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The Economic Foundations of the Green Economy in Poland: Implications for Short Food Supply Chains and Regional Development

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Abstract

The aim of this article is to determine the significance of short supply chains for local and regional development in Poland. The supply chain in Poland is defined as a coordinated set of people, financial and material resources, and activities involved in the process of delivering goods and services from the producer to the end consumer. Short Supply Chains (SSCs) are the foundation of the green economy, aiming to minimize the number of intermediaries and build direct relationships based on trust. Although short supply chains have been widely discussed in the context of sustainable agriculture and rural development, there is still limited research examining how digitalization and local organizational models jointly influence the development of SSCs and their contribution to local and regional development in Poland. This study addresses this gap by analysing selected Polish case studies and examining the combined role of digitalization, institutional support, and local initiatives in strengthening short supply chains. The article presents the situation of short supply chains in Poland using the example of selected organizations and initiatives, such as Poznań Green Market, Sady Grójeckie, Warmiński Koszyk, and Wiejska e-skrzynka. These cases demonstrate the impact of advancing digitalization on the development of local food markets, particularly in terms of shortening distribution channels, increasing access to local products, and strengthening producer–consumer relationships. The economic basis of SSCs is based on farmers taking over market margins and diversifying their income through agricultural retail trade (RHD), marginal, local, and limited (MOL) activities, and agritourism. This development is stimulated by EU funds, including the Rural Development Program (RDP) and Local Action Group (LAG) initiatives, as well as ongoing digitization and growing demand for local food. Furthermore, the development of local markets and short supply chains in the food sector is in line with the European "Farm to Fork" Strategy, which aims to ensure better food quality, reduce waste, and decrease the environmental impact of food systems. The analysis presented in the article will highlight the potential of short supply chains in political processes and make a significant contribution to the debate on strategies for supporting local and regional food markets.

Keywords: green economy; economy; short supply chains (SSC); the Farm-to-Fork Strategy; regional development; sustainable agriculture

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1. Introduction

Contemporary economies face growing environmental, climate, and structural challenges that require a redefinition of existing growth models. The intensification of production, globalization of supply chains, and pressure on natural resources make it necessary to integrate economic objectives with environmental and social dimensions [1–3]. The concept of a green economy has emerged in response to these challenges, promoted internationally by the United Nations and implemented in the European Union through its transformation strategies [4].

Data published by Eurostat show that public expenditure on environmental protection in the European Union remains at approximately 0.8% of GDP. Although not dominant in public budgets, its stability and gradual increase reflect the integration of climate and ecological goals into mainstream state policy. Environmental protection has thus become an important component of fiscal and investment policy.

The systemic nature of the green transition is emphasized in the "Green Economy" report prepared by the Polish Economic Institute, which indicates that the shift toward a low-emission and resource-efficient model requires coordinated regulatory, financial, and infrastructural instruments. In this perspective, the green economy enhances long-term competitiveness, resilience, and macroeconomic stability, extending beyond energy and industry to include food production and distribution systems.

Short food supply chains are particularly relevant in this context. By reducing intermediaries and transport distances while strengthening producer–consumer relationships, they support sustainable development, local labor markets, and lower environmental impact. In Poland, characterized by a fragmented agrarian structure and regional diversity, they may play an important role in local and regional development. The literature emphasises that the development of SFSC helps to increase producers' incomes, strengthens local economies, improves food traceability and reduces the negative environmental impact of transport [5,6].

The aim of this article is to determine the significance of short supply chains for local and regional development in Poland.

Addressing this issue is of the utmost importance, as building resilient and sustainable food systems is now the cornerstone of the green transition and a strategic challenge for rural development policy [7,8].

This paper serves as a theoretical and conceptual introduction to further, in-depth empirical research. The next stage of the work will involve conducting a survey amongst producers and consumers, which will enable the assumptions made to be verified in economic practice. The remainder of the article is structured so that, following a description of the research methodology and data sources (Section 2), it presents a literature review and conceptual framework Section 3), moves on to a discussion of the results obtained Section 4), and to conclude with findings containing recommendations for economic policy and directions for further research (Section 5).

2. Research Methodology

This article is a review and empirical study. Our aim was to demonstrate how the potential of short supply chains fits into political processes and how local and regional food markets can be supported. To achieve this, we combined a systematic review of the literature, legislation and industry reports with a multiple case study analysis. This approach allowed us to directly compare theory and legislation with the actual operational practices of market actors. We carried out our research in four clear steps. In the first phase, we searched leading databases, official registers of legal acts and institutional repositories using predefined keywords. We supplemented the search using the 'snowball' method,

reviewing the bibliographies of the items found to identify both theoretical literature and documented practical cases. In the second phase, we verified the collected material based on clear inclusion and exclusion criteria. We rejected texts of a purely journalistic or marketing nature, selecting for further analysis only those items that contained reliable and verifiable data. The third phase involved a detailed analysis of the content of selected documents, legislation and case studies. We extracted key information from them regarding the formal and legal framework, supply chain support mechanisms, the organisational structure of entities, and the measurable outcomes of their activities. In the final, fourth phase, due to the high diversity of the collected data, we applied a qualitative thematic synthesis combined with a comparative method. A direct comparison of findings from theory and law with the results of the case studies enabled us to map key success factors, identify existing knowledge gaps, and formulate final conclusions (Figure 1).

