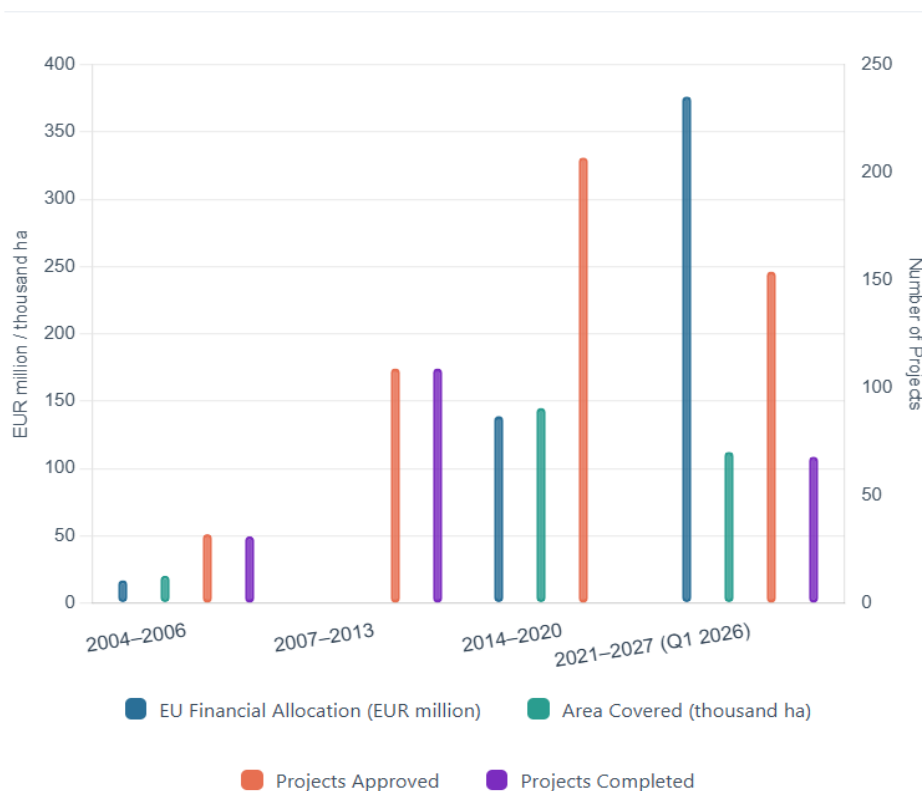
According to data from the Agency for Restructuring and Modernisation of Agriculture (ARMA) and the Ministry of Agriculture and Rural Development, as of the end of the first quarter of 2026 (status as of March 2026):

- A total of 187 aid applications were submitted, of which 154 were approved for implementation,
- The total area of land covered by approved projects is approximately 112.4 thousand ha,
- 68 consolidation projects have been completed (finalized), covering a total area of 48.7 thousand ha,
- 86 projects covering a total area of 63.7 thousand ha are currently under implementation.

Compared to the 2014–2020 programming period, in which approximately 145 thousand ha were consolidated (aggregate data for the entire period), the new perspective demonstrates higher dynamics in the initial years of implementation. This is attributed to streamlined administrative procedures and increased awareness among local governments and farmers regarding the benefits of consolidation.

Figure 1 illustrates the progressive increase in financial allocations and implementation scale across programming periods.

Figure 1. The progressive increase in financial allocations and implementation scale across programming periods



Source: own studies

7. SPATIAL DIFFERENTIATION OF IMPLEMENTATION

Spatial analysis of approved projects under the 2021–2027 perspective confirms trends observed in previous periods. The highest number of projects and the largest area covered by consolidation are recorded in the following voivodeships:

- Lublin – 27 projects, 19.6 thousand ha,
- Malopolska – 21 projects, 12.8 thousand ha,
- Subcarpathian – 19 projects, 14.3 thousand ha,
- Masovian – 18 projects, 13.5 thousand ha,
- Swietokrzyskie – 14 projects, 9.2 thousand ha.

Simultaneously, relatively low activity continues to be observed in the western and northern voivodeships (West Pomeranian, Lubuskie, Warmian-Masurian), where the agrarian structure is historically more favorable, and the demand for consolidation is lower. This indicates a persistent spatial polarization of consolidation processes, concentrated in areas with the highest degree of land fragmentation, located mainly in south-eastern and central Poland.

