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# THE ROLE OF ESG BUSINESS REPORTING IN WATER MANAGEMENT

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***Abstract.*** *The rational use of water resources by business structures requires the development of appropriate strategies and their adherence to the chosen policy in terms of management of these objects: drawing up programs and plans, introducing environmental protection actions, displaying the economic effect and documenting all transactions, minimizing negative impacts on the environment and presentation of the positive and negative consequences of the use of natural resources in the format of ESG reporting, which discloses information about the activities of companies in the field of* ***E****nvironmental aspects,* ***S****ocial responsibility and Corporate* ***G****overnance. This practice positions companies as an active participant in sustainable development and allows them to increase their own ratings, which makes it possible to have advantages in attracting investments and targeted financing, increasing one's own competitiveness due to improved trust in such companies, etc. Improving the quality of information in ESG reporting on water resources management and related processes allows stakeholders to receive complete and reliable information when making management decisions. On the basis of the study of ESG reporting of 8 corporations from Ukraine in terms of the use of water resources during the implementation of the strategy of sustainable development, positive and problematic practices of companies were identified when preparing the necessary data for reporting. During this analysis, the experience and legislative guidelines on the exploitation of water resources and the use of ecological and economic accounting of water in the countries were taken into account. In addition, approaches to applying the level of materiality in ESG reporting were analyzed when reporting in this format. The results of the study made it possible to rank the elements of water resources management of economic entities according to the rule of materiality of data in ESG reporting and to propose an algorithm for compiling ESG reporting in the part of water resources management, taking into account the level of materiality. The article substantiates the directions of providing companies with adequate information on water resources management measures and reflecting such practices in ESG reporting to meet the needs of internal and external users. The directions of further scientific research in the field of reporting on the use of water resources by various business entities are also outlined. A critical analysis of the peculiarities of ESG reporting in the area of water resources management can provide an opportunity for top managers of domestic companies to improve the quality of financial and non-financial information, which, in turn, will contribute to the improvement of the corporate governance system on the one hand, and on the other hand, improve the satisfaction of information users. requests of all stakeholders when making their own management decisions.*

***Key words:*** *Environmental aspects, Social responsibility, Corporate Governance, ESG reporting, sustainable development, materiality, water management*

**Relevance of research.** Goal 6 "Ensuring availability and sustainable management of water resources and sanitation" [1] was defined as an integral component of achieving the sustainable development goals of Ukraine by 2030. To achieve this goal, adequate modern approaches to water management are required. That poses businesses In Ukraine the implementation and use of a system of indicators in water use areas, which must meet the requirements of sustainable development. Key performance indicators (KPI) can serve as one of the important tools in the field of ESG.

To increase the volume of sustainable investments and combat the laundering of financial funds by unscrupulous companies

(subjects that unreasonably apply for investments within the scope of implementing sustainable development – ESG-investing), when conducting "green" businesses many countries are introducing requirements for disclosing the information on ESG and the need for risk assessment when implementing a sustainable development strategy [2]. Thus, non-financial reporting, especially reporting on sustainable development, should be considered within the framework of a single concept of ESG in the long term [3].

Compliance with the recognized ESG investment criteria (investor requirements) for sustainable development is an important factor in the competitive advantages of business entities, which allows them to position themselves as the most advantageous on the capital market and in the eyes of civil society.

Therefore, it is expedient to study the approaches to disclosing and improving organizational and methodological tools in the modern accounting system, which will optimally meet current information requests and the format of ESG reporting, the quality content of which can be recognized as one of the methods of verifying the sustainable development of modern effective business [4].

**Analysis of recent publications.** An analysis of the use of materiality level in preparing corporate reporting in terms of water management in the ESG format [5] proved that EU regulations require the presence of a criterion of the absence of significant damage to other ESG goals [6]. In this regard, business entities need to assess the financial impact on the environment at the legislative level when determining ESG risks [7]. It is worth noting that practitioners focus on the growing tendency to reassess traditional interpretations of the principle of materiality in ESG [8], which makes it possible to prepare reports using traditional financial indicators of the enterprise's economic activity, considering achieving generally accepted goals of sustainable development [3]. Publishing these data in open access allows companies to demonstrate the effective use of all natural resources, in particular water when implementing ESG strategies [9–16]. However, there is no proper scientific generalization of the accounting and reporting component regarding the frugal use of water resources based on ESG strategies.