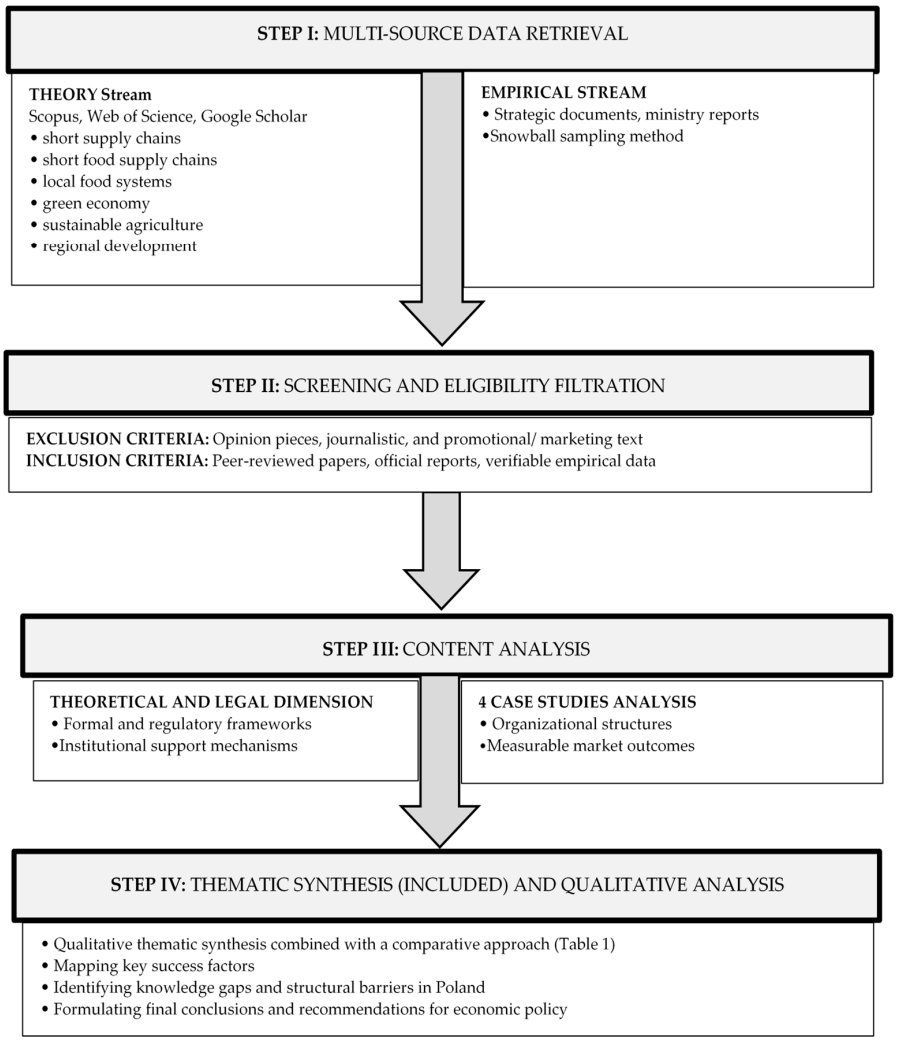

Figure 1. A schematic of the analysis carried out, combining a partially literature review with an empirical analysis of case studies. Source: Own study.

3. Literature Review and Conceptual Framing

The theoretical basis of this study is the concept of sustainable development, according to which economic development should strike a balance between economic, social and environmental objectives [9–11]. As [8] and [12,13] point out, from this perspective, the green economy involves the efficient use of natural resources, reducing pressure on the environment and supporting the development of local communities. The second key

factor in explaining how short supply chains work is the theory of social capital. The literature suggests that trust, cooperation and lasting social relationships are important factors in economic development. In the case of SFSC, direct contact between producers and consumers takes on particular significance, as it increases market transparency, strengthens confidence in food quality and builds lasting relationships between participants in the local market [14]. As [15] and [16] emphasise, it is precisely social relationships and the traceability of products' origins that distinguish short supply chains from conventional food distribution models. The economic significance of short supply chains can also be explained through Porter's [17] value chain concept, according to which competitive advantage stems from the effective management of the value creation process. Reducing the number of intermediaries enables producers to capture a larger share of the trade margin, develop direct sales and diversify their sources of income. Ref. [18] emphasises that SFSCs increase the profitability of agricultural production and improve producers' bargaining power, whilst [19] point out that farms participating in short supply chains demonstrate greater resilience to market disruptions thanks to the diversification of sales channels and closer relationships with consumers. The importance of SFSC should also be considered from the perspective of local and regional development. As [20,21] and [22,23] point out, the sustainable development of regions is based primarily on the use of endogenous resources, local entrepreneurship and cooperation between participants in economic and social life. Short supply chains facilitate the achievement of these objectives by strengthening local producers, creating regional food brands, fostering entrepreneurship and revitalising rural communities.

Based on the concepts presented, it can be assumed that short supply chains influence local and regional development through three interrelated mechanisms: economic, social and environmental. The economic mechanism is linked to an increase in producers' incomes and retaining a greater share of added value within the region; the social mechanism relates to the building of trust and social capital; whilst the environmental mechanism encompasses reducing transport distances, cutting emissions and supporting sustainable food production (Figure 2). This theoretical framework forms the basis for the analysis of the four case studies presented later in this article.

3.1. Green Economy and Short Supply Chains

The term "green economy" first appeared in Blueprint for a Green Economy by 1. Barbier and Markandya [8], although it was not explicitly defined, as the publication focused mainly on sustainable development. The concept gained prominence after the 2007–2008 global financial crisis, alongside growing awareness of climate change, and has since been viewed as a systemic response to interconnected economic and environmental crises.

In 2008, the United Nations Environment Programme (UNEP) launched the Green Economy Initiative to support its implementation. The report A Global Green New Deal argued that investments in low-carbon sectors could stimulate economic recovery while reducing fossil fuel dependence, protecting ecosystems, and alleviating poverty. Consequently, the green economy evolved into a broader strategy for economic modernization, generating new opportunities in clean energy, energy efficiency, waste management, and green construction [13].

UNEP's 2011 report defined a green economy as one that improves human well-being and social equity while reducing environmental risks and resource scarcity. In essence, it is a low-carbon, resource-efficient, and socially inclusive model integrating the environmental, social, and economic pillars of sustainable development.