Several factors contribute to this spatial pattern. First, historical land reform implementation varied across regions, with former Prussian territories in the west and north experiencing different ownership structures than former Russian and Austrian partition areas in the east and south. Second, socio-economic conditions, including higher population density and smaller average farm sizes in south-eastern Poland, create stronger demand for consolidation. Third, institutional capacity differences across county offices affect the readiness and ability to initiate and manage consolidation projects. Fourth, farmer attitudes and awareness of consolidation benefits vary regionally, influenced by local traditions and past experiences with land management interventions. These interlocking factors require spatially differentiated policy approaches rather than uniform national strategies.

8. NEW CHALLENGES AND INNOVATIONS IN THE CONSOLIDATION PROCESS

In the current perspective, several solutions have been introduced to streamline the implementation of land consolidation:

1. Digitization of the process – implementation of an electronic system for consolidation documentation circulation (e-consolidation), which shortens administrative procedures and improves communication between county offices, geodetic offices, and ARMA.
2. Integration with other CAP instruments – land consolidation is increasingly implemented in conjunction with investments in water management infrastructure (intervention I.14. “Water management in agriculture”) and actions for soil protection and biodiversity.
3. Strengthening social participation – mandatory broader public consultations at the preparatory stage, involving not only direct participants of the consolidation but also residents of the area, non-governmental organizations, and economic entities.
4. Flexibility in shaping land layout – the possibility of allocating land for public purposes (e.g., local investments, mid-field greenery, retention) with a greater share of financial compensation than before has been permitted, increasing social acceptance for projects.

However, these innovations also introduce new challenges. The digitization process requires significant investment in staff training and technical infrastructure, particularly in rural county offices with limited resources. Enhanced social participation, while norma-

tively desirable, may extend consultation timelines and create additional procedural complexity. The integration with other CAP instruments demands greater inter-departmental coordination that may exceed current institutional capacities. These tensions between innovation and implementation feasibility should be acknowledged in policy design.

9. PRELIMINARY ASSESSMENT OF EFFECTS

Preliminary monitoring results for intervention I.13. indicate positive effects concerning:

- Reduction in the number of plots in consolidated holdings – by an average of 62%,
- Improved road access – within completed projects, a total of 487 km of access roads to agricultural land were built or modernized,
- Regulation of water relations – on an area of 22.4 thousand ha, works related to the reconstruction and modernization of drainage networks were carried out,
- Allocation of land for environmental infrastructure – a total of 1.2 thousand ha were designated for mid-field afforestation, ponds, and other elements enhancing retention and biodiversity.

While these quantitative metrics suggest positive outcomes, several important caveats should be noted. First, the 62% reduction in plot numbers may vary significantly across projects and regions, and the underlying baseline data may not be fully standardized. Second, the allocation of 1.2 thousand hectares for environmental infrastructure, while a positive development, represents only approximately 1.1% of the total consolidated area, raising questions about whether this share is sufficient to meaningfully advance European Green Deal objectives. Third, the monitoring framework does not systematically capture farm-level economic outcomes, such as changes in productivity, profitability, or competitiveness, which are ultimately the key criteria for assessing consolidation effectiveness. Fourth, social impacts, including effects on small-scale farmers, land tenure patterns, and community cohesion, are not comprehensively evaluated in current monitoring systems. These gaps in the assessment framework limit the ability to draw definitive conclusions about the overall effectiveness of consolidation interventions.

Simultaneously, challenges are being identified, including:

- Lengthy administrative procedures (averaging 3–4 years from application submission to project completion),
- Difficulties in obtaining the required majority of owner consents in areas with complex ownership structures,
- Rising costs of geodetic and infrastructure works under inflationary conditions.

10. COMPARATIVE PERSPECTIVE: LESSONS FROM OTHER EUROPEAN COUNTRIES

A comparative analysis of land consolidation practices in other European countries offers valuable insights for addressing Poland's implementation challenges. Germany, with its long history of consolidation dating back to the 19th century, has developed sophisticated procedures that typically complete within 2–3 years—significantly faster than Poland's 3–4 year average. Key success factors in the German system include: (1) stronger legislative authority for consolidation associations, which can initiate proceedings with lower consent thresholds; (2) dedicated professional staff at the regional level with specialized training; and (3) well-established procedures for resolving disputes through specialized land consolidation courts (Thomas, 2006).

The Netherlands provides another relevant model, where consolidation has been integrated with comprehensive spatial planning since the 1920s. Dutch consolidation projects typically incorporate broader rural development objectives, including nature con-

servation, recreation, and landscape management, from the outset rather than as add-on components (van Dijk, 2003). This integrated approach has contributed to higher stakeholder acceptance and more efficient project implementation. The Dutch experience also demonstrates the importance of sustained, long-term funding commitments rather than project-based, periodic funding cycles.