**The purpose of the article**. The purpose of the article is to resolve the current issues of ESG business reporting by companies in terms of water management based on the actualization of a materiality principle, which will ensure its high-quality content, as well as informational value regarding the use of water resources for all stakeholders.

**Research methods**. This study used:

– logical and abstract methods (analysis of regulatory and legal acts, assessment of the significance of water management components, analysis of scientific sources);

– system analysis (summarization of research results and implementation of best practices by domestic and foreign companies regarding the use of water resources based on ESG principles);

– historical and logical methods (analysis of the data from official reports of Ukrainian corporations and advanced global practices of effective use of water resources);

– analytical and synthetic methods (processing of information and synthesis of results in the form of consolidated data on the qualitative characteristics of the use of water resources).

**Research results and discussion**. ESG reporting regarding water management was studied based on specifying the importance of preparing such information, analysis of the advantages and disadvantages of using water by domestic corporations, applying a materiality level in activities, and report preparation.

***The results of the analysis of legal acts on regulating business reporting in terms of water use according to ESG principles.***

At the current stage, improving the efficiency of business economic activity is influenced by implementing the concept of sustainable development, taking into account the interests of society, by voluntarily assuming responsibility for the impact of one's activities on other subjects of the business environment and members of society, which goes beyond the obligations, established by law. The form of such responsibility is the preparation and publication of sustainable development reports by business entities, one of the modern mechanisms of which is the concept of ESG, which is institutionalized through the adoption of standards and initiatives, the mandatory use of which is fixed by a directive [3]. According to Directive 2022/2464/EU [2], from 2024, the rules for reporting on sustainable development will change; instead of voluntary reporting, an imperative principle of business reporting will be introduced in the territory of the EU, which establishes a mandatory reporting procedure, including regarding water use by businesses.

For domestic companies, the researchers suggest that information on the impact of the company's activities on the environment, the industry in which the company operates, and

introducing environmental protection measures have to be shown in the "Environmental Aspects" section of the Management Report. It also has to specify reducing its activity impact on the environment. Given these aspects, it is recommended to show the data on the rational use of water in the Management Report, namely: volumes and shares of water intake; volumes and shares of wastewater; volumes and shares of malignant compounds that enter water bodies due to draining used water by the company; share of suppliers using quality standards for water used in the production cycle; financial effect of introducing "green" technologies for water purification; volumes of industrial water consumption in areas with a shortage of drinking water for the population; ecological coefficient of product safety; coefficient of "ecological ballast"; coefficient of waste rational use; profitability of products from waste; environmental pollution coefficient; degree of environmental pollution; index of environmental protection activities, etc. [17–19]. It is worth noting that permanent management of these key indicators is expedient since regulators in the regulatory framework require a reduction of some ESG indicators, for example, malignant compounds in reservoirs as the result of economic activity [20].

The Annex on ESG, by the Corporate Governance Principles, provides for environmental protection measures that must be included in the reported policy of the company. Thus, the company's activity on ESG issues in the area of environmental protection is encouraged [8]. In addition, Ukrainian companies should adhere to International Financial Reporting Standards, the norms of which, in particular IAS 1 "Presentation of Financial Statements" [21], recommend the provision of additional information, for example, environmental reports for those business entities whose activities are significantly affected by environmental factors, and the staff is an important group of corporate reporting users. Ukrainian companies are recommended to implement other existing EU norms regarding sustainable development. The business practice of displaying the information on water use in ESG reports in open access also spreads in Ukraine.

According to national statistics, in 2017, 58.6 % of the total volume of water resources was used for industrial needs in Ukraine. Instead, in 2023, this figure was 62.1 %. In 2017, 17.1 % of total water resources were consumed for drinking water supply, sanitary, and hygienic purposes, and in 2023-21.1 %. 22.6 % of water volume was used for irrigation in 2017, and only 5.5 % in 2023 [22, 23].