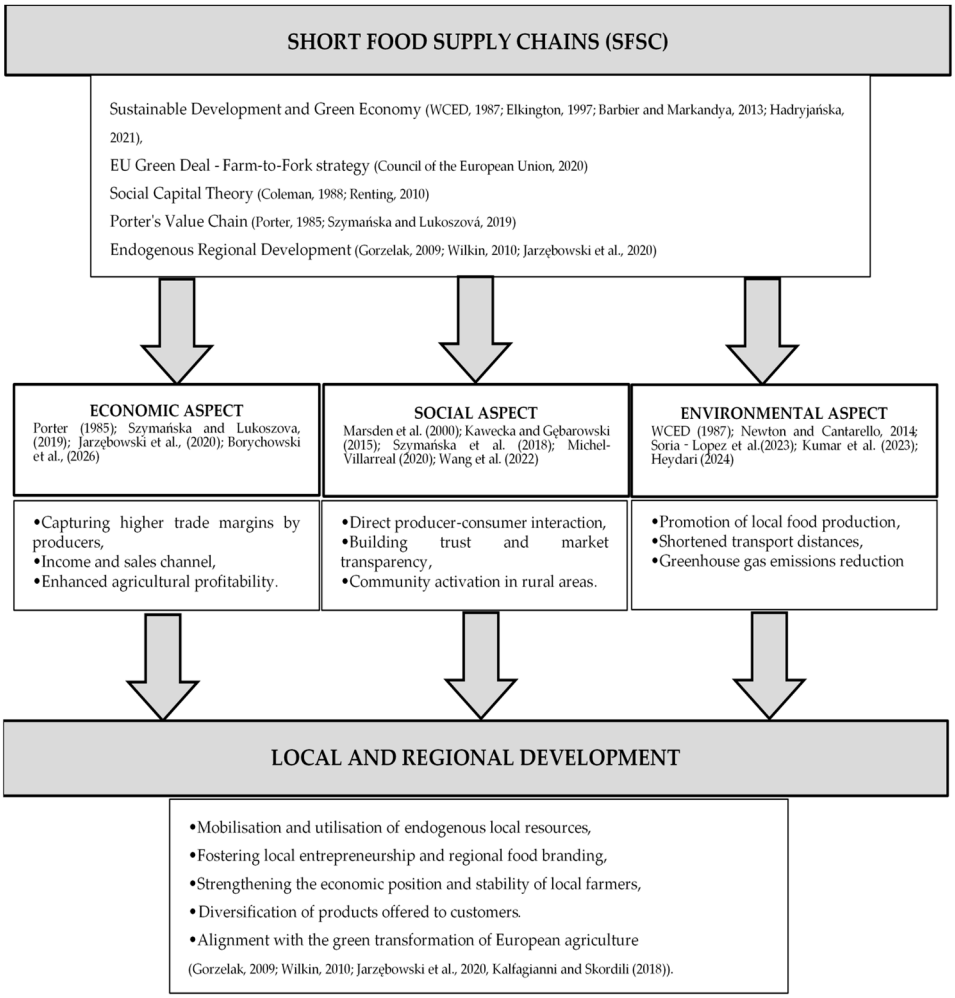

Figure 2. A conceptual model of theoretical analyses [8–11,13–31]. Source: Own study.

In parallel, the concept of "green growth," promoted by the Organisation for Economic Co-operation and Development (OECD), emphasizes maintaining economic growth while ensuring the sustainable use of natural resources. Despite conceptual differences, both approaches highlight the compatibility of economic development with environmental protection and social responsibility [32–34].

Within the European Union, the green economy framework is embedded in the European Green Deal, adopted in 2019 as a long-term strategy to achieve climate neutrality by 2050. The European Climate Law sets binding targets, including a 55% reduction in greenhouse gas emissions by 2030, providing policy direction and regulatory certainty.

The EU also supports regions most affected by the transition through financial and social mechanisms such as the Just Transition Fund. Examples from Estonia and Sweden illustrate how these instruments facilitate worker retraining and regional economic restructuring. Additionally, the EU provides financial assistance to coal-dependent regions and households affected by energy poverty, promoting modernization across Member States [34].

Short Food Supply Chains (SFSCs) have emerged alongside conventional food systems, playing a crucial role in the development of alternative food networks that provide a counterpoint to the globalized agro-industrial model [5].

The IPCC Special Report on Climate Change and Land emphasizes that consuming locally produced food, along with improving the efficiency of food processing and transportation, helps minimize food losses, enhance food security, and reduce greenhouse gas

(GHG) emissions [35]. Other studies further indicate that expanding local production contributes to lower GHG emissions, and that local food self-sufficiency is closely connected to climate change mitigation, dietary patterns, and urbanization trends [36,37].

Short Food Supply Chains can be interpreted as an applied, localized economic mechanism implementing the principles of the green economy through resource efficiency, reduced externalities, territorial embeddedness and value redistribution.

SFSCs are gaining importance in agri-food policies and rural development strategies as instruments supporting sustainable transformation. They can contribute to reducing the environmental footprint of the food system, strengthening local economies, and enhancing social cohesion by engaging local communities and civil society organizations.

According to the Polish Ministry of Agriculture and Rural Development, a Short Food Supply Chain is defined as a simplified set of activities in which farmers produce food on a small scale and sell it directly to consumers or to local retail outlets. In Poland, four main types of Short Food Supply Chains are distinguished (Figure 3) (Ministry of Agriculture and Rural Development, 2025 [38]):

- direct sales (DS);
- direct deliveries (DD);
- agricultural retail trade (ART);
- marginal, local and limited operations (MOL);

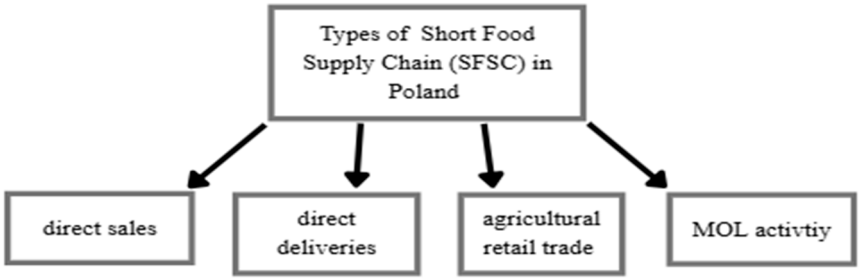

Figure 3. Different types of Short Food Supply Chain in Poland. Source: Ministry of Agriculture and Rural Development, 2025 [38].

Although Short Food Supply Chains are not inherently more environmentally friendly than conventional, longer food supply chains, their ecological impact should be assessed using a holistic approach that considers production methods, processing, packaging, storage, transport, and levels of food loss. It is emphasized that food miles (transport distance) alone do not constitute a sufficient indicator of environmental sustainability. Rather, the key factor is the use of non-renewable resources throughout the product life cycle, including the energy required for cooling, storage, and processing.

In many cases, SFSCs contribute to reducing packaging use and minimizing food waste. Direct sales are often associated with reusable packaging or its complete elimination, which reduces pressure on natural resources. A shorter time between harvest and sale decreases the need for energy-intensive storage. An important aspect is also the possibility of marketing products that do not meet strict visual standards imposed by large retail chains, thereby reducing food losses at the production and distribution stages.

At the same time, it should be noted that the resource efficiency of SFSCs may be lower in situations involving dispersed distribution of small quantities, particularly when consumers travel individually to purchase products. This implies that the environmental performance of short supply chains largely depends on logistical organization and scale of operation [28].

Beyond the environmental dimension, SFSCs have significant social relevance. They are based on direct, relational connections between producers and consumers, which

foster trust, price transparency, and a fairer distribution of value within the supply chain. Consumers gain greater awareness of the real costs of food production, which increases their willingness to pay prices reflecting farmers labour input. As a result, producers may obtain more stable and equitable incomes, and supply chain relationships become less asymmetrical than in global chains dominated by large retail corporations.

SFSCs also contribute to strengthening social capital and local identity. They frequently promote local varieties, traditional production methods, and seasonality, thereby supporting biodiversity conservation and the cultural heritage of rural areas. In some cases, such initiatives also serve an integrative function by creating spaces for interaction and cooperation within local communities [36].

From an economic perspective, short food supply chains represent an important instrument for small and medium-sized farms that face difficulties competing within conventional distribution channels. By reducing the number of intermediaries, producers are able to capture a larger share of the added value, lower transaction costs, and increase their autonomy in production and marketing decisions [5]).