France offers lessons in managing consolidation in areas with strong resistance from small-scale farmers. The French system employs extensive consultation mechanisms and allows for flexible project boundaries that can exclude particularly resistant landowners, reducing overall project delays while still achieving meaningful consolidation outcomes (Pauchard et al. 2016). This pragmatic approach may be relevant for Poland's south-eastern regions where landowner resistance has historically been a barrier.

From these comparative cases, several transferable lessons emerge for Poland: (1) reducing consent thresholds through stronger associational powers could significantly accelerate project initiation; (2) integrating consolidation more comprehensively with spatial planning and rural development objectives would enhance stakeholder buy-in and project efficiency; (3) developing specialized professional cadres at the regional level would reduce reliance on overstretched county office staff; and (4) creating dedicated dispute resolution mechanisms would reduce the time spent on individual landowner objections. These reforms, however, would require legislative changes and substantial investment in institutional capacity development.

11. POTENTIAL NEGATIVE CONSEQUENCES AND MITIGATION STRATEGIES

While land consolidation is predominantly framed as a beneficial intervention, scholarly literature and empirical evidence from various European contexts suggest several potential negative consequences that warrant careful consideration. First, consolidation may contribute to social displacement, as smaller farmers and part-time agriculturalists may be pressured to sell or exchange land in ways that disadvantage their economic position (Dijk & Koomen, 2003). In the Polish context, where a significant portion of agricultural land is held by small-scale, semi-subsistence farmers, this risk is particularly acute. Mitigation strategies could include guaranteed minimum land parcels for participants, enhanced compensation mechanisms for land quality differentials, and the provision of advisory services to help smaller farmers navigate the consolidation process.

Second, landscape homogenization represents another potential concern. Consolidation often prioritizes regular, large plots that facilitate mechanized farming but may eliminate valuable landscape elements such as hedgerows, field margins, wetlands, and small woodlands that support biodiversity and provide ecosystem services (Pinto-Correia & Vos, 2004). While the 2021–2027 framework includes provisions for environmental infrastructure allocation, the modest scale of such allocation (1.2 thousand hectares out of 48.7 thousand completed) suggests that this risk may not be adequately addressed. Strengthening environmental safeguards through mandatory ecological assessments and higher minimum allocations for green infrastructure would help mitigate this concern.

Third, consolidation may disrupt established social networks and community structures, as farmers are relocated to new plots and the traditional spatial organization of villages is altered (Scott, 2004). This is particularly relevant in areas with strong place-based identities and traditional land use patterns. Enhanced social participation and community engagement in project planning, already introduced in the current programming period, could be further strengthened through community facilitators, local advisory committees, and transparent communication about project implications.

Fourth, the concentration of land through consolidation may contribute to increased economic inequality, as larger farms with greater consolidation benefits may become more competitive while smaller farms face heightened pressure to exit agriculture (Haldrup, 2015). This outcome is at odds with the EU's stated commitment to supporting family farms and maintaining vibrant rural communities. Countermeasures could include progressive support structures that provide proportionally greater benefits to smaller holdings, integration with early retirement and generational renewal programs, and the development of non-agricultural livelihood options in consolidated areas.

Fifth, consolidation creates path dependencies that may limit future land use flexibility. Once plots are consolidated and infrastructure is developed, returning to more diversified land use patterns becomes economically and administratively difficult. This is particularly relevant in the context of climate change, where future agricultural systems may require more diverse and resilient spatial arrangements. Flexible consolidation designs that incorporate options for future adjustments, coupled with periodic review mechanisms, would help address this concern.

12. FINAL CONCLUSIONS

Rural development through land consolidation has occurred in many European countries. The pursuit of land consolidation originated from a similar source across all countries, i.e., the need to adjust unfavorable land divisions and promote an appropriate shape of agricultural property perceived as a uniform and compact unit. The fundamental principle was to maintain the ownership status, and when changes occurred, they were introduced based on the principle of equivalence. Within the EU, depending on the country, differences existed in the objectives and procedures of land consolidation. The costs and methods of financing consolidation also varied. Procedures were typically shaped under the influence of historical trends, culture, tradition, and the law of each country.

In Poland, the consolidation process was influenced by the 1982 Act, as subsequently amended. Land consolidation involved the delineation of new plots with a shape different from the original. Land consolidation aimed to reduce the number of small, fragmented plots constituting an agricultural holding and increase their average size. Consolidation projects also included post-consolidation land development works, which consisted, in particular, of constructing functional access roads to agricultural land and carrying out works affecting the regulation of water relations within the consolidation area.