Water management measures have to be performed in the legal ecological and economic fields. According to the EU Water Framework Directive water supply is recognized as a public interest service [24]. While complying with the requirement of social justice, the service provider does not seek to obtain a direct economic benefit. Therefore, services of general economic interest, which are basic, and those provided for a fee are distinguished. These services are governed by European internal market and competition rules. However, deviations from these rules may occur if there is a need to protect citizens' access to such services.

It is also necessary to consider the recommendations of environmental accounting [25], which corresponds to existing areas of water use by respondents in their economic activities. Recommendation implementers should assess the applicability and practicality of such recommendations, given their specific features, such as identified user needs, resources, priorities, and respondent burden. Making these recommendations the basis of data collection on water issues will be an important factor in their management, in particular, recognizing the need to improve basic data on water use and integrating these data with social, economic, and environmental aspects to form ESG-reporting.

***Positive results of evaluating the meaningful content of ESG reports.***

Table 1 shows the analysis of information on water use in terms of implementing the ESG strategy and its presentation in the corporate reporting of domestic corporations. The reports indicate the goal of the company's activity in the field of ESG and the degree of its achievement, in particular, in terms of water management, namely rational water use, ensuring effective use and reproduction of natural resources (surface and underground water), determining the impact on the environment, achieving the goals of the GRI 303 "Water and Wastewater" standard, responsible consumption of water, reducing water losses, improving programs and specifying the level of ambition, as well as adding new goals and measures. Also, the reports emphasize compliance with instructions, descriptions of rules, procedures, and regulations regarding implementing the sustainable development policy, state maximum increase in water reuse, reduction of water intake to a minimum, clarify the results of activities, and determine the measures to eliminate deficiencies.

1. Water use and display of information about it in ESG reports by Ukrainian companies

| **Name/main areas of activity/source** | **Report name and status** | **Purpose of reporting, degree of goal achievement** | **Quantitative results** | **Measures for the rational water use** | **Multifaceted factors** |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| Metinvest/ Metallurgy [14] | Report on sustainable development | Water resources; Sewage; Waste assigned to the highest level of priority | Reuse of 81 % of total water withdrawn from all sources, including previously recycled water. In 2020, the Group's enterprises reduced the total volume of water intake and discharge by 4 % and 3 %, respectively, compared to 2019. | – reduction of water consumption and waste generation;<br>– a set of measures to minimize the impact on water resources;<br>– improvement of operational efficiency and maintenance | Risks are classified as non-commercial and related to:<br>– lack of water;<br>– efficiency of consumed water and wastewater control;<br>– implementation of environmental projects,<br>– introduction of a closed cycle of water circulation |
| Kernel/ AIC (plant production) [9] | Annual reports on sustainable development activities | Impact on the environment; Water and wastewater (GRI 303); Achieving the general goal of rational water use | Compliance with current legislation; Prevention of water bodies pollution; Restoration of the internal sewage treatment system; Accounting for water use, reduction of water consumption for cooling; Compliance with limits on discharges into water bodies. | – areas of water use;<br>– prevention of water bodies pollution;<br>– land irrigation;<br>– environmental protection policy;<br>– the company's own environmental protection standards | Implementation of measures to overcome a plant water stress (irrigation) and preserving soil moisture; Implementation of sustainable farming systems; Considering the impact of the interaction of all water users in conditions of limited water resources on the effective use of irrigation systems (irrigation/water supply). |
| MXP/ AIC (animal production) [10] | Sustainable development, environmental protection | × | Compliance with the requirements of environmental protection legislation; Reduction of water losses in water use | × | Specialists responsible for environmental protection |
| Carlsberg Ukraine / Production of beer and soft drinks [15] | ESG program, ESG report | There is no water losses | × | × | Replenishment of water reserves in areas with high water risks |

Table 1 (ending)