A practical example of the functioning of Short Food Supply Chains (SFSCs) in Poland is the "Dobre, bo nasze" marketplace in Tomaszkowo (Warmińsko-Mazurskie Voivodeship), which has become a symbol of the development of direct sales and cooperation among local producers. Initially launched by a small group of farmers, currently brings together around 40 vendors, with growing interest from additional producers wishing to participate. The model is based on direct producer–consumer relationships, the reduction in intermediaries, and the development of a local food market.

Statistical data confirm the dynamic growth of sales models based on the shortest distribution channel. In the area of direct sales, the number of producers of unprocessed apicultural products increased from 5477 in 2015 to 12,602, while the number of fisheries product producers rose from 833 to 1106. At the same time, more advanced forms of activity, such as agricultural retail trade (RHD) and marginal, local and limited (MOL) activity, have also been expanding.

According to data from the Chief Veterinary Inspectorate (as of 22 October 2025), the number of entities operating in Poland within specific forms of short food supply chains amounts to:

- Direct sales (SB)—15,751 entities
- Agricultural retail trade (RHD)—19,916 entities
- Marginal, local and limited (MOL) activity—1936 entities

The systematic increase in the number of operators indicates that short food supply chains are becoming a permanent element of the structure of Polish agriculture. They can be interpreted as an instrument strengthening farm resilience, diversifying income sources, and fostering the development of local food markets within the framework of sustainable transformation [38].

Short Food Supply Chains (SFSCs) in Poland are supported not only by market demand but also by structured public financial mechanisms. The Rural Development Programme (PROW 2014–2020) has been a key instrument, providing funding for investments that improve the functioning of SFSCs. Relevant actions include: investments in local marketplaces and promotional facilities supporting direct sales and enhancing consumer awareness. Restructuring and modernization of small farms enabling farmers to enter processing and retail stages, increasing autonomy and value capture. Support for processing and marketing of agricultural products facilitating vertical integration within SFSCs. Incentives for young farmers and the formation of producer groups fostering horizontal integration and collective action [39].

These mechanisms demonstrate that SFSCs are not purely market-driven initiatives but institutionally embedded instruments, contributing to regional economic resilience. Horizontal and vertical integration allows producers to capture a larger share of value added, reduce transaction costs, and improve competitiveness, while also promoting direct relationships with consumers. Programs such as LEADER (Community-Led Local Development, CLLD) further illustrate the role of SFSCs in territorial development. By funding collaborative initiatives and local markets, LEADER supports endogenous regional growth, strengthens local identities, and encourages cooperation among producers. Such initiatives align with green economy principles by promoting resource efficiency, minimizing food losses, and enhancing social cohesion at the local level. Access to capital remains a critical factor for the growth of SFSCs. While small-scale operations can function with minimal investment, scaling up requires financial support to fund infrastructure, equipment, and product development. Public funds, regional operational programs, and accessible credit thus serve as essential enablers of sustainable expansion [40,41].

In sum, SFSCs in Poland illustrate a microeconomic application of green economy principles: integrated environmental sustainability, social inclusion, and economic efficiency, while contributing to local and regional development. Public financial instruments like PROW and LEADER ensure that short supply chains are both economically viable and territorially embedded [18].

At the EU level, the Farm-to-Fork strategy (2020) complements national initiatives by promoting sustainable and locally embedded food systems. It emphasizes reducing environmental impacts, supporting small and medium-sized farms, and encouraging shorter, more transparent supply chains, in line with SFSC objectives. By fostering local production and strengthening producer–consumer relationships, the strategy enhances the economic and social value of SFSCs. Consequently, EU policies provide both regulatory guidance and financial incentives that support regional development and the transition toward a green economy [24].

3.2. Short Supply Chains in Poland

The supply chain within the Polish agri-food sector is fundamentally characterized as a highly complex, multi-stage process that mobilizes substantial human, financial, and material resources as agricultural commodities traverse the intricate path from primary producer to the final consumer. In the traditional, conventional distribution model, which has dominated the post-transition economic landscape, there is a stark and deeply entrenched asymmetry in the distribution of value and profit margins [42].

A highly developed and consolidated network of intermediaries, encompassing primary aggregators, processing conglomerates, wholesale distributors, and large-scale retail supermarket chains, effectively captures the overwhelming majority of the generated commercial margin. This oligopsonistic market structure leaves the primary agricultural producer with only a marginal fraction of the final retail price, significantly diminishing the economic viability of small to medium-sized family farms [42].

The strategic and structural response to this profound economic imbalance is the development and professionalization of Short Food Supply Chains (SFSCs), which currently constitute one of the most critical foundations of the European Green Economy [43].

The overarching theoretical and practical premise of SFSCs is the drastic reduction or complete elimination of intermediate links within the distribution channel, coupled with the cultivation of direct, transparent, and trust-based socio-economic relationships with the end consumer. The systemic disintermediation, or the elimination of the so-called "middle" of the supply chain, empowers farmers to directly appropriate the market margin that would otherwise be absorbed by corporate logistics and retail entities.

From a microeconomic perspective, this phenomenon has emerged as the primary pillar of income diversification and financial stabilization strategies for agricultural holdings. By capturing a higher percentage of the value added, farmers effectively insulate themselves from the extreme price volatility and asymmetric bargaining power characteristic of globalized mass commodity markets [42].

However, the effective implementation and scaling of the Short Food Supply Chain model in Poland relies not merely on entrepreneurial will, but heavily upon a specific institutional and legal-tax architecture. Within this regulatory framework, the mechanism of Agricultural Retail Trade (Polish: Rolniczy Handel Detaliczny—RHD) plays a fundamental and transformative role [44].

RHD is a dedicated legal instrument designed to enable farmers to fully and legally process and sell their own food products such as artisanal cheeses, cured meats, traditional preserves, or baked goods, directly to final consumers, as well as to local retail outlets and regional gastronomic establishments. The undeniable economic advantage of the RHD framework lies in its highly favorable tax preferences, which were designed to stimulate rural micro-entrepreneurship and reduce the shadow economy. Under current regulations, an agricultural producer is entirely exempt from income tax on this specific type of direct sales up to a significant statutory threshold of 100,000 PLN of revenue annually [45].

Furthermore, even upon exceeding this generous limit, the producer is subject to a highly preferential, flat-rate tax of merely 2 percent. It must be strongly emphasized, however, that the strict condition for the economic viability and legal compliance of this model is the absolute requirement that the raw materials utilized in the production of these processed goods originate predominantly from the farmer's own agricultural holding. This stipulation deliberately prevents the model from being exploited by standard commercial reselling operations and strictly ties the added value to the primary agricultural production of the specific farm. Complementing the RHD framework is the legal provision for Marginal, Local, and Restricted activity (polish: Działalność Marginalna, Lokalna i Ograniczona—MOL) [46].

This is a specialised legal framework enabling farmers to process and sell products of animal origin under tailored veterinary supervision. Operating within the MOL facilitates standardisation and the safe supply of food from farms to the local HoReCa sector and independent retail outlets. From a business perspective, this enables farmers to move from occasional market sales to stable, long-term B2B contracts, which translates into a predictable and scalable source of revenue. At the same time, agritourism is a key element in the development of the value chain, acting as a powerful catalyst for direct sales within short supply chains (SFSC). In the context of the experience economy, a direct presence on the farm and transparency in the production process build trust and relational capital between the producer and the consumer—something that is difficult to replicate in conventional trade. In the long term, visitors become a loyal customer base, continuing to make purchases via e-commerce channels after their stay in the countryside, which provides the farm with a stable, geographically dispersed market.

In the literature, the term 'e-commerce' is understood as the process of conducting commercial transactions and exchanging information, goods and services via computer networks (primarily the Internet), covering the entire process—from marketing, through sales and payment, to after-sales service [47–50]. Furthermore, it currently offers customers a modern and highly attractive shopping alternative [49].

While legal-economic frameworks and experiential initiatives like agritourism create solid structural foundations and the necessary physical space for the incubation of Short Food Supply Chains, their full, scalable market potential is only unlocked through the aggressive adoption and implementation of modern technologies. Traditional, direct forms

of physical sales, such as farm-gate sales or local farmers' markets, while absolutely crucial for building initial consumer trust and brand authenticity, inevitably encounter natural geographic and spatial barriers. The physical limits of transportation, time constraints of the farmer, and the localized nature of rural populations inherently cap the maximum revenue potential of physical direct sales. Therefore, the natural evolutionary step for ambitious agricultural producers, allowing them to overcome these spatial limitations and smoothly transition from strictly local sales to servicing broader, more lucrative markets, is the strategic migration of a portion of their commercial activity into the virtual sphere. In this context, the accelerating process of digitalization currently stands as one of the most critical determinants stimulating the dynamic and exponential development of Short Food Supply Chains within the Polish agri-food sector [18]. The widespread implementation of modern Information and Communication Technologies (ICT), including the creation of dedicated online marketplace platforms and the adaptation of advanced e-commerce solutions specifically tailored for agriculture, is driving a radical transformation of traditional, linear models of food distribution and sales [27]. Digital tools allow for a highly efficient "virtual disintermediation," radically shortening distribution channels and vastly increasing the accessibility of high-quality, local products to a much wider demographic of consumers. The strategic utilization of electronic commerce in agricultural operations primarily facilitates the bridging of the spatial divide, drastically reducing the geographic and psychological distance between the isolated rural farm and the final retail consumer. Thanks to integration with virtual marketplaces, farmers gain the unprecedented ability to offer their fresh crops and artisanal preserves directly to affluent clients residing in major urban agglomerations across the country. Crucially, from the perspective of farm economics and cost–benefit analysis, this sophisticated distribution process occurs without the necessity of incurring the notoriously high transaction costs associated with maintaining a physical presence at traditional urban markets (such as travel time, stall fees, and physical labor) or paying hefty margins to external logistics brokers. Furthermore, digitalization plays an absolutely invaluable role in the realm of marketing communication, serving as the primary instrument for directly reinforcing interactions and deepening the relationship between producer and consumer. Contemporary e-commerce platforms, tightly integrated with social media networks, allow farmers to present their operational methods, the multigenerational history of their farms, and the specific ecological virtues of their products in a highly transparent, authentic, and engaging manner [51,52].

This virtual, direct communication strategy, often heavily reliant on visual storytelling, fosters the cultivation of profound consumer trust and long-term brand loyalty. This digital trust, when combined with frictionless access to online sales channels and reliable courier logistics, constitutes the undeniable economic foundation for the successful functioning of the green economy and the sustainable, future-proof development of Polish regional agriculture [43].

4. Discussion

Four case studies were selected for analysis, representing different models of how short food supply chains operate in Poland. The selection was based on purposive sampling and was guided by the following criteria: (1) the recognisability of the initiative, (2) representation of different organisational models, (3) the use of direct sales or digital distribution channels, and (4) the availability of reliable sources enabling comparative analysis.

All the initiatives analysed share the implementation of the fundamental principles of short supply chains. Above all, they reduce the number of intermediaries in the food trade, enable producers to have direct or near-direct contact with consumers, and increase

farmers' share of the final value of the products sold. Each initiative promotes local food, strengthens regional entrepreneurship and helps to build trust between producers and consumers. Another common feature is the use of digital tools, such as websites and social media, which support product promotion, communication with customers and sales growth.

4.1. Poznań Green Market

Poznań Green Market is the longest-running market in Poznań offering organic, traditional, regional food and handicrafts. Operating since 2010, it takes place every Saturday. The initiative was launched by the Green Market Association. The market attracts healthy eating enthusiasts and conscious consumers [53]. It is also frequented by families with children, individuals planning a healthy pregnancy, and consumers with food intolerances or allergies [53]. All sales are conducted directly by farmers and producers. Products available at the market include bread, fruits and vegetables, meat, cold cuts, game, cheeses and dairy products from goats, sheep, and cows, preserves, juices, flours, eggs, honey, spices, oils, dried fruits, as well as vegetarian and gluten-free products [54]. All vendors hold certificates verifying product quality, which must be renewed annually [55].

The Poznań Green Market is funded by the Green Market Association, which charges fees to vendors. According to the 2020 rate table—the last publicly available—fees ranged from PLN 2.30 to PLN 9.10 per square meter for daily stall space [56]. At the same time, free parking for customers is available near the market, further incentivizing visits [57].

Media reports, including those from the portal "Sukces po Poznańsku," indicate that at the time of its launch, local residents had limited awareness of today's "bio" and "eco" labels, yet interest in the market grew rapidly. The venue quickly gained a strong reputation. One of Poland's leading opinion platforms, "Newsweek," ranked it among the ten most interesting destinations for healthy food in the country. It was also regularly featured in the prestigious "Gault&Millau" guide [55]. Over time, Poznań Green Market began attracting chefs from numerous restaurants [58], residents of surrounding towns, and tourists. The market evolved into a space for engaging directly with producers, tasting products, and exploring the region's culinary traditions.

Residents describe Poznań Green Market as a "village in the middle of the city," highlighting its unique atmosphere [53]. The market has become a space for meetings, exchanging experiences, and education around healthy lifestyles. According to the local portal "Głos Wielkopolski," it also offers a pause from the daily rush, allowing visitors time for conversation and reflection. Locals associate the market with a natural pharmacy, stocked with juices, honey, purees, and cosmetics. In interviews with journalists, they also emphasize the friendly atmosphere and their loyalty to specific stalls [55]. Visitors can also explore numerous vendor perspectives. Representatives of the Barka Foundation, which runs an organic farm in Chudobczyce—raising animals and cultivating fruits and vegetables—emphasize that Poznań Green Market supports the organization not only in sales but also in fostering a community that encourages mutual support [59].