The conducted research demonstrated that the land consolidation process was implemented only in a few villages due to high costs and the necessity to obtain consent from the majority of farmers. In the process of land consolidation and exchange, we are still at the beginning of a project leading to the resolution of this issue. The scale of consolidation works should be considered in light of the number of villages (42.8 thousand) or sołectwos (40.3 thousand) that are appropriate areas for conducting land consolidation.

In the past, agrarian changes in Poland involved implementing land reform (1944), which resulted in the parceling out of large estates. Furthermore, Poland belonged to the group of South-Eastern European countries that opposed the process of creating agricultural production cooperatives. Therefore, in Poland, the land consolidation process had a different character and socio-economic conditions compared to other countries, resulting in fragmented agriculture and the creation of a large number of agricultural plots. In this process, an appropriate land layout can be achieved through land consolidation and exchange.

Analysis of land consolidation implementation across successive European Union programming periods indicates gradual, albeit still insufficient relative to the needs, progress in improving Poland's agrarian structure. In the 2004–2006 financial perspective,

31 projects covering 20.4 thousand ha were implemented; in the 2007–2013 period, 109 projects (area data not fully comparable due to methodological changes); in the 2014–2020 perspective, 207 projects covering approximately 145 thousand ha; whereas under the CAP Strategic Plan for 2023–2027 (2021–2027 perspective), by the end of the first quarter of 2026, 154 projects covering 112.4 thousand ha were approved, of which 68 projects (48.7 thousand ha) have already been completed. The implementation dynamics in the new perspective are higher than in previous periods, which can be attributed to streamlined procedures, process digitization, and increased awareness among local governments and farmers regarding the benefits of consolidation.

At the same time, it should be emphasized that despite the increased scale of intervention, a significant disparity persists between the needs and the actual scope of implementation. Considering that there are approximately 1.3 million agricultural holdings larger than 1 ha in Poland, a significant portion of which exhibit unfavorable spatial structures, the cumulative area covered by consolidation across all programming periods (approximately 320 thousand ha) constitutes only a fraction of the areas requiring intervention. Sustaining concentrated support for the south-eastern voivodeships (Lublin, Malopolska, Subcarpathian) and central voivodeships (Masovian, Swietokrzyskie), where the problem of land fragmentation is most acute and which, as data from the 2021–2027 perspective shows, concentrate the greatest application activity, is particularly important.

The new financial perspective has also brought a significant strengthening of the environmental component of land consolidation. An increasing number of projects incorporate actions for climate change adaptation, soil protection, increasing water retention, and shaping biodiversity. In completed projects under intervention I.13., a total of 1.2 thousand ha were allocated for environmental infrastructure, a positive sign of integrating productive and protective objectives. However, further efforts should be made to increase this share, particularly in the context of implementing the European Green Deal objectives.

Shortening the duration of administrative procedures and simplifying the process of obtaining the required majority of landowner consents remain key challenges. The average implementation time for a consolidation project is currently 3–4 years, which, within a seven-year EU budget perspective, limits the potential for full utilization of the allocated funds. The continued implementation of the e-consolidation system and the development of staff competencies in county offices and geodetic bureaus should be pursued as key streamlining actions.

The findings of this study have several implications for policy and practice. First, while increased financial allocation is welcome, the effectiveness of consolidation depends equally on institutional capacity and procedural efficiency. Investment in county office staffing and training should accompany financial increases. Second, the integration of environmental objectives must move beyond modest land allocations to become a systematic component of consolidation design, with higher minimum requirements for green infrastructure. Third, the comparative evidence from Germany, Netherlands, and France suggests that stronger associational powers and lower consent thresholds could significantly accelerate project implementation without compromising landowner rights. Fourth, a more comprehensive monitoring framework is needed to assess economic, social, and environmental outcomes beyond the current focus on implementation metrics. Fifth, future programming periods should consider experimental or pilot approaches in particularly challenging regions, testing innovative procedures that could be scaled up if successful.

The study's limitations should also be acknowledged. The analysis relies primarily on aggregated institutional data that may mask significant regional and local variations in consolidation effectiveness. The absence of systematic micro-level data on farm-level out-

comes limits the ability to assess whether consolidation achieves its stated objectives of improving competitiveness and sustainability. The temporal scope of the analysis, while capturing long-term trends, does not allow for detailed assessment of project-level dynamics that would require qualitative case study research. Future research should address these gaps through comparative regional studies, farm-level economic analyses, and longitudinal tracking of consolidated holdings to assess whether the improvements in land structure translate into tangible economic and environmental benefits.

