

SCIENTIFIC ARTICLE

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Sustainability reporting in the Hungarian agricultural sector: an exploratory qualitative study

ABSTRACT

This study examines the organisational readiness of the Hungarian agricultural and food industry to introduce and implement effective sustainability reporting regimes from a supply chain perspective, with a focus on knowledge exchange and practical partnerships with regulators and academic institutions. The methodology for this qualitative study was designed to capture the complexity of evolving sustainability reporting practices and organisational responses in Hungary's agri-food sector. Semi-structured interviews were conducted with twelve companies, specifically selected as they are subject to the CSRD and EU Taxonomy. The findings reveal a dynamic and rapidly evolving landscape in the approach to sustainability and ESG reporting within the Hungarian agro-food industry, underscoring its practical impact on corporate strategies and reporting. By embracing standardised measurement systems and supporting public-private collaboration, Hungarian agricultural companies – and the rural communities that depend on them – can achieve measurable, internationally-respected progress in sustainability, resource use, and market resilience. This study provides practical guidance for companies and policymakers, prioritising comprehensive data models for supply chain disclosures and planning for multi-year capabilities development.

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Introduction

The agricultural sector, which is fundamentally dependent on natural resources and has a significant impact on ecosystems, is increasingly facing the need for sustainability (Máté *et al.*, 2022, Török *et al.*, 2023). This escalating pressure stems from several factors, including changing regulatory frameworks, heightened consumer awareness, and investor demands for transparent environmental, social, and governance (ESG) performance (Setyaningsih *et al.*, 2024). Furthermore, due to the global challenges of climate change and ongoing social inequalities, agricultural businesses in particular need to integrate long-term, sustainable decision-making into their core operations and strategies (Rushchitskaya *et al.*, 2024). Within this perspective, comprehensive and transparent sustainability reporting is not only a compliance exercise but also a strategic tool to demonstrate responsibility and promote resilience in the agricultural supply chain (Jindřichovská *et al.*, 2020, Freund, 2023). Despite its crucial role, the agricultural sector often underperforms other industries in terms of implementing and maturing sustainability reporting practices, especially in the Hungarian context (Fiore *et al.*, 2022, Török and Jámor, 2013).

This research aims to explore, through in-depth sectoral dialogue, the preparedness of Hungarian agricultural companies to introduce and implement effective sustainability

practices and reporting mechanisms, with a focus on knowledge exchange and practical partnerships with regulators and academic institutions. Specifically, it examines how Hungarian agricultural companies are dealing with the complexities imposed by the latest European Union directives, such as the Corporate Sustainability Reporting Directive (hereinafter referred to as: CSRD) and the EU Taxonomy, which introduce stricter non-financial and financial disclosure requirements for selected companies. Currently, there is a significant research gap due to the lack of qualitative research examining the practical implementation and strategic use of sustainability reports in this niche sector, particularly concerning preparedness for changing regulatory requirements (Gombkötő *et al.*, 2025).

This qualitative study intends not only to fill the knowledge gap by gathering first-hand experiences from key stakeholders but also to contribute to a shared understanding and collective problem-solving through university-led dialogue initiatives. The study employs a semi-structured qualitative interview methodology to capture the experiences and observations of these companies across all their various aspects, thereby providing novel insights into sustainability and non-financial reporting. A thorough examination of the agricultural sector is vital, as it is a sector particularly vulnerable to climate change and crucial for addressing global food security and environmental challenges (Jámor and Gorton, 2025). Understanding the motivations and challenges behind sustainability and its

integration is therefore fundamental to developing effective strategies to promote a more sustainable agricultural future (Pupo D'Andrea *et al.*, 2025).

This paper also contributes to the broader academic discussion on the development of a more sustainable economic paradigm by exploring the integration of sustainability into reporting and the disclosure of non-financial information, particularly in the agricultural sector (Gombkötő *et al.*, 2025). This research provides a comprehensive insight into the performance of sustainability frameworks in the Hungarian agrarian industry, highlighting their practical impact on corporate strategies and reporting (Máté *et al.*, 2022). All this is presented from a supply chain perspective to obtain the broadest possible picture of the operating mechanisms of agricultural companies. Additionally, it identifies the most significant factors and barriers influencing the adoption of sustainable practices and subsequent reporting, thereby providing actionable recommendations for policymakers and industry stakeholders.