Poznań Green Market became such a vital part of the local community that the decision to relocate it sparked significant public reaction. Portals such as "Głos Wielkopolski," "Radio Poznań," "Sukces po Poznańsku," and "Codzienny Poznań" covered the relocation. The move resulted from a dispute between vendors from the Green Market Association and the municipal company "Targowiska," which had nearly doubled the market's waste disposal fees [60]. Following the relocation of Poznań Green Market, a competing venue, the Bernardine Organic Market, opened at its former site [59]. This intensified the conflict between the Green Market Association and city authorities and drew criticism from residents [55]. Despite the move, Poznań Green Market remained resilient, demonstrating how

strongly the market and its brand had embedded themselves in the local community. In the search for a new location, several institutions became involved—the Laba.Land Foundation secured a site for the Green Market from the Posnania Sports Club [55].

Some vendors at Poznań Green Market also use the Too Good To Go app, which allows them to sell products nearing their expiration date at a discounted price [61]. This helps the market further reduce food waste from items that were not sold during the day. The market also maintains active Instagram and Facebook pages to communicate with customers, where vendor offers are regularly shared.

4.2. Grójec Orchards

Grójec Orchards is an initiative led by local community members and fruit growers from the Warka and Grójec regions, organized by the Grójec Orchards Association. Established in 2007, the initiative aims to promote local apples, though the offering also includes pears, plums, cherries, sweet cherries, strawberries, and various preserves [62]. The Association initiates and coordinates marketing activities for fruit producers from the Grójec region as well as other stakeholders in the orchard industry. It brings together nearly 500 growers, organized into 12 producer groups [63]. The Warka and Grójec region has been referred to as the "Largest Orchard in Europe" for over 500 years [62]. Approximately 40% of Poland's apple production comes from this area [63], cultivated in more than 40 varieties, 27 of which originate from the Grójec region.

Thanks to the Grójec Orchards initiative, Grójec Apples have been included on the European Union's list of Protected Geographical Indications (PGI) [62]. All members of the association have the right to produce apples under this designation, which serves as a unifying element for the producers' activitie (Poland Tastes Good). Under the Grójec Apples brand, only premium-class apples (Extra and Class I) are offered. All farms producing Grójec Apples are required to follow the principles of Integrated Production (IP) or comply with the GLOBALG.A.P. food safety standard [64]. Every member of the Association involved in production, sorting, packaging of Grójec Apples, or related products must adhere to strict quality standards for packaging and transportation. All apples must be packed in containers with a specified color scheme. Each fruit carries the official label, positioned at two-thirds of the apple's height on the blush side. Attention to detail is also essential in arranging the apples, such as ensuring all stems point in the same direction [63].

In an interview with the industry portal sadyogrody.pl, the Association's president emphasized that the Grójec Apples designation, combined with the region's long-standing tradition of fruit growing, gives local products a strong competitive edge in Europe, placing these apples on a par with well-known French and Italian wines and cheeses [63]. The Association funds its activities through membership fees, contributions, income from properties owned or leased by the organization, grants, donations, bequests, and revenues from both statutory and commercial activities [65]. However, it operates as a non-profit organization, falling within the definition of a socially responsible enterprise, with its primary goal being to support the business activities of its member fruit growers [66].

The Grójec Orchards Association collaborates with numerous government offices and organizations to promote Polish products at both domestic and international trade fairs. Partners include the Ministry of Agriculture and Rural Development, the Polish Association of Fruit Growers, the National Union of Fruit and Vegetable Producer Groups, the "Polska Ekologia" Association, and the Marshal's Office of the Mazovia Voivodeship. The Association also participates in international trade fairs in Berlin, Madrid, London, Singapore, and Beijing, promoting local apples worldwide [62]. Grójec Apples are also available in retail chains such as Lidl, Kaufland, and Carrefour [63].

In an interview with Magazyn Teraz Polska, Michał Lachowicz, a board member of the Grójec Orchards Association, stated that the strength of the natural Grójec Apples brand ensures that local authorities recognize it not as an artificially created label but as a genuine public asset. This gives fruit growers a voice that is often considered in local decision-making processes.

Apples are a symbol of the Grójec region and play a key role in the local economy and cultural identity. When apple trees bloom in the local orchards, Grójec celebrates the Festival of Blooming Apple Trees [67]. Grójec Orchards supports its member growers in running their businesses, allowing them to preserve traditional cultivation practices without worrying about income. Beyond helping producers obtain the PGI certification, the Association organizes specialized training, engages the local community, and educates consumers. For over 20 years, in partnership with the Marshal's Office of the Mazovia Voivodeship, it has run educational programs in schools, where representatives present the apple's nutritional value and the unique qualities of Grójec Apples, which are recognized worldwide. The Association also continually seeks new locally producible products. So far, this has expanded the offering to include apple fudge, an apple juice-based energy drink, and apple juice infused with hops.

The Grójec Orchards Association also sells its products through its own online store. It engages with potential customers via social media platforms such as Facebook and Instagram, where it showcases its products and shares updates on its latest initiatives.

4.3. Warmian Basket

Warmiński Koszyk is an initiative that allows customers to purchase fresh, healthy, and organic products directly from farmers through a single, consolidated online order. The project was created by a group of farmers and friends from Warmia and the surrounding areas. Their offerings include dairy products, flours, groats, bread, vegetables, and honey. Orders are collected and shipped collectively by the farmers twice a month.

Within this initiative, you can purchase products that are unique, based on proprietary recipes, or produced entirely on a single farm. Eko-Zagroda Warmińskich Chłopów Bosych offers sourdough bread, with almost all ingredients sourced and prepared on their own farm, as well as hemp-based products. Kaszarnia Włodowo—Marcin Majewski sells glyphosate-free and gluten-free buckwheat groats. Pasieka na Lipowym Wzgórzu—Jabłoński Krzysztof provides items such as emmer, rye, lentils, bee forage, and bread made from their own flour. Gospodarstwo Na Kamieniu offers flours and groats made from ancient grains like spelt, emmer, einkorn, rye, and buckwheat, all cultivated on their farm. "Sery Praslickie"—Elżbieta and Andrzej Symonowicz Farm delivers cheeses with short ingredient lists, made from the milk of their own cows.

The initiative was supported by funding from the European Agricultural Fund for Rural Development: Europe Investing in Rural Areas. Its objective is to promote short food supply chains and provide healthy, organic food directly to individual consumers [68]. This enables farms to offer locally produced products more quickly and at more accessible prices.