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Ferrexpo / Mining industry [11] | Report on responsible conduct of business | Rational water use;<br>Restoration of biodiversity up to 98 %. | Responsible water use;<br>Reducing the negative impact on the environment;<br>Increasing water reuse;<br>Water quality control. | Use of rainwater from the quarry for production activities;<br>Reuse of water from the processing complex;<br>Effective use of water for specific purposes;<br>Reduction of water intake from open sources. | Considering water shortage risks |
| Nibulon/ AIC (plant production) [16] | Report, section “Environmental policy” | Protection, efficient use and reproduction of natural resources;<br>Ecological safety. | Use of phosphate-free detergents;<br>Application of purification technologies for household water and rainwater;<br>Protection of groundwater used for water supply. | × | Water protection from pollution;<br>Implementation of technologies with minimal impact on the environment. |
| Astarta/ AIC (sugar production) [12] | Report on sustainable development | Responsible water consumption | ***Abstracti***on of surface and underground water is performed in accordance with the established limits;<br>Starting from 2021, water intake and water withdrawal in the segments “Agriculture” and “Animal Production” have been separated;<br>Closed cycles of process water use have been introduced. | Water is used for crop irrigation;<br>Wastewater is discharged to treatment facilities;<br>The quality of treated wastewater is monitored. | Implementation of water-saving irrigation systems (drip irrigation);<br>Ensuring water recirculation in greenhouses;<br>Water buffering in lakes and aquifers;<br>Selection of crop rotations with lower water consumption;<br>Introduction of circular agriculture. |
| Corteva/ Production of seeds and plant protection products [13] | Management report | Promotion of effective water management | Оптимізація користування водними ресурсами в господарствах.<br>Ефективне використання води<br>Optimization of water use in farms;<br>Efficient water use. | All water intake points are equipped with water meters | × |

*Source: compiled by the authors*

In addition, the investigated reports provide data on water use in the technological processes of the companies' activities and state the stages of these processes, emphasizing the priority of the wastewater treatment stage. The reports show differentiated water-related measures in the regions of companies' activities as to water stress for plants (water shortage risk). The investigated reports of the companies declare the importance of implementing technologies associated with minimal negative impact on the environment and offer different approaches to water management.

In ESG reporting, domestic companies pay considerable attention to taking into account environmental risks; showing the closed cycle of water circulation; a set of measures to minimize the company's impact on water resources; changes in technological processes of wastewater treatment; preventing pollution of water bodies; reducing water consumption for cooling; technologies for purification household water and rainwater; minimizing water losses; maximum increase in water reuse; wastewater accumulation and water quality control; modern irrigation technologies; cultivation of crops with lower water demand.

A comprehensive ecological approach to environmental protection is one of the key areas of corporate social responsibility, which requires the development of programs for implementing the best available practices and technologies in labor, health, and environmental protection, including reducing water consumption and waste generation.

It is necessary to evaluate the attitude of the business owners and management toward the importance of sustainable development approaches reflected in defining environmental goals and implementing special measures, making and publishing ESG reports regularly to improve the quality of ESG reports. Regarding the measures to improve the efficiency of water use, business activities have to aim at the implementation of necessary techniques for accurate assessment of the impact on the efficiency of water use and its fair distribution, as well as its displaying in ESG -reports for information needs of various interested users.

**Problem areas of business corporate reporting regarding water management.** In reporting documents, it is appropriate to indicate the company's structural divisions responsible for the implementation of its strategies and responsibility for the proper use of natural resources, in particular, water resources. At the same time, actions related to the implementation of strategies have to be displayed in the official duties of the personnel. In corporate reporting, it is necessary to define the terms used and their content: responsible water use, philosophy of sustainable agriculture, effective water management, etc. It is expedient to specify in the corporate reporting the description and provide a quantitative assessment of the proposed measures and application technology: areas for water use optimization; implementation of information technologies for annual and operational planning of irrigation; implementation of farming monitoring systems (meteorological stations, ERS, control and measuring devices); implementation of precision farming systems, etc. [26, 27].