This study aims to go beyond superficial evaluations of technical readiness by revealing deeper and often overlooked challenges to the effective implementation of the CSRD. The research question posed is:

What are the real experiences, regulatory adaptation, and principal challenges encountered by the Hungarian agricultural sector and its value chain in preparing for sustainability reporting in compliance with CSRD standards?

The article is consequently structured as follows. After the introduction, Section 2 synthesises the burgeoning body of literature on sustainability within the agricultural sector alongside pertinent regulatory advancements. Section 3 delineates the qualitative, interview-based research methodology and elucidates the sampling procedures. Section 4 presents the empirical findings, organised thematically to examine the current status of sustainability reporting, the key organisational and strategic challenges, and the integration of ESG considerations into governance frameworks; it also provides comparative analyses between local and multinational entities. It is important to note that this project contributes empirical, qualitative insights to the broader academic and policy dialogues concerning sustainability regulation. Section 5 examines the policy and practical implications of these findings, while Section 6 concludes with recommendations and propositions for future research directions. This study seeks to improve both academic comprehension and regulatory development by capturing grounded, practitioner-level insights.

Literature Review

The global agri-food sector, and specifically its European branches, faces intensifying pressure to adapt to complex sustainability challenges. Drivers include climate change, market volatility, regulatory innovation, and societal demand for transparency (Paredes-Rodríguez *et al.*, 2024). Hungary, as a significant agricultural producer in the EU, is not exempt

from these trends – industrialisation, market integration, and recent production volatility have rapidly transformed its agricultural and food landscape (Török and Jámor, 2013; Jámor and Gorton, 2025). As a result, sustainability and resilience have become twin pillars of both academic debate and practical supply chain management.

Traditionally, agri-food sustainability research has centred on operational efficiency (e.g., yield maximisation), but recent work increasingly advocates for “whole value chain” and multi-stakeholder approaches (Paredes-Rodríguez *et al.*, 2024; Fragoso and Viera, 2024). Knowledge exchange – across enterprises, regulators, and academic institutions – is recognised as critical to effective sectoral transformation. This shared learning is particularly necessary for SMEs, which often lack the internal resources or networks to systematically respond to new reporting regimes (Setyaningsih *et al.*, 2024).

Key recent EU legislative initiatives – most notably the Corporate Sustainability Reporting Directive and the EU Taxonomy Regulation – set stricter non-financial and financial disclosure requirements for selected companies (European Parliament & Council, 2022; European Commission, 2025). The CSRD, in particular, has expanded the breadth and detail of sustainability reporting well beyond previous Non-Financial Reporting Directive (hereinafter referred to as: NFRD) regimes, while ESRS (hereinafter referred to as: European Sustainability Reporting Standards) defines standardised metrics, materiality assessments, and third-party assurance systems for sustainability data (European Commission, 2025).

These regulatory changes are further complicated by the complexity and uncertainty inherent in the evolving EU legal landscape. The 2025 Omnibus amendments have deferred implementation deadlines – large Hungarian agri-food companies are required to report from 2028 – and narrowed the field of immediate obligation by raising company-size thresholds (European Parliament & Council, 2025). In parallel, ESRS standards have reduced the number of compulsory disclosure items, allowing for a more targeted and materiality-led approach (European Commission, 2025). These developments create both time for adjustment and new risks of fragmentation or uneven compliance, especially for smaller actors with less institutional knowledge (Setyaningsih *et al.*, 2024).

Research indicates that Hungarian companies often perceive sustainability reporting as a strategic opportunity rather than a compliance burden – especially when requirements seem to outpace sectoral readiness or practical capability (Setyaningsih *et al.*, 2024; Hossain *et al.*, 2025). As Gombkötő *et al.* (2025) and Setyaningsih *et al.* (2024) emphasise, a critical qualitative gap persists: there are few in-depth, ground-level studies exploring the lived experiences and pragmatic adaptation strategies of Hungarian agri-food firms in response to EU mandates. Particularly lacking are studies on how knowledge flows, dialogue with public authorities, and collaboration with academic partners equip firms to meet new compliance challenges.

Effective navigation of the new regime requires more than technical compliance; Hungarian agri-enterprises are increasingly turning toward strategic alliances with professional bodies, digital service providers, and universities to co-design

reporting templates and exchange best practices (Paredes-Rodríguez *et al.*, 2024; Hossain *et al.*, 2025). Knowledge-sharing platforms and cross-sectoral roundtables are emerging as crucial venues for translating complex regulatory norms into practical templates for real-world businesses. This is especially true now that Hungarian law enables voluntary, streamlined ESG reporting for SMEs using the “VSME” guidance and defers mandatory disclosures for the smallest entities until 2027 (European Commission, 2025).

Despite advancements, scholarship continues to highlight persistent “implementation gaps”, especially regarding motivations for voluntary adoption, the internalisation of sustainability as a business asset, and a holistic understanding of value chain risk. More qualitative, participatory research is needed to reveal how firms interpret regulatory ambiguity, negotiate compliance with multiple authorities, and capitalise on regulatory postponements for capability-building (Setyaningsih *et al.*, 2024).

In conclusion, the literature acknowledges that the Hungarian agri-food sector faces both operational and strategic challenges in preparing for transitions driven by the CSRD and EU Taxonomy. The sector’s successful adaptation hinges upon cross-sectoral knowledge exchange, effective public-private partnership, and qualitative inquiry into the lived, practical realities of regulatory adaptation. The current research thus responds to an urgent gap by investigating not only technical compliance but also the strategic, dialogic, and capacity-building processes through which sustainability reporting readiness is being negotiated along the Hungarian agri-food value chain.

Research Design and Methodology

The research employed a qualitative design, conducting semi-structured interviews with twelve companies operating within the Hungarian agricultural and food sectors, which were selected as they are subject to the CSRD and Hungarian regulatory frameworks. The methodology for this qualitative research was designed to capture the complexity of evolving sustainability reporting practices and organisational responses in Hungary’s agri-food sector. To provide a rigorous and detailed perspective, a combination of document analysis and semi-structured interviews was employed, ensuring data validity and facilitating in-depth thematic analysis in accordance with established academic standards (Ruslin *et al.*, 2022).

Prior to the interviews, a comprehensive document review was conducted to provide context and background for each participant organisation. Reports, company profiles, and regulatory disclosures were examined to understand how participating companies have dealt with sustainability and non-financial reporting in recent years, and to inform the development of targeted interview protocols (Natow, 2019). This preparatory step enabled the interviewers to approach discussions with a nuanced understanding of each organisation’s strategic integration of sustainability, the level and format of prior ESG reporting, and the extent of involvement by internal and external auditors.

A two-stage methodology structured the empirical work. First, potential companies were identified and assessed for inclusion based on objective criteria: revenue ranking within the Hungarian agribusiness and food sectors and representation across value chain segments. The value chain was mapped according to input suppliers (plant protection, genetics and breeding, seeds, fertilisers, equipment, logistics, capital), primary producers and service providers (including animal husbandry, grain/feed, vegetables/fruits, animal products, tobacco), processors (food, beverage, milling, feed, biofuel and biogas, waste), and distributors (retail and wholesale). A minimum of three companies per value chain segment was targeted to ensure feedback depth and sector representativity. This approach aligns with existing best practices in qualitative research, which employ purposeful sampling to ensure diversity and insight into patterns across sub-sectors (Patton, 2014). The final sample was further refined according to the company’s willingness and availability, resulting in a cohort of organisations listed in Appendix 1.

Interviews lasted between 45 and 60 minutes and were conducted in Hungarian to maximise the expressiveness and communicative accuracy of responses (Truant *et al.*, 2017). The semi-structured format balanced a focus on predefined thematic areas, formulated based on prior document analysis and regulatory context, with scope for respondents to expand on emerging and organisation-specific topics. This structure encouraged interviewees to reflect openly on historical developments, current challenges, and future goals, resulting in responses that were both context-specific and sufficiently detailed for cross-case analysis (Ruslin *et al.*, 2022).

The interview guide was organised in both chronological and thematic order. Chronologically, the questions evolved from retrospective experiences and established practices, through current relevance and regulatory adaptation, to anticipated future changes and organisational strategies. Thematically, questions were grouped to address: (1) company characteristics and sector specificity, (2) historical and present sustainability reporting practices, (3) challenges and compliance with CSRD and related assurance processes, (4) stakeholder pressures (including regulatory, supply chain, and insurance factors), (5) pillar-specific ESG issues (environmental, social, governance), (6) technology and digitisation (impact of AI, digital solutions), (7) effects of company size and scale, and (8) recommendations for sectoral sustainability improvements (Lozano *et al.*, 2018). Open-ended questions fostered an atmosphere where respondents could articulate their perceptions and strategic decisions freely, while the structure ensured that all major research areas were covered.

Triangulation was a central component of quality control throughout the methodology (Natow, 2019). Along with the preliminary document review, data from interviews were cross-checked using multiple methods: transcripts were reviewed independently by both researchers; company representatives were asked to validate completed transcripts to confirm interpretative accuracy and eliminate potential misunderstandings (Bowen, 2009). The combination of these techniques enhanced the study’s validity by reducing bias and capturing organisational perspectives comprehensively.

For data analysis, thematic coding was employed. Interview transcripts were transcribed in full and entered into NVivo software for qualitative analysis and subsequent methodological literature (Braun and Clarke, 2006). The coding process began with broad deductive codes based on the literature and regulatory context but was refined iteratively as new themes and patterns emerged from the interview data (Lozano *et al.*, 2018). Topics were further synthesised and compared across participant organisations and value chain segments, supporting the interpretive depth required in ESG research.

Ethical considerations were embedded throughout all stages of the research. Participation was voluntary, and informed consent was obtained prior to the participant's involvement. Each participant was assured of confidentiality in accordance with general qualitative research standards and sectoral research standards (Truant *et al.*, 2017). Research reflexivity was actively encouraged to minimise the impact of researcher biases on data analysis (Bowen, 2009). This methodological approach is underpinned by a recognition of the dynamic and evolving regulatory landscape in Hungary and across the EU, particularly in relation to the transition from NFRD to CSRD regulation (Lippai-Makra *et al.*, 2024). By combining rigorous sampling and triangulation with structured yet flexible interview design and systematic coding, the study delivers comprehensive and nuanced insights into the ESG adaptation processes underway in Hungary's agri-food sector.

Results

The findings of this study show a dynamic and rapidly changing landscape in the approach to sustainability and ESG reporting within the Hungarian agri-food sector. The sample covered a heterogeneous cross-section of the value chain, from crop cultivation and animal husbandry to feed production, food processing, wholesale and retail, and financial services. Despite notable differences in company size, ownership structures, and market embedding, several recurring patterns emerged: maturity in sustainability strategy, data-driven operations, supply-chain engagement, and the handling of local impacts are central across most interviews.

A consistent finding is that the majority of companies have surpassed the initial "reporting threshold." Sustainability concerns are increasingly integrated into executive decision-making, and earlier ad-hoc activities have evolved into systematic approaches. However, critical constraints remain – fragmented data, definitional uncertainties, and supplier-side capacity gaps continue to limit the broader effectiveness of ESG initiatives. The following section highlights the main strategic considerations expressed by companies during the interviews.

Sustainability and competitiveness

Companies increasingly treat sustainability as inseparable from business life. Integrating ESG into business risk management and value creation reduces exposure to

input price volatility (such as energy, water, and fertiliser), strengthens supply security, and improves brand and product positioning in both consumer and B2B markets. Interviews reveal that dual return logic is increasingly common in investment decisions: alongside financial indicators, risk reduction and reputation effects are now highly valued. "No-regret" interventions, such as energy efficiency, water reuse, and loss reduction, are prioritised in tandem with preparations for larger, mid-term transformations, including precision and regenerative practices, circular resource flows, and product-level carbon footprint reduction. Thus, the competitiveness narrative reframes sustainability as a question of efficiency and risk management – not merely as a cost increase. The FirstFarms interview demonstrated that *"Sustainability is an organic part of FirstFarms' corporate strategy, where circular resource reduction is essential. ... For us, one of the main tasks in the coming years is to create and introduce a data management and reporting system that fully satisfies both group and business partners' and regulators' expectations"*.

Market-based thinking with public-private cooperation

Interviews indicate that the rapid adoption of solutions depends on aligned market incentives and public policy tools. Companies find financing arrangements useful that reduce transaction costs and risks, such as green loans, guarantee programmes, and targeted subsidies for irrigation development, soil renewal, and bioenergy investments. Insurance products are also critical for managing climate risks. This approach is most efficient when public funds address genuine market gaps, cover part of the initial surplus costs, and allow space for competition and innovation. Successful programmes align support conditions with actual investment schedules, while financial actors clearly and uniformly articulate ESG data expectations upfront. The MBH Bank said, *"It is possible for us as a bank to actively support the green transition of the agri-food sector through financing. We finance practices such as organic farming, agroforestry, and water-efficient irrigation systems ... and development of agricultural risk mitigation and insurance programmes is a good direction for proactive resilience development"*.

Supply chain perspective over point solutions

Environmental and social impacts in the agri-food value chain are heavily concentrated on the supplier side. Companies are increasingly moving beyond internal improvements to launch sustainability programmes that span the entire supply chain. They set expectations for suppliers, provide detailed guides, organise targeted training, and run joint field pilot projects – scaling up proven approaches. Long-term procurement contracts are increasingly stipulating sustainability requirements. Lidl Magyarország mentioned that *"For critical raw materials, we require our partners to hold recognised sustainability certifications"*.

Short supply chains and transparency

Companies emphasise the business and sustainability benefits of local embeddedness and short supply chains. Regional collaborations – including producer groups and cooperative landscape programmes – simultaneously reduce logistics and supply chain risks, increase social acceptability, and localise environmental interventions (such as water retention, soil management, and biodiversity conservation). The “start local” approach does not diminish the significance of strategic goals but brings them to the operational level – making interventions more measurable, better adapted to the landscape’s ecological and social conditions, and centring execution on rapid, practical problem-solving. Stated in the interview with representatives of Első Pesti Malom, *“It is not rare today to see local produce become local feed and then return to local livestock, ultimately resulting in local meat consumption ... the short supply chain and trust-based, long-term relationships are invaluable for sustainability”*.

Measurability and continuous monitoring

Data is the engine of progress. Companies are increasingly instituting site-, product-, and process-level measurements. Quarterly ESG KPI reports, Scope 1–2–3 emissions measurements, and comprehensive energy, water, soil, and waste monitoring are proliferating. Sensor-based and remote (IoT, satellite, drone) solutions are increasingly used for field data, alongside formally validated measurement protocols (such as sampling, frequency, and thresholds). UBM mentioned that *“We have established our quarterly ESG reporting system, with various departments involved in measuring and evaluating our most important sustainability KPIs ... We track our CO₂ emissions at the site level and calculate our feed GHG-intensity”*.

Balancing short and long-term objectives

Short-term profitability pressures often collide with longer sustainability transitions. According to interviews, change proceeds fastest where management sets clear goals and accountability, with annual, measurable targets driven by strategy (energy, water intensity, loss rates, supplier coverage). These targets are linked to executive and shop-floor KPIs, which in turn are linked to compensation. Első Pesti Malom stated, *“The key to a sustainable transition is clear management commitment – where management is committed, everything is easier ... Sustainability is not just an idea for the distant future, but a daily reality in the sector today”*. Shifting responsibility is only avoided when bigger players support capacity building and transition, such as via training, pilot projects, joint investments, while financiers offer predictable transitional risk management (grace periods, targeted pricing). As GALLICOOP said, *“The key to our company’s resilience is supporting professional development, ongoing education and training, and deploying dedicated ESG expert roles to coordinate the transition”*.

Heatmap of operational sustainability activity

Some companies have several years of reporting experience, internal controls in place, and independent assurance, while expanding supplier data coverage. Elsewhere, voluntary reporting processes and pilot measurement initiatives are just beginning, supported by evolving IT solutions. Increasing data maturity and broadening supplier coverage are the key operational challenges. The overarching goal is methodological consistency and auditability, which provide a stable basis for executive decisions. Lidl mentioned that *“At Lidl Magyarország, we feel fully prepared to compile sustainability reports. We have already completed three national-level sustainability reports, utilising the Global Reporting Initiative (GRI) standard. Our reports have been assured by an external independent body, providing us with substantial experience with sustainability assurance”*.

At the same time, most companies call for a sectoral data dictionary and uniform reporting templates. On the financing side, this demand converges on standardised bank ESG surveys: unified data fields, methodological guidance, and formats readable by machines. Outcomes include a reduced administrative burden, faster financing decisions, and the ability for banks to price measured performance comparably.

Digital traceability plays a vital role in enhancing transparency. It encompasses the use of site and field identifiers, electronic waybills, and product “passports”, all of which contribute to a more informed and trustworthy supply chain. The calculation of product-level carbon footprints is on the rise and is gradually being integrated into corporate routines. For many, mapping multiple supplier tiers remains an early-stage process, but large companies have begun introducing unified methodologies and reporting systems, thereby accelerating learning and tangibly reducing administrative burdens on smallholders. Skills shortages are apparent everywhere; rapid advance depends on internal training, university-corporate partnerships, and supplier education. Several firms have created dedicated ESG co-ordinator roles bridging production, quality, finance, and procurement. Gallicoop mentioned that *“With hundreds of partners, suppliers, and buyers – managing their data is challenging. We plan to introduce software solutions for more efficient data collection and partner evaluation”*. Firms increasingly strive for auditability, as robust internal control points and independent third-party assurance not only enhance the credibility of reports but also improve the quality of internal decision-making. This is particularly crucial for supplier data and product-level metrics, where methodological consistency is key.

Key ingredients of successful practice include good data governance – responsible staff, consistent definitions and units, traceable calculation logic, control points, and auditability. Companies begin by focusing on indicators that have the greatest impact on decisions and financing, gradually expanding their coverage. Major buyers are increasingly requesting specific, verifiable indicators (methane intensity, responsible sourcing certificates, animal welfare standards).

Transparency becomes a market advantage, as measurable and audited performance earns better supplier positions and longer contracts.

Companies typically follow a staged process – fast, easily implemented measures (such as energy and water savings) are followed by mid-term technological changes (precision, regenerative practices, and digital traceability), capped by longer-term infrastructure projects (biogas/biomethane, irrigation, and logistics). As UBM mentioned, “*The introduction of carbon footprint calculation at the product level will allow us to map the highest emission points from raw material sourcing to logistics to end use. Based on these data, we can develop new product formulas that have equal or better utilisation but a lower environmental footprint*”.

In the following, a heat map was created based on the maturity of agricultural companies’ ESG reporting. The ESG maturity assessment framework for agricultural supply chain analysis is structured to provide a multidimensional view of companies’ sustainability integration. The practice-based rows reflect increasing levels of ESG sophistication, as *Reporting* evaluates the thoroughness and auditability of disclosures, ranging from basic voluntary statements to internationally recognised frameworks such as GRI and CSRD. *Data coverage* addresses the comprehensiveness of sustainability measurement, including greenhouse gas emissions (Scope 1, 2, and 3) and supplier compliance. *Assurance* measures the extent to which ESG data and reports are externally validated, whether by third-party audits or formal certification. *Training* captures systematic efforts to build sustainability awareness and competence, both internally and among partners, through educational programmes and ongoing engagement. Lastly, *Pilots* recognise experimental and innovative activities, including digital solutions and novel integrations, that help propel new practices and enhance adaptability within agricultural supply chains.

The columns in the heatmap define the major segments of the agricultural supply chain. *Input companies* supply the foundational materials and technologies for farming – such as seeds, fertilisers, and machinery – setting the baseline for sustainable transformation. *Producers* span those who culti-

Table 1: Companies included in the supply chain segments of the ESG heatmap.

| Supply chain segment | Companies included ^{a)} |
|---------------------------|--|
| Input | IKR Agrár Kft. KITE Zrt. UBM Group |
| Producer | FirstFarms Hungary Kft. GALLICOOP Zrt. Zwack Unicum Nyrt. |
| Processor | Coca Cola HBC Magyarország Kft. Első Pesti Malom- és Sütőipari Zrt. Nestlé Hungária Kft. |
| Distributor and financing | MBH Bank Nyrt. Lidl Magyarország Kereskedelmi Bt. |

^{a)} Magyar Élelmiszerbank Egyesület was excluded from the heat map because this non-profit organisation is not required to report on sustainability and has other priorities to consider as a member of the supply chain.

Source: Own composition based on interview data

vate crops and rear livestock, forming the operational core of agricultural production. *Processors* represent organisations responsible for transforming raw agricultural materials into finished goods, driving value creation and compliance with sustainability demands. The *Distributor and Financing* sectors play a crucial role in ensuring the smooth operation of companies, the timely delivery of products to consumers, and the provision of financing. Segmenting by supply chain role allows researchers to distinguish where sustainability strengths and developmental needs lie, providing targeted insights for policy and industry advancement in a context where comprehensive regulatory standards are rapidly evolving (Table 1).

The heatmap (Figure 1) visually displays ESG maturity gradients across both supply chain roles and ESG practices, identifying leaders (blue and green with higher scores) and highlighting areas for improvement with lower scores. This helps clarify which companies excel in specific supply chain functions and which ESG dimensions (such as training or assurance) require further development for sustained compliance and impact.

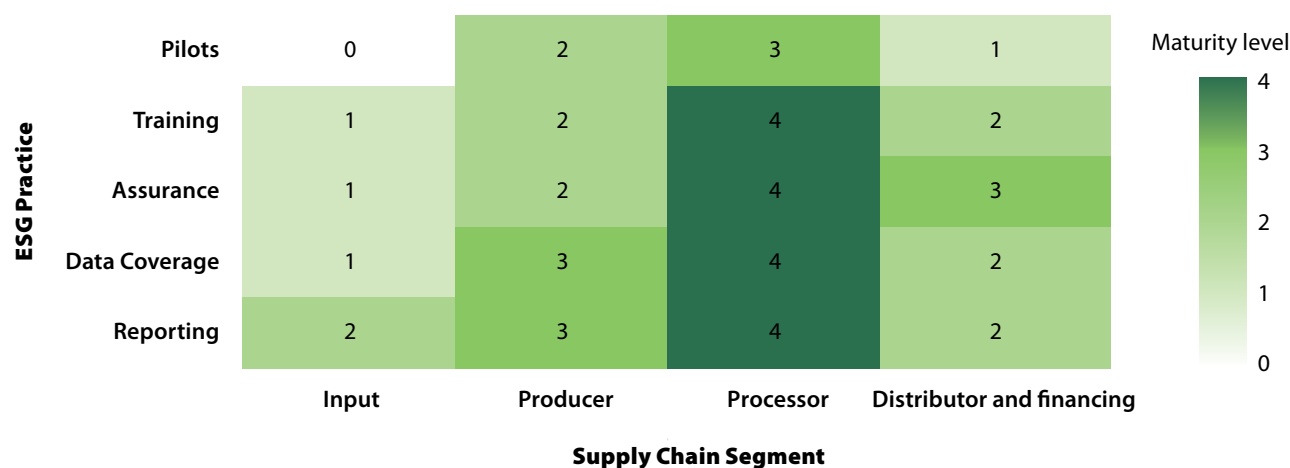


Figure 1: ESG maturity by supply chain segments.

Source: Own composition based on interview data

Conclusions

This research highlights that sustainability and competitiveness are not mutually exclusive but mutually reinforcing objectives for the Hungarian agri-food sector. The study demonstrates that true progress in sustainability will be achieved not merely through compliance or isolated initiatives, but through holistic supply chain thinking, measurable outcomes, and the establishment of standardised data infrastructure. If these conditions are met – particularly with agrifood-specific data standards, field-based measurement templates, and harmonised banking surveys that incentivise companies – the sector could achieve substantial and verifiable improvements both locally and nationally. Although the new regulatory changes can reduce short-term administrative efforts, industry stakeholders warn that the narrower reporting basis may hinder data transparency and comparability, especially for investors and international stakeholders. The competitiveness of Hungarian companies may ultimately depend on proactive capacity building and voluntary commitment, even in a less stringent regulatory environment.

These findings can inform not only individual company strategies but also the design of targeted support programmes and the evolving regulatory approach, helping to bridge the knowledge and capability gap across the Hungarian agri-food value chain. Such advancements would yield tangible results, including improved resource efficiency, more resilient supply chains, and stronger market positions that reinforce the long-term vitality of rural communities and ecosystems. Importantly, these benefits are not abstract; they are shown to be locally measurable, nationally comparable, and internationally recognised, confirming the sector's potential for both domestic leadership and international benchmarking.

These results also highlight the crucial role of knowledge exchange and capacity building, facilitated by partnerships among agri-food companies, regulators, and academic institutions. The companies interviewed demonstrated that proactive engagement with public policy forums, sector associations, and higher education maximised their ability to interpret regulatory demands and adapt reporting practices efficiently. Importantly, such collaborations not only improved technical compliance but also fostered a more holistic and strategic view of sustainability, transforming external pressure into a driver for internal learning, innovation, and long-term value creation. Future efforts should focus on expanding these networks, developing sector-specific guidance for SMEs, and encouraging continuous learning to ensure that Hungarian agriculture's progress in ESG reporting remains robust, inclusive, and internationally benchmarked.

Nevertheless, the research is subject to several limitations. First, data were gathered exclusively through semi-structured interviews with twelve Hungarian companies, which may limit the generalisability of the findings to the broader and more diverse Hungarian agri-food sector, as well as to different regulatory or market environments. The relatively small sample size may underrepresent certain sub-sectors or regions within Hungary. Moreover, the qualitative

nature of the research provides depth and context but may not capture the full spectrum of sustainability performance nor the rapidly evolving compliance environment outside the period of study. While the methodology provides rich, nuanced insights into organisational practices and perceptions, it is less equipped to measure actual, quantitative performance outcomes across the sector. Additionally, the evolving regulatory landscape, including the adoption of CSRD and ESRS frameworks, means that company preparedness and industry pressures may shift significantly in the immediate future, underscoring the need for continuous, longitudinal research and sector-wide dialogue.