In conclusion, land consolidation in Poland, although implemented for two decades with the participation of EU funds, is still in the phase of building a systemic and permanent instrument for agrarian structure restructuring. The increased allocation in the 2021–2027 perspective (EUR 376.5 million) and the higher project implementation dynamics indicate the growing importance of this tool in rural development policy. Nevertheless, considering the scale of historical backlog and the number of villages and sołectwos requiring intervention, it is necessary to maintain and strengthen support in subsequent programming periods after 2027, while further simplifying procedures and strengthening the environmental component. Only in this way will it be possible to gradually mitigate the adverse historical legacy of land fragmentation and create lasting foundations for competitive and sustainable agriculture in Poland.

REFERENCES

- Agency for Restructuring and Modernisation of Agriculture. (2004). Organisational Regulations of ARMA. [Internal document]. (In Polish)
- Agency for Restructuring and Modernisation of Agriculture. (2026). Periodic reports on the implementation of intervention I.13. Land consolidation – status as of March 31, 2026. Warsaw: ARiMR. (In Polish, internal report)
- Alsharaideh, A. M. A., Alzubi, M. M. S., Alqudah, A. M. A., Alqudah, O. M. A., & Darabah, K. (2026). AI-Enabled Frugal Innovation: Extending the Dynamic Capabilities Framework for Sustainable Development. *ECONOMICS - Innovative and Economic Research Journal*, 14(2), 435-455. <https://doi.org/10.2478/eoik-2026-0044>
- Council of the European Union. (2005). Council Regulation (EC) No 1698/2005 of 20 September 2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD). *Official Journal of the European Union*, L 277, 1–40. <https://eur-lex.europa.eu/eli/reg/2005/1698/oj/eng>
- Dijk, T. van. (2003). Dealing with Central European land fragmentation: A critical assessment on the use of Western European instruments [Doctoral dissertation, Delft University of Technology].
- Haldrup, N. O. (2015). Agreement based land consolidation – In perspective of new modes of governance. *Land Use Policy*, 46, 163-171. <https://doi.org/10.1016/j.landusepol.2015.01.027>
- Mayorga-Abril, C., Vanegas-López, J. G., Ruiz-Guajala, M., Tamayo-Vásquez, M., & Santana-Mayorga, R. (2026). Gender Discrimination and Women's Decision-Making in Sustainable Agriculture: Evidence from Ecuador. *ECONOMICS - Innovative and Economic Research Journal*, 14(2), 53-66. <https://doi.org/10.2478/eoik-2026-0025>
- Ministry of Agriculture and Rural Development. (2025). Report on the implementation of the CAP Strategic Plan for 2023–2027 for the year 2024. Warsaw: MRiRW. (In Polish)
- Pašakarnis, G., & Malienė, V. (2010). Towards sustainable rural development in Central and Eastern Europe: Applying land consolidation. *Land Use Policy*, 27(2), 545–549. <https://doi.org/10.1016/j.landusepol.2009.07.008>
- Pauchard, L., Madeline, P., & Marie, M. (2016). L'échange parcellaire : une nouvelle étape dans l'aménagement foncier de l'Ouest français [Plot exchanges: A new step in rural land planning in Western France]. *Noréis*, (240), 7-24. <https://hal.science/hal-01610452v1>
- Pinto-Correia, T., & Vos, W. (2004). Multifunctionality in Mediterranean landscapes – past and future. In R. H. G. Jongman (Ed.), *The New Dimensions of the European Landscapes* (pp. 135-164). Springer.

- Sabates-Wheeler, R. (2002). From the state to the market? Pension reform paths in Central-Eastern Europe and the Former Soviet Union. *Social Policy & Administration*, 36(2), 142–155. <https://doi.org/10.1111/1467-9515.00277>
- Scott, J. C. (2004). Seeing like a state: How certain schemes to improve the human condition have failed. Yale University Press. <https://yalebooks.yale.edu/book/9780300078152/seeing-like-a-state/>
- Seisenbekov, A., Beisenova, M., Koshetayev, D., Akhmetova, Z., & Suyunbayev, S. (2026). The Impact of Digitalization and Innovation on Postal and Courier Services in the Context of Sustainable Economic Development: Evidence from Kazakhstan. *ECONOMICS - Innovative and Economic Research Journal*, 14(2), 249-268. <https://doi.org/10.2478/eoik-2026-0035>
- Thomas, J. (2006). Property Rights, Land Fragmentation and Emerging Structure of Agriculture in Central and East European Countries. eJADE: *Electronic Journal of Agricultural and Development Economics*, 3(2), 225-275. <https://ideas.repec.org/a/ags/ejade1/112607.html>
- Vitikainen, A. (2004). An overview of land consolidation in Europe. *Nordic Journal of Surveying and Real Estate Research*, 1(1), 25–43. <https://journal.fi/njs/article/view/41504>