Also, to improve the quality of information in the ESG reporting of domestic companies, it is appropriate to display data related to the monetary assessment of the impact of production fixed assets on the pollution of water used by the company in its production cycle; monetary evaluation of the negative impact of water on the functional state of the basic means of production. In addition, given the impossibility of quantitative and monetary assessment of all important points regarding water use and management, it is advisable to display the following information in the form of a descriptive part: water intake control measures; implementing purification technologies for reservoirs used by companies for production purposes; measures performed by the company to clean water bodies, preserve fauna and microclimate in the areas of such water bodies, etc. [29].

***Consideration of the materiality factor in ESG reporting.*** When making ESG reporting, the company relies on the generally recognized postulates of providing reliable information about its activities, and an important characteristic of the provided data is the level of their materiality.

Materiality is the fundamental principle of preparing reporting on sustainable development [5], which provides the criterion of information sufficiency [27], necessary for a complete and unambiguous understanding by all stakeholders of the situation regarding the information provided in such reporting [2, 3, 5]. Information is recognized as material if it significantly influences the company, assessments, and the decisions of stakeholders and when it is useful for decision-making by all interested parties satisfying their information expectations. At the same time, the International Accounting Standards Board defines information as material if "… its omission, distortion or concealment may affect the decisions taken by the main users of general purpose financial statements…".

The regulatory acts consider the concept of "double materiality", which consists of both the company's financial impact on the environment, society, and other stakeholders and their impact on the situation in the company [3]. Also, an important term is "dynamic materiality", under which it is appropriate to understand information that may not be financially significant now but may become financially significant in the near, medium, and long term.

The new vision of materiality in ESG reporting is not the information that can predictably move the market, but rather information that provides a deep, long-term understanding of a company's risks, prospects, and drivers of success. Businesses should be aware that the attitude towards what is considered essential is changing [8]. Instead, investors need consistent, comparable, and useful information to realize ESG risks and opportunities to consider them in the decision-making process [20].

Based on the conducted expert assessment, it is possible to propose essential elements of water management by materiality degree, which corresponds to the principle of strategic orientation of ESG reporting [5], presented in Table 2.

***Algorithm for compiling ESG-reporting regarding water management by materiality degree.*** Reporting of Ukrainian companies on water management by the materiality factor involves the following actions:

– determining the purpose of activities and specific tasks to be achieved in the reporting period (reference is made to the program and environmental policy of the company); choosing a report format indicating compliance with ESG requirements and selection of metrics for data collection; ensuring compliance with a unified approach to water use and conservation; displaying the developed and used materiality criteria (materiality matrix), as well as the areas of responsibility of the respondent company and developing its standards for environmental protection;

– collecting, auditing, analyzing, and summarizing data on implementing programs

2. Elements of water management when considering materiality degree in ESG reporting

| Materiality degree | Components of water management by materiality degree |
|---|---|
| High | – indicating the goal of the company's activities in the field of ESG and reporting about the goal achievement;<br>– achieving the goals of the GRI 303 program "Water and Wastewater (GRI 303)";<br>– offering data that provide a comprehensive long-term realizing the risks, prospects, and drivers of the company's success regarding efficient water use;<br>– displaying the results of the optimization of water use;<br>– assessing potential benefits, cost of implementing measures for water efficient use, and potential losses in case of non-implementation;<br>– assessing the possibility of financial impact and absence of harm to other ESG goals;<br>– using available reserves, limitations, and diversification of the company's activities;<br>– achieving a high level of data integration;<br>– introducing measures aimed at preventing/eliminating damage caused to the environment by companies. |
| Average | – introducing advanced "green" technologies;<br>– availability of accredited laboratories;<br>– availability of internal environmental audit;<br>– keeping ecological water accounting [25];<br>– monitoring of water quality;<br>– assessing environmental impact (depending on the industry in which the company operates);<br>– assessing environmental protection measures, reducing the negative impact on the environment;<br>– rational water use;<br>– environmental pollution coefficient;<br>– making water reserves and funding for environmental protection measures;<br>– assessing military risks;<br>– displaying in reporting extraordinary events, including those that occurred regardless of the company's activity;<br>– risk insurance. |
| Low | – considering the interests of all water users, assessing the impact of their activities on water management;<br>– reducing water losses;<br>– stating the facts on fulfilling the obligations. |

