

Sustainable development, ESG and the “price” of health

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Abstract

In today's global community, there is an increasing focus on prioritizing the preservation of human health while addressing the challenges of transitioning to sustainable development and environmental protection. The significance of health is well emphasized in the UN Sustainable Development Goals. This article highlights the objectives and key indicators pertaining to Goals 3, 6, and 11. Within the context of health, the ESG (Environmental, Social, and Governance) approach is considered, emphasizing the integration of environmental (E) and social (S) aspects. It's important to recognize the close relationship between environmental and social aspects, including health, while acknowledging the role of governance (G) in ensuring this integration and interconnection. In the realm of economic theory and practice, underestimating or neglecting the factor of health in socio-economic decision-making processes is a classic problem of «market failures» and negative externalities that remain uninternalized. The authors propose five categories of indicators that establish a connection between population health and the condition and pollution of the environment: 1) levels of morbidity and mortality resulting from environmental pollution; 2) proxy indicators related to the impact on health; 3) economic assessment of the population's willingness to pay for environmental quality and disease prevention; 4) direct economic harm to public health caused by environmental pollution; 5) comprehensive indicators that quantify the relationship between the state and pollution of the environment and the health of the population in monetary terms. Particular emphasis is placed on a set of indicators that evaluate the direct economic harm to the health of the population. The total environmental damage to the health of the Russian population, primarily attributable to air and water pollution, can be estimated at 2.3-6.1% of the GDP.

Keywords

environmental pollution, public health, indicators of sustainable development, damage to health, ESG

JEL codes: I18, J17, Q51

Introduction

The concept of sustainable development has emerged as a guiding principle for humanity in the 21st century, and it has been embraced by all nations during recent UN conferences of great significance (UN 2012a, 2012b; UN 2015). Within this concept, there is a strong emphasis on the critical role of human health, recognizing its significance in both the social and environmental aspects of sustainability. Consequently, addressing the challenges of transitioning to sustainable development and combatting environmental pollution has become increasingly intertwined with the preservation of human health. Two decades ago, the primary concerns of environmental policy revolved around safeguarding the environment and its individual components, as well as conserving biodiversity and other related issues. However, there has been a shift towards placing greater importance on human health, necessitating its inclusion in socio-economic decision-making and national policy development.

The development of sustainability indicators has a strong theoretical and practical foundation. The impetus for creating a methodology for measuring sustainability was the adoption of the United Nations' «Millennium Development Goals» (2000–2015) and the «Sustainable Development Goals» (2016–2030) (UN 2015), which, as a result of consensus among all countries in the world, included indicators reflecting multi-component and integral assessments. Major international organizations, such as the UN, the World Bank, the OECD, and others, use systems of indices and indicators and provide information about them. In Russia, significant work has been done to adapt these indicators and integrate them into the system of statistical observation, government programs, strategies, and projects at the federal ministries and agencies, regions, and cities. Indicators adapted for Russia with regards to the Sustainable Development Goals (SDGs) are published by Rosstat (Rosstat 2022). The authors have substantiated and analyzed the systematization of sustainability indicators, criteria for their selection, prioritization, and grouping based on the field and level of application in a series of pioneering publications (Bobylev et al. 2015; UN Sustainable... 2016).

The significance of health is clearly evident in the UN Sustainable Development Goals (SDGs) established by the UN General Assembly in 2015 (UN 2015). Several SDGs are closely associated with the factor of health, with SDG 3 taking center stage. Furthermore, various aspects of health are addressed in other SDGs, particularly those related to evaluating the access of the population to clean water, sanitation services (SDG 6, «Clean Water and Sanitation»), living conditions in polluted urban areas (SDG 11, «Sustainable Cities and Communities»), and numerous other SDG targets and indicators. Below, you will find Table 1 detailing key indicators for these SDGs.

The article discusses health in the context of the connections within SDGs. (Sustainable Development Goals) and ESG (Environmental, Social, Governance) and between them. These two concepts are often mentioned together in the literature, with the differences between SDGs and ESG being discussed infrequently. However, these two concepts are distinct, primarily due to the amorphous nature of ESG, and it's possible for the indicators of SDGs and ESG to reflect opposing trends.