For regional producers, Warmiński Koszyk represents an opportunity to pool their strengths in selling unique, top-quality products. On the Warmiński Koszyk online store, Elżbieta and Andrzej Symonowicz Farm notes that the cheeses they produce are made from milk sourced from cows grazing outdoors in Warmińskie pastures. The owner of Pasieka na Lipowym Wzgórzu emphasizes that his products rely on herbs and natural bee products, as he has found that these ingredients help alleviate the symptoms of Lyme disease, from which he suffers [68]. Warmiński Koszyk operates its own website, through which orders can be placed. The initiative also maintains profiles on Facebook and Instagram, where the farmers showcase their products.

4.4. Rural E-Box

Rural E-Box is an initiative bringing together producers from the Kuyavian-Pomeranian Voivodeship, united by the goal of delivering the freshest local products to consumers. The Rural E-Box Operational Group was established by the Kuyavian-Pomeranian Agricultural Advisory Center in Minikowo, which acts as the project leader [69]. The consortium also includes Bydgoszcz University of Technology and 17 agricultural producers, comprising farms engaged in direct agricultural retail, as well as marginal, local, and limited-scale sales.

The core of the producers' collaboration is the e-commerce platform http://wiejskaeskrzynka.pl/, which allows consumers to connect directly with multiple producers at once [70]. The online sales platform enables residents to place a single payment, while the system automatically distributes the payment to each individual producer [71]. Sales operate on a weekly cycle, with orders collected via the platform until Monday at midnight. Rural E-Box delivers up to 350 products directly to customers' doors [71]. The website offers fruits (including dried), vegetables, fruit juices, cold cuts, bread, cheeses, herbs, and honey. Customers can check at any time who produces each agricultural product [72]. As part of the project, participating farmers also upgraded their small processing facilities with new machinery and equipment, and a delivery vehicle was purchased [70].

The initiative was funded by the European Agricultural Fund for Rural Development: Europe Investing in Rural Areas [71]. The project aligns with the "Farm to Fork" policy, aiming to minimize the role of intermediaries and enable direct contact between consumers and local food producers. This approach also enhances traceability of food sources, reduces the carbon footprint, and ensures the freshest, highest-quality products possible [72].

Most products ordered through Rural E-Box are produced, harvested, cooked, or smoked shortly before delivery. Deliveries occur within a few hours of packaging by the producers. Orders are delivered in special boxes, which buyers can take home after paying a refundable deposit of 60 PLN in cash. The boxes can be exchanged when placing subsequent orders [72]. For producers, joining the Rural E-Box sales group means entering a structured, transparent quality management model based on an Internal Quality Assurance System. Developed by experts from Jan and Jędrzej Śniadecki University of Technology and Life Sciences in Bydgoszcz, the system defines clear production and hygiene standards. It requires continuous quality improvement and ensures the health safety of all products. Producers guarantee consistent quality parameters and maintain high product standards. A key component of the system is mutual audits among producers, which verify production conditions and hygiene levels, ensuring uniform standards across the group. This system also strengthens consumer confidence that products are made safely and reliably [69].

For producers, Rural E-Box has become a catalyst for joining forces to sell top-quality products created with passion and tradition [73]. For many residents of Bydgoszcz and surrounding municipalities, deliveries from local producers provide an alternative to shopping in retail chains. In interviews published in local media, consumers emphasize that all products offered through the initiative are of high quality. Equally important is the direct contact with farmers, which allows them to adjust recipes in real time based on community feedback [73].

The Table 1 below presents a comparison of four local food supply chain initiatives in terms of their key strengths and operational limitations. The analysis is based on descriptive data regarding organizational structure, sales mechanisms, product range, and quality verification methods.

Table 1. Advantages and disadvantages of activities carried out within short supply chains by Poznań Green Market, Grójec Orchards, Warmian Basket, Rural E-Box.

	Advantages	Disadvantages
Poznań Green Market	• Promotes healthy food among local residents • Provides a nearby market for local farmers • Encourages sellers to verify and monitor product quality through certifications • Builds direct relationships between buyers and producers • Supports the promotion of the region's culinary traditions • Allows product sampling before purchase, reducing food waste • Creates a local meeting place • Fosters a mutually supportive community of producers and buyers • Reduces carbon footprint	• High dependence of sales on the market's location • Vulnerability to municipal administrative decisions • Strong sensitivity of sales to weather conditions • Lack of publicly available detailed information about vendors
Grójec Orchards	• Promotes the offerings of local orchardists • Highlights the history and traditions of the region • Encourages sellers to verify and monitor product quality through certifications • Creates a cohesive image for the entire group of producers • Provides a competitive advantage to orchardists from the region • Strengthens the real influence of local orchardists on municipal decision-making • Educates consumers about the importance of healthy food • Encourages producers to expand their product range	• Heavy reliance on a single type of product increases risks • Association of over 500 orchardists may make it difficult to maintain quality and a consistent customer experience • High requirements for standardization and certification may pose a barrier to entry for smaller producers
Warmian Basket	• Enables procurement of products from different categories and multiple producers through a single order • Allows purchasing products without the need for direct human interaction • Increases access to high-quality and healthy products • Supports local producers in creating unique products based on their own recipes • Enhances access to information about product details and their producers • Reduces carbon footprint • Promotes eco-friendly production	• Limited frequency of order fulfillment • Lack of a common quality benchmark for products • Need for production synchronization
Rural E-Box	• Enables procurement of products from different categories and multiple producers through a single order • Encourages producers to modernize their operations • Increases access to detailed information about products and their producers • Enhances availability of high-quality, healthy, and eco-friendly products • Reduces carbon footprint • Requires continuous quality improvement from producers • Ensures uniform quality standards • Strengthens consumer trust in product safety and reliability	• Limited frequency of order fulfillment • Increases dependence of sales on the online sales platform • Internal Quality Assurance System requirements and mutual audits may deter smaller producers

Source: own study based on an analysis of the cases.

However, individual initiatives differ in terms of their operating model and scale of activity. Poznań's Zielony Targ is based on a traditional model of direct sales carried out during regular markets, where personal contact between the producer and the consumer plays a key role. In contrast, Sady Grójeckie operates as an association of producers, whose main task is the joint promotion of the regional brand, the protection of the geographical indication, and the coordination of marketing and quality control activities. A different model is represented by Warmiński Koszyk and Wiejska e-skrzynka, which utilise online platforms enabling bulk orders to be placed with multiple producers simultaneously. Wiejska e-skrzynka also stands out for its well-developed logistics system, electronic payment processing and an internal quality assurance system.

The differences also relate to the scope of the initiatives under analysis. The Zielony Targ in Poznań focuses primarily on the local urban market and on building a community of consumers. Sady Grójeckie has a regional and international character thanks to its use of the Protected Geographical Indication (PGI) and the promotion of its products in foreign markets. In contrast, Warmiński Koszyk and Wiejska e-skrzynka focus on regional cooperation between producers, using digital solutions to increase the availability of local food and streamline the sales process.

The analysis carried out indicates that, despite their differing organisational models, all the initiatives studied pursue common economic, social and environmental objectives. Their activities contribute to strengthening local food markets, increasing producers' competitiveness and developing sustainable food systems [40,42,52]. At the same time, the results of the analysis show that digitalisation does not replace traditional forms of direct sales, but rather serves as a tool to support the development of short supply chains by improving sales organisation, communication with consumers and the building of lasting market relationships. It should be noted, however, that the further development of these models will be constrained by logistical challenges, the costs of digital infrastructure and consumers' price sensitivity; as [74–76] points out, this requires the scale of operations to be flexibly adapted to local market conditions.

5. Conclusions

The contemporary transformation of European agriculture, driven by the ambitious objectives of the European Green Deal, has extended far beyond conventional environmental protection measures, entering the sphere of profound structural reorganization of entire food systems. In the Polish context, this debate is not merely academic but represents a critical necessity due to the country's distinctive agrarian landscape, characterized by a highly fragmented farm structure, uneven regional development, and the ongoing—often challenging—modernization of rural economies. Short Food Supply Chains (SFSCs) are increasingly perceived not as marginal or alternative distribution mechanisms but as robust instruments capable of supporting the economic foundations of a green economy while simultaneously strengthening regional resilience. This article examines the role of short food supply chains in Poland, providing an in-depth analysis of their contributions to economic stability, social cohesion, and environmental sustainability, drawing upon current policy frameworks, economic theories of local multipliers, and recent empirical research [19,77]. The literature review confirms that the development of SFSCs can enhance the resilience of food systems and improve food security, particularly in the face of contemporary economic, social, and environmental challenges. At the same time, the analysis demonstrates that the expansion of this distribution model continues to face numerous organizational, economic, and legal barriers, indicating the need for further research and practical implementation efforts [20,21,25,31].

In Poland, the development of this sector has been significantly accelerated by legislative changes introduced after 2017, particularly those concerning Agricultural Retail Trade (Rolniczy Handel Detaliczny—RHD) and Marginal, Local and Restricted Activities (Marginalna, Lokalna i Ograniczona—MOL). These reforms represent a fundamental shift in the bargaining power of Polish farmers, transforming them from passive price takers within the global marketplace into active price makers within local systems. From an economic perspective, SFSCs enhance farmers' income stability by enabling them to capture a larger share of the final retail price. Research conducted among Polish farms indicates that those more intensively engaged in short supply chains demonstrate significantly higher perceived resilience to market shocks, exhibiting approximately 15% greater adaptive and transformative capacity.

Beyond economic stabilization alone, supply-chain networks generate profound social effects that are essential for regional development [40,41]. In rural areas of Poland, which continue to face the challenges of depopulation and structural marginalization, these networks contribute to the rebuilding of social capital. Initiatives such as local food markets, cooperative platforms, and regional distribution systems based on traditional products—with Grójec apples serving as a notable example—illustrate that such networks function as social structures fostering cooperation and community engagement. The dynamic growth of local marketing strategies and digital sales channels further demonstrates how Polish farmers increasingly combine traditional production methods with modern communication technologies, effectively creating a "new rural community" that is simultaneously technologically advanced and deeply rooted in local heritage [78]. Digitalization plays a particularly important role in overcoming the geographical barriers that once constrained the scale of local trade. Online platforms and e-commerce solutions reduce the spatial distance between rural producers and urban consumers, expanding the reach of local markets while preserving the relational nature of transactions. This integration of digital tools into local food systems reflects a sophisticated hybridization of traditional agriculture and modern economic practices, enabling the development of a green economy through efficiency and transparency rather than mere geographical proximity.

Environmental considerations further reinforce the strategic importance of small and medium-sized agricultural enterprises within the Green Economy framework. Reduced distribution distances naturally contribute to lower transport-related emissions and diminish the demand for excessive plastic packaging required for long-distance transport and extended shelf life [9,13,28–30]. However, it should be emphasized that small and medium-sized farms are unable to deliver systemic ecological transformation without adequate infrastructural support. A key challenge remains balancing environmental objectives with economic viability and the preservation of employment in artisanal agri-food processing, which helps limit rural-to-urban migration. From a strategic perspective, these systems also serve as a food security buffer in the event of disruptions to global trade. The principal barriers to SFSC development continue to include complex sanitary and administrative regulations, difficulties associated with organizing "last-mile" logistics to urban areas, and consumer habits that prioritize low prices over food quality. A crucial instrument for overcoming these barriers and scaling small-scale operations without losing their local character is the development of Local Food Hubs—centralized procurement and distribution centers.

In conclusion, the Polish example demonstrates that short food supply chains constitute an important and structurally stable pillar of the green economy [77]. Empirical evidence confirms their positive contribution to income diversification, farm resilience, and social cohesion. This study verifies the hypothesis that SFSCs are a key driver of regional development and provides an answer to the research question concerning how

Poland can advance towards a more sustainable food system. Policy recommendations should therefore include further simplification of regulations, investment in both digital and physical infrastructure supporting local trade, and the implementation of a nationwide educational campaign promoting the benefits of locally sourced food.

The article also has a practical dimension. It presents the current state of knowledge and the contemporary situation regarding the functioning of short food supply chains, identifying both their potential and their most significant challenges. The conclusions drawn may serve as a valuable source of information for policymakers, ministries of agriculture, agricultural advisory services, and other entities responsible for shaping agricultural and food policies. They may also support the design and implementation of measures aimed at fostering sustainable food systems and strengthening local markets.

Nevertheless, it is important to acknowledge the limitations of this study, which stem primarily from its reliance on publications indexed in the Scopus, Web of Science, and Google Scholar databases, as well as from the absence of original empirical research. These limitations simultaneously indicate directions for future studies, which should include analyses of various SFSC models under differing geographical, social, and economic conditions, complemented by field-based empirical investigations. Such research would facilitate a more comprehensive understanding of the factors determining the effectiveness of SFSC implementation and enable the identification of good practices that could be adapted across different sectors of the food economy.

Ultimately, within the current framework of European agricultural policy, short food supply chains represent one of the most important mechanisms linking the principles of the green economy with the practical realities of regional development in Poland. As observed in other EU Member States (e.g., France or Italy), where SFSCs are backed by public procurement or strong regional identity networks, the Polish experience also demonstrates considerable strategic significance and may serve as a valuable model for other countries seeking to achieve the sustainable transformation of their agricultural system.

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