*Source: compiled by the authors*

and environmental projects on environmental water accounting; coordinating the ESG report with other reportings of the company (financial, tax, statistical, etc.);

– considering approving and publishing ESG reporting; determining the company's rank in the ESG strategy implementation ratings, and considering ways to improve the company's reputation by adjusting materiality characteristics;

– searching for financing for implementing water management measures, since the economic corporate management plays a leading role; cost planning for data preparation and ESG reporting, as well as for environmental and social measures.

Thus, the information from ESG reports regarding efficient water use provides for determining the goal, stating compliance with the regulatory requirements of such practice, and displaying water use measures. The respondents of ESG reporting have to focus on compliance with the obligations of water users and responsibility for violations of water legislation [30].

**Conclusions.** For effective water management, it is necessary to introduce a set of rules in the regulations of the companies, according to which the companies' activities and reporting related to water use will meet the requirements for sustainable development accepted in the world, in particular, the requirements of the best practices of ESG reporting. The function of the materiality degree consists of a scientifically based rating of the components of water management performed by companies, establishing task priorities focusing not only on the future economic benefits but also on the responsibility of companies for rational water use in their economic activities, as well as increasing the number of responsible persons in the area of nature management and environmental protection.

**Areas for further research**. Further scientific research should provide for the development of an appropriate toolkit for the use of the terminological apparatus, in particular, considering the latest understanding of water management [25], methods of data formation, specification of the goal considering risks, improvement of methodological approaches for assessing a financial impact and identifying risks in ESG conditions, application of integrated water management by the basin principle, clarification of the companies' responsibility for violations of environmental regulations.

The article analyzes the reports of Ukrainian companies for 2019–2021, that is, before the COVID-19 pandemic started and during it. Analysis of such reports on business activities during the war and post-war recovery period in Ukraine will enable us to establish how businesses used water resources and achieved positive results by introducing broad reforms in rational water use.

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## РОЛЬ ESG-ЗВІТНОСТІ КОМПАНІЙ В УПРАВЛІННІ ВОДНИМИ РЕСУРСАМИ

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***Анотація*** *Раціональне використання водних ресурсів компаніями потребує впровадження стратегій та дотримання ними обраної політики в частині управління цими об'єктами: складання програм та планів; запровадження дій природоохоронного спрямування, відображення економічного ефекту та документального оформлення усіх трансакцій; мінімізація негативних впливів на навколишнє середовище; представлення позитивних та від'ємних наслідків використання природних ресурсів у форматі ESG-звітності (англ. – ESG reporting), у якій розкривається інформація про діяльність компаній у сфері взаємовпливу навколишнього середовища (**E**nvironmental aspects), соціальної відповідальності (**S**ocial responsibility) та корпоративного управління (corporate **G**overnance). На основі дослідження ESG-звітності восьми корпорацій з України щодо користування водними ресурсами визначено позитивні практики та вузькі місця при підготовці компаніями необхідних даних. Під час проведення цього аналізу враховано іноземний та вітчизняний досвід, а також законодавчі норми в частині екологічного обліку, зокрема використання водних ресурсів. Крім того, проаналізовано підходи до застосування рівня суттєвості у ESG-звітності. Результати дослідження дали змогу здійснити ранжування елементів управління водними ресурсами суб'єктів господарювання за рівнем суттєвості у ESG-звітності та запропонувати алгоритм складання такої звітності у частині управління водними ресурсами. У статті обґрунтовано необхідність забезпечення компаніями належною інформацією щодо використання водних ресурсів у ESG-звітності для задоволення інформаційних потреб усіх стейкхолдерів. Також окреслено напрями подальших наукових досліджень у сфері звітування щодо користування водними ресурсами різними суб'єктами господарювання.*

***Ключові слова:*** *ESG, ESG-звітність, сталий розвиток, суттєвість, управління водними ресурсами*