In recent years, the ESG approach has become perhaps the most common and trendy among current directions for sustainable development, particularly for businesses and large corporations, including those in Russia. For example, the Russian Institute of Directors and Sberbank conducted research on ESG issues in the practices of Russian businesses, covering 47 public companies listed on the Moscow Stock Exchange's first tier (Russian Institute... 2022). A significant portion of these companies has declared environmental goals, such as

reducing air pollution and greenhouse gas emissions, attracting ESG bonds and financing, incorporating non-financial factors into borrower assessments, and more. This integration of E and S, where environmental aspects are closely linked to social aspects, including health, is observed in several ESG directions. The governance factor (G) should take into account such integration and interconnection.

Corporate sustainability reports demonstrate the efforts of several companies, including Gazprom, Lukoil, Norilsk Nickel, Rosneft, Novatek, Severstal, and others (The Future Is Ours 2022; Lukoil. Financial results 2023; Maintaining Sustainability 2022; Responsible Energy 2022; Building the Future... 2022; Together for Sustainable ... 2022). There is a certain formalization of the ESG approach, with guidelines for sustainability reporting prepared by the Russian Union of Industrialists and Entrepreneurs (RSPP 2013), and recommendations on non-financial information disclosure for public joint-stock companies issued by the Central Bank of Russia (Bank of Russia 2021).

The gravity of the environmental challenge concerning the preservation of health in Russia was underscored by the President of the Russian Federation. It was noted that the economic damage resulting from environmental degradation in the country amounts to approximately 6% of GDP annually. When factoring in the consequences for the health of the population in polluted regions, this figure rises to 15% of GDP (State Council meeting... 2016).

Pollution and health: economic analysis of interaction

The economic assessment of the damage to public health resulting from environmental pollution is a crucial aspect that requires robust scientific justification. Such an assessment is essential for guiding economic decision-making processes and the development of policies aimed at reducing environmental pollution. Incorporating the human factor, particularly by evaluating the cost of preventing health harm caused by environmental pollution or estimating health-related damages, when comparing the benefits and costs of programs or projects, allows for the identification of potential inefficiencies and environmental unfriendliness.

In the world of research, the interaction between ecology and health within the framework of sustainable development and SDGs is receiving increasing attention. International organizations have played a significant role in this regard (UNDP 2020; World Bank 2016, 2017; OECD 2016). Among recent scientific studies, the work of Jeffrey Sachs and his colleagues on accounting for health priorities for sustainable development (Sachs and Sachs 2021) and the inclusion of the health factor in the integrated SDG index (Sachs et al. 2022) is noteworthy. Research by (Bak and Szczecinska 2022; Matheson 2020) conducts a constructive analysis of healthcare as an element of sustainable development and SDGs. G. Halkos and colleagues have made a positive attempt to use environmental indicators to assess the health factor within the SDGs (Halkos and Argyropoulou 2022). In domestic literature, the health factor within the context of sustainable development and SDGs has not received sufficient attention. More often, health assessments have been included in the broader category of environmental damage (Medvedeva et al. 2017; Mekush 2011; Ryumina 2009).

Currently, the incorporation of the health factor represents a classic challenge linked to «market failures» and negative externalities that are not internalized. Without accounting for this factor in pricing and various assessments, incorrect socio-economic decisions are made, leading to an increase in health issues. Examples of such challenges include the use of coal, which is the cheapest energy resource in many regions of Siberia and the Far East.

Transitioning to natural gas in these areas may seem expensive in purely economic terms. However, the economic losses resulting from illness and mortality due to coal pollution make natural gas a competitive and more sustainable alternative (Porfiriev 2019).

The motivation of many large corporations to embrace the ESG (Environmental, Social, Governance) approach is not solely driven by an attempt to improve their public image, especially in export-oriented activities. It's worth noting that ESG is more than just philanthropy, particularly in industries associated with environmental pollution. Corporations, often in a less overt manner, seek to internalize their own negative externalities and mitigate environmental damage, including accumulated damage, resulting from their operations. This is a characteristic feature of many leading corporations in sectors like metallurgy and energy. For instance, Norilsk Nickel is currently implementing social and environmental investment projects under «Sulphur Programme 2.0» (Sulphur programme 2023) aimed at mitigating the significant environmental and social harm caused by the corporation's long-term activities in the region.

Moreover, apart from externalities, the assessment of damage to public health from environmental pollution also encounters challenges related to information asymmetry and transaction costs. In this context, there is a unique complexity associated with their application, stemming from the fact that both the producers of pollution and the recipients often lack comprehensive information. Due to this information gap, producers may erroneously assume that their activities do not inflict significant environmental damage, and negative externalities are minimal. Simultaneously, high transaction costs are associated with the necessity of conducting intricate interdisