Sustainability reporting practices of agricultural and forestry companies in Hungary: a content analysis

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Abstract. To demonstrate the sustainability of companies, some companies have already produced sustainability reports, most of which have been published on their websites, while others have only produced and made public the reports and certifications required by law. In the European Union, legislation as of 2014 required the preparation of non-financial reports for publicly relevant entities, companies and parent companies of large groups of companies considered to be entities and having an average number of employees of more than 500. However, in line with the European Green Deal and the Taxonomy Regulation, as of 2023, a new law has been introduced, which extends the sustainability reporting obligation to non-public large companies and public small and medium-sized enterprises. Agricultural enterprises should also be prepared for this reporting obligation. This study aims to examine the ESG indices of the sampled companies and seek a correlation between the quality of the information disclosed and the financial characteristics of the companies. The results show that while forestry companies pay more attention to the disclosure of this type of information, there is some under-disclosure in both sectors.

1 Introduction

To align with the European Green Deal's goal of achieving a carbon-neutral economy by 2050, companies are required to prepare and publish non-financial reports detailing their sustainability efforts. The Corporate Sustainability Reporting Directive (CSRD) 2022/2464 [1] was introduced in 2023, superseding the previous Directive 2014/95/EU[2]. This new directive mandates more extensive and detailed sustainability reporting for a broader range of companies. In addition, the EU Taxonomy was introduced in 2020 [3], which also sets targets for achieving sustainable production. These two regulations are in conformity with each other. For the implementation of the CSRD, publicly interest entities, as well as parent companies of large groups with an average of more than 500, must being applying the new Directive from January 1, 2024, with the first reports due in 2025. Other large companies will come under the directive from January 1, 2025, and their initial mandatory reporting is scheduled for 2026. For listed small and medium enterprises (SMEs) and other companies,

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the directive takes effect from January 1, 2026, with first reports to be submitted in 2027. (However, SMEs will be exempted from the mandatory application until 2028, provided they meet specific criteria.) Non-EU companies will be subject to the CSRD from January 1, 2028, with the first reporting due in 2029.

Every company operating in Hungary is required by law to produce an energy report, which may also contain sustainability-related information. In addition, to increase efficiency and reduce environmental impacts, some companies have introduced various international standards and certifications (Table 1).

Table 1 Main standards and certifications of agricultural and forest companies.

Name	Description
ISO 50001	ISO standards are designed to support companies in all sectors in developing energy management systems (EnMS) to facilitate the implementation of energy use.
ISO 14001	ISO 14001 for environmental management systems (EMS) is the only certified standard for ISO14000. It establishes a framework for companies and organizations to develop effective EMS.
ISCC	ISCC is a globally applicable sustainability certification system and covers all sustainable feedstocks, including agricultural and forestry biomass, biogenic wastes and residues, circular materials and renewables.
FSC	Forest Stewardship Council - Promotion of sustainable forest management that is ecologically, socially and economically compatible.
PEFC	Pan-European Forest Certification - Documentation and improvement of sustainable forest management with special consideration of European ownership structures characterised by family forestry operations. Improving the image of forestry and the renewable raw material wood.

Source: [4-7]

Corporate sustainability reporting is not uniformly regulated and therefore varies in form and content across regions and countries. However, according to Turzo et al. [8] commonalities can be found in many respects. Hungarian companies typically prepare their reports in a unique format, and it is pretty uncommon for companies to report according to legally recommended standards Bögöly et al. [9]. The increasingly stringent requirements for the content of sustainability reports are aimed at ensuring consistent and reliable information. However, this presents a growing challenge for companies. The disclosure of sustainability-related information influences how companies are perceived in terms of their environmental performance and their ability to meet the expectations of investors, as discussed by Lámfalusi et al. [10].

When companies fulfill their reporting obligations, they can utilize various tools. According to Siew's [11] comprehensive overview, these tools can be categorized into three main groups: frameworks, standards, and ratings and indices. Ratings and indices provide an independent evaluation of a company's performance in environmental, social, and governance (ESG) aspects. ESG is the most commonly used framework in the literature to assess sustainable performance. Within the EU regulatory context, sustainability and ESG frameworks are often used interchangeably.

Companies have many tools at their disposal to meet their disclosure requirements. Siew [11] divided these tools into three categories: frameworks, standards, ratings and indexes. Ratings and indexes are third-party assessments of a company's ESG performance. In the

literature, ESG is the most widely used environmental framework for measuring sustainable performance. In the EU regulatory environment, sustainability and the ESG framework are essentially interchangeable concepts.

Research by Boeva et al. [12] suggests that corporate managers take sustainability into account to a significant extent in their operations. Sustainable development policies, including all three dimensions, are increasingly being integrated into corporate governance. V. Zamlynskyi et al. [13] investigated the relationship between corporate sustainability reporting and agricultural enterprise governance in Ukraine. They found that the main problem is that the management of medium and small agricultural enterprises in Ukraine has little motivation to participate in sustainable development programmes. Buallay [14] examines the impact of sustainability reporting on the performance of agricultural industries. Using data from 1,426 observations from 31 different countries over ten years (2008-2017), the author highlights governance gaps in the agricultural sector, manifested in the weak correlation between some components of ESG and the performance of agricultural industries.

Hungary's most significant challenges are the production and assessment of sufficient quality data, making it difficult to compare company non-financial performance. To overcome this, Lippai-Makra and Kovács [15] propose to use a uniform format. According to Boros et al. [16], some of the company reports they examined only addressed ESG issues at the level of principles and a minority reported on concrete measures and results achieved. For this reason, they suggest that comparability of companies based on ESG indicators is desirable.

Hristov and Searcy [17] provide a framework of four key steps (initial assessment, strategic formulation, action, and sustainability reporting) that provide structured guidance for practitioners to start building CSRD at the company level. The four-stage process provides a basis for addressing high-profile sustainability issues such as the implementation of ESG requirements. The UN's Sustainable Development Goals (SDGs) are closely linked to the subject area and are also reflected in sustainability reporting.

The research of Gunawan et al. [18] found that the levels of regulatory compliance may vary across companies in different sectors, and it may be worthwhile to analyse sustainability reports separately at the sectoral level. According to Kozma and Bosnyák-Simon [19], Hungarian food, tobacco and agricultural companies can be classified into three characteristics based on their documentation related to sustainability: 1) the publication of sustainability reports; 2) the publication of annual reports on the energy sector; and 3) the publication of environmental information on their websites or brochures.

In Spain, Anguiano-Santos et al. [20], using the example of agri-food companies, examined the transposition of the NFRD into Spanish law and found the process to be unsuccessful. They propose the creation of a legal framework setting specific standards and requirements for the preparation of non-financial reports. They also call for the introduction of incentives and training programmes for EU governments, as well as the clarification and simplification of recommendations, thereby improving the overall quality of non-financial information. Furthermore, it is crucial that the 'real picture' in sustainability reporting is given the same level of importance as in financial reporting in order to effectively reduce the risk of greenwashing. This means that new tools and approaches are needed to counteract greenwashing practices and the manipulation of non-financial information Sundarasen et al. [21].

Falkenberg et al. [22] examined the status of circular farming in the agri-food industry in the context of sustainability reporting. They point out that the analysis of these reports has certain limitations. For example, their study only includes agri-food companies that publish their sustainability activities in English-language sustainability reports, which means that many small and medium-sized enterprises are excluded from the potential subjects of the study.

Companies that go beyond general sustainability goals, as studied by Todaro and Torelli [23], have a more significant positive impact on the environment and society and operate in a more sustainable way in the long term. The authors have also shown that such companies can also reap long-term economic benefits as their commitment to sustainability contributes to their competitiveness and business success. It is, therefore, important that companies not only set themselves general sustainability goals but also ambitious targets towards a paradigm shift. This will not only protect and improve their environment but also ensure their long-term success. Another study, also on sustainability reporting, found that it has a positive impact on both financial performance and corporate reputation Amra et al. [24].

As a precursor to the present research, Gombkötő et al. [25] found that agricultural companies need to make more efforts in reporting. The study found that almost one-fifth of them do not have any information about sustainability on their website, while two thirds of the companies report only indirectly or in other content about their sustainability activities. Companies that are diversified and up-to-date on sustainability are better off, but still need to prepare for CSRD regulations. It is important to understand that the CSRD Regulation is binding for all types of businesses, but due to sectoral differences, the form and content of these reports may vary between the industrial and agricultural/forestry sectors. Agricultural and forestry enterprises face different types of challenges and accordingly the content and format of the reports will generally reflect the specificities and requirements of the industry. This is why it was considered essential to study the agricultural and forestry sector based on the most recent information available.

The aim of the study is to examine the practices of agricultural and forestry enterprises in Hungary covered by the NFRD in terms of the quality and disclosure of their sustainability reporting. This research seeks to answer whether these organisations are prepared to fulfil their reporting obligations in a more regulated way in the future. The analysis will also examine whether a correlation can be established between the quality of published reports and the financial and other parameters of companies.

2 Materials and methods

The study examined companies supplying forestry and agriculture in Hungary that meet at least two of the NFRD's requirements: the total financial results of more than 20 million Euro, the net annual turnover of more than 40 million Euro or average number of employees of more than 250 in the financial year. To select the companies in this category and to analyse the financial data, the database provided by OPTEN (OPTEN Informatics Ltd.) and the reports available through the Ministry of Justice's Service for the Information and Electronic Register of Companies were used. Based on the available data, the analysed category included 9 forestry enterprises and 17 agricultural enterprises in 2020. In 2022, the category was represented by the same 9 forestry enterprises, while the number of agricultural enterprises decreased by 4 (13 firms). The analysed enterprises represent each of the NUTS 2 statistical regions of Hungary (Figure 1).

The companies' sustainability disclosures were determined by scanning their websites and by personally contacting company representatives. The sustainability reporting practices of the surveyed companies - the quality of the information interface - were correlated with some of their main characteristics (annual net sales, balance sheet total, equity, registered capital, average statistical number of employees, type of activity).

The quality of sustainability reporting is grouped and coded as follows:

no sustainability-related information disclosed;

documents and certifications that companies are required to produce are published;

sustainability-related information is displayed indirectly or as other content;

other sustainability-related information and documents are available on the website in addition to the mandatory documents.

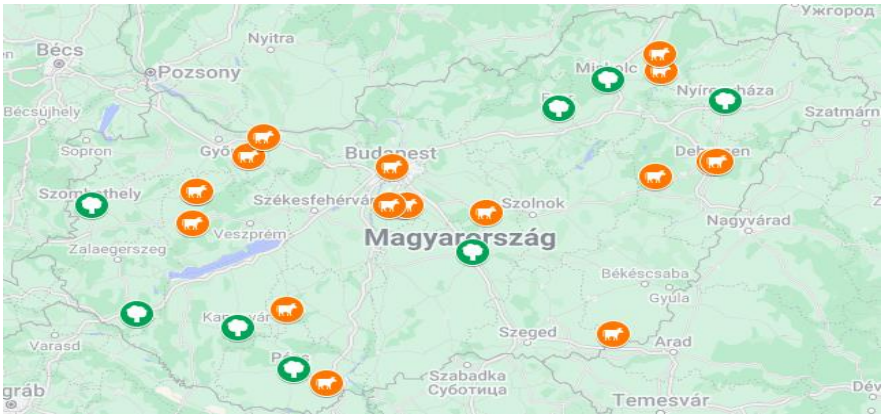

Fig.1. Geographical location of the surveyed enterprises in Hungary (2020).

Source: own compilation of the authors

For the analysis, a method for measuring the strength of mixed relationships was used, where the qualitative parameters were the types of sustainability reports, and the quantitative criteria were the main financial characteristics.

The variance ratio (η^2) was calculated using the following formula:

$$\eta^2 = \frac{\sigma_K^2}{\sigma^2} \qquad (1)$$

η^2 indicates the extent (percentage) to which membership of a variant of a quantitative criterion determines membership of a qualitative criterion.

σ_K^2: variance between

σ^2: variance total

As a supplementary indicator, the standard deviation ratio (η) was also calculated.

$$\eta = \sqrt{\frac{\sigma_K^2}{\sigma^2}} \qquad (2)$$

The value of η indicates the closeness of the relationship between the qualitative and quantitative criteria.

The SPSS software (IBM SPSS Statistics for Windows, Version 27.0) was used to perform the calculations.

The ESG Indices provided by OPTEN (2024) enabled another platform for analysis. The OPTEN ESG Index shows the ESG level of a company based on more than 75 parameters. That is an index number from 1 to 10 based on the results of environmental (E), social (S) and governance (G) awareness. OPTEN uses a scoring model to construct the indices, assigning points to different aspects individually at company level: the points can take positive, negative or 0 values depending on the parameters. The scores are weighted and grouped into baskets on a scale of 1 to 10. The index approximates a normal distribution, ensuring that most businesses move towards the mean. The indices (ESG, E, S, G) categorise firms from 1 to 10, with 10 being the best (Table 2).

Table 2 Major parameters used to construct the ESG index.

E – Environment pillar	S – Social pillar	G – Governance pillar
Emissions of CO2, particulate matter and acidifying gases in relation to turnover, distinguishing between companies with turnover below and above HUF 100 million	Social, moral aspects	Number of executions
Membership of an organisation working to promote sustainable development	Evolution of headcount	Classification by National Tax and Customs Administration, taking into account tax arrears and VAT defaults
Taking into account the environmental impact of different sectors	Responsible behaviour and respect for consumers and workers	EU tenders and public procurement
	Composition by type and sex of the holder of the registration	Financial indicators, trends and stability
	Non-profit activity	Risk classification of the company and its affiliates
	Health and safety at work and labour fines, penalties for unlawful and unfair conduct	Disqualified contacts
	Contributing to the development of catching-up municipalities (e.g. by establishing a headquarters)	Strategic partnership
		Market activities prohibited by Hungarian Competition Authority, and Hungarian National Bank warnings

Source: based on OPTEN (2024).

3 Results and discussion

3.1 Main characteristics and financial parameters of the enterprises surveyed

In Hungary, based on the company information data for 2020, 9 forestry holdings and 17 agricultural enterprises, and in 2022, 13 agricultural enterprises will meet the parameters set in the methodology, in addition to the same number of forestry holdings (4 enterprises will be excluded from the 2020 sample). All forestry holdings and 9 agricultural enterprises operate as private limited companies, while the remaining enterprises operate as limited liability companies (8 in 2020 and 4 in 2022).

In terms of ownership, forestry companies are 100% state-owned, two of the agricultural companies are fully foreign-owned, and the rest are Hungarian-owned. The average number of forestry companies is 410 in 2020 and 357 in 2022. Agricultural companies will have 301 employees in 2020 and 370 in 2022. In addition to the average figures, the aggregate figures are shown in Table 3.

Table 3 Financial characteristics of the surveyed companies 2020-2022.

Company under investigation	Average number of stat. staff (persons)		Average annual net sales (thousand HUF)		Average balance sheet total (thousand HUF)	
	2020	2022	2020	2022	2020	2022
Forestry companies	410	357	6,396,626	9,653,013	10,405,129	12,522,536
Agricultural companies	301	370	22,662,744	24,969,976	24,233,955	34,892,268
Company under investigation	Total number of stat. staff (persons)		Total annual net sales (thousand HUF)		Total balance sheet total (thousands HUF)	
Forestry companies	4,096	3,213	63,966,264	86,877,113	104,051,288	112,702,822
Agricultural companies	5,121	4,810	385,266,648	324,609,682	411,977,234	453,599,479

Source: based on database provided by OPTEN and data from reports available through the Ministry of Justice's Business Information and Electronic Business Register Service.

The annual net turnover of the sampled companies in 2020 and 2022 is shown in Figures 2 and 3. In 2020, forestry companies represent 29% of the net turnover of all Hungarian forestry partnerships and agricultural holdings represent 14% of the net turnover of all agricultural partnerships. In 2022, these proportions are similar, 29% for forestry holdings and 10% for agricultural holdings (four companies excluded from the sample).

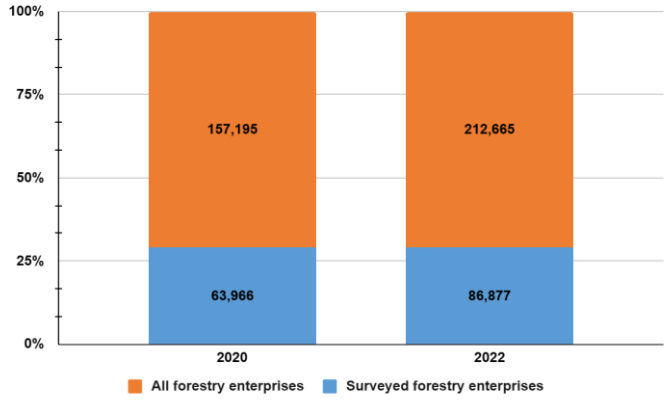

Fig. 2. Trend of annual net turnover of the surveyed forestry holdings in 2020 and 2022, in HUF million and %.

Source: own compilation of the authors, Institute of Agricultural Economics (IAE) financial report 2020, 2022 data [26]

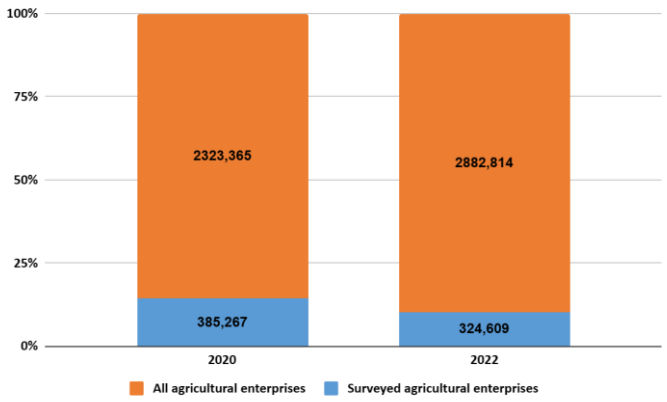

Fig. 3. The evolution of the annual net turnover of the agricultural enterprises surveyed in 2020 and 2022, HUF million and %.

Source: own compilation of the authors, IAE financial report 2020, 2022 data [26]

3.2 Sustainability information of the enterprises surveyed

The qualitative forms and frequencies of sustainability-related information of the sample companies are shown in Table 4. In 2023, only 3 agricultural companies out of 26 were found to have no sustainability-related content, decreasing to 2 in 2024. In general, forest owners tend to pay greater attention to the dissemination of such information because of the nature of their activities. In addition to mandatory documents (energy technical reports), these companies typically have certificates of ISO 50001, ISO 14001, and FSC on their websites. In many cases, they publicly participate in various programmes that promote sustainability, the environment, nature conservation and animal welfare. In agriculture, the most common method of communication about sustainability is through direct content (in 11 cases in 2023). In 2024, however, this frequency fell to 7, partly because the number of samples was reduced. This frequency does not indicate any significant differences between the two years of the survey. Only one company has a detailed sustainability report. In addition to the mandatory reports, information on sustainable measures is also used to present the ISO standard, good manufacturing and hygiene practices, and quality policy objectives.

Table 4 Quality of sustainability information in surveyed enterprises.

Categories	Number of forestry holdings (number)		Number of agricultural enterprises (number)	
	2023	2024	2023	2024
No sustainability-related information disclosed (1)	0	0	3	2
Documents and certifications that companies are required to produce are published (2)	3	1	0	0
Sustainability-related information is displayed directly or as other content (3)	1	1	11	7

In addition to mandatory documents, website provides other information and documents on sustainability (4)	5	7	3	4
Total:	**9**	**9**	**17**	**13**

Source: own compilation of the authors

The study investigated the correlation between the quality of sustainability information in 2023 and the quality of sustainability information in 2020 for company financial and other characteristic parameters. Regarding the closeness of the mixed relationships, the following results were obtained (Table 5).

Table 5. The closeness of the relationship between the type of sustainability information and other characteristics of companies.

Featured on	Standard deviation ratio (η)	Variance-ratio (η2)
Annual net turnover	0.382	0.146
Balance sheet total	0.311	0.097
Average statistical headcount	0.387	0.15
Equity capital	0.243	0.059
Share capital	0.498	0.248
Diversity of activity	0.287	0.082

Source: own compilation of the authors

Examining standard deviation ratios, the study finds the strongest (medium) relationship between the quality of sustainability information and the share capital. This leads to the conclusion that higher founder wealth is generally associated with greater responsibility for the disclosure of sustainability information. The same measure shows a weaker than medium correlation for annual net turnover and number of staff, while equity and diversity of activities are also below these indicators. In the case of the variance ratios, useful results were found for registered capital.

3.3 ESG index analysis of the companies in the sample

The average ESG index of the companies surveyed is 6.5, with values ranging between 6 and 7. The G index shows the highest average, with a value of 8.86, and the lowest value is for the E index (4.64) (Table 6).

Table 6. Analysis of the ESG index of the companies included in the study.

	ESG index			E index			S index			G index		
Businesses examined	**Mean**	**SD**	**CV**	**Mean**	**SD**	**CV**	**Mean**	**SD**	**CV**	**Mean**	**SD**	**CV**
Forestry	7.00	0	0	6.67	0.5	0.08	5.22	0.97	0.19	8.89	0.33	0.04
Agricultural businesses	6.15	0.38	0.06	3.23	1.79	0.55	6.77	0.83	0.12	8.85	0.69	0.08
All enterprises	6.50	0.51	0.08	4.60	2.21	0.48	6.10	1.23	0.2	8.90	0.6	0.07

Source: own compilation of the authors, OPTEN (2024)

The ESG index of all forestry holdings takes a value of 7. The E indices are also moderately high for these farms, ranging between 6 and 7. The lowest average value is represented by the E index of agricultural holdings, with a total of 3.23. This is less than half the average index for forestry holdings of 6.67. The smallest difference between the two groups is found in the average G index (8.89-8.85). Based on the standard deviation ratios, the E indices show the highest variability (between 8 and 55%), so the sustainability-environmental issues are highly differentiated in this company segment.

4 Conclusions

Sustainability reporting for Hungarian forest and agricultural enterprises under the CSRD will be mandatory from 2024, and this reporting and disclosure practices will be restricted. They should better prepare for mandatory reporting in the future. The study found that forest companies show a more favourable situation, as they focus more on this disclosure. However, all actors post some information on their website, and other mandatory reports (certificates and other sustainability information) are also available to the public. As almost two-thirds of agricultural companies report on sustainability efforts only indirectly or in other content, it can be concluded that preparation of agricultural companies for reporting will take more work. From 2023 to 2024, no material change in the publication of the information content examined has occurred. There is no significant correlation between the characteristics of companies and the quality of the sustainability information they disclose, thus the type of companies that are better or worse off in this respect is less predictable. The sustainability information published by companies on their websites is moderately correlated with their share capital (η = 0.498), but a descriptive relationship with annual net sales and an average number of statistical staff (η= 0.382 and 0.384) can also be seen. On average, an analysis of the ESG indices of the 22 companies shows that they are moderately strong. The lowest index average is seen for the environmental pillar of agricultural enterprises with a total score of 3.23 for this area. In terms of the indices, for the social pillar, there is no significant difference between the two groups of enterprises. On the complex ESG indicator, forestry holdings with an average of 7.00 (with a standard deviation of 0), show a more consistent picture in terms of the aspects of the study, similar to the reports examined. This research provided an opportunity to carry out a complex analysis of sustainability information for enterprises in the forestry and agriculture large business environment that meet the 2020-2022 requirements. As the number of companies included in the study was relatively small (26 and 22 respectively) based on the legal parameters, these findings can only be considered within the limits of this small sample analysis. Another limiting factor may be the qualitative rating of sustainability reports. With the current legislative changes and the potential expansion of the scope of companies, it is evident that further investigations are crucial. These future studies will help to address the limitations of the current study and provide a more comprehensive understanding of sustainability reporting practices, compliance with content requirements, and the disclosure of information.

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