In summary, this study confirms that sustainability and competitiveness in Hungarian agriculture can only be advanced concurrently, by aligning market incentives, policy tools, and data-driven operational frameworks. By embracing standardised measurement systems and supporting public-private collaboration, Hungarian agri-food companies – and the rural communities that depend on them – can achieve measurable, internationally-respected progress in sustainability, resource use, and market resilience. Ultimately, the pathway to transformation is rooted in recognising sustainability not as an external obligation but as the foundation of long-term value creation, social trust, and rural prosperity.

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Appendix

Appendix 1: Main activities of the companies involved in the research.

| Company | Introduction of the company's main activity |
|-------------------------------------|---|
| Coca-Cola HBC Magyarország Kft. | Hungary's Coca-Cola bottler is part of Coca-Cola HBC AG (serving approximately 750 million consumers in 29 countries). It operates two bottling plants in Hungary, employs approximately 1,000 people, and exports to 14 countries, offering a comprehensive beverage portfolio that includes soft drinks, waters, juices, teas, sports and energy drinks, coffee, and premium spirits. |
| Első Pesti Malom- és Sütőipari Zrt. | A historic Budapest-based milling and baking company and a key player in Hungary's grain-to-bread value chain, operating modern facilities and emphasising quality, traceability, and responsible supply in cereal processing. |
| FirstFarms Hungary Kft. | The Hungarian subsidiary of Denmark-based, Copenhagen-listed FirstFarms A/S. In Hungary it operates through FirstFarms Hungary Kft. (pig production) and FirstFarms HunAgro Kft. (arable farming). ESG reporting is prepared at group level, with the Hungarian entities providing data; the group transitions to CSRD-based reporting from 2025. |
| GALLICOOP Zrt. | One of Hungary's leading poultry integrators and processors, active across breeding, feed, and meat processing. Its scale enables dedicated sustainability expertise and longer-term planning to embed ESG in operations. |
| IKR Agrár Kft. | A nationwide inputs and services provider for crop producers, supplying fertilisers, seeds, and plant-protection products, plus precision-ag solutions (e.g., mapping, drone surveys, soil sampling), financing, insurance, and grain trading. Part of the AGROFERT Group since 2012, it discloses sustainability performance within the group's reporting framework. |
| KITE Zrt. | A major Hungarian agribusiness integrator and distributor of agricultural inputs, machinery, and precision-farming solutions. Beyond compliance, it invests in efficiency and environmental performance (e.g., fleet upgrades) and supports farmers with training and technology for more sustainable practices. |
| Lidl Magyarország Kereskedelmi Bt. | The Hungarian subsidiary of the Schwarz Group's Lidl discount chain, part of one of the world's largest food-retail networks (31 countries, 12,600+ stores, around 200 logistics centres, and 595,000 employees). Lidl Hungary has published multiple GRI-based sustainability reports, underlining transparency and commitment to ESG. |

| Company | Introduction of the company's main activity |
|---------------------------------|--|
| MBH Bank Nyrt. | A leading Hungarian banking group financing the agri-food sector among others. It is building ESG capabilities and processes across the organisation, aligning with evolving regulation and supporting clients' sustainability transitions |
| Magyar Élelmiszerbank Egyesület | A nonprofit focused on food rescue and prevention of food waste, the Association engages agricultural producers and supply-chain partners to redirect edible surplus to those in need, while running awareness and training campaigns to build environmental, social, and governance awareness. |
| Nestlé Hungária Kft. | The Hungarian arm of the world's largest food company. Nestlé integrates ESG into strategy, focusing on sustainable sourcing, resource protection, and community support; in Hungary it reports sustainability achievements via its "Creating Shared Value" summary rather than a standalone report. |
| UBM Group | A prominent Hungarian feed, grain trading, and food-industry group with vertically integrated activities across the agri-food chain. UBM emphasises scalable, data-driven operations and continuous strengthening of sustainability management and disclosures. |
| Zwack Unicum Nyrt. | One of Hungary's most renowned heritage spirits producers for over two centuries, maker of Unicum and other premium beverages. The company combines tradition with innovation and sustainability in production and market engagement at home and internationally. |

Source: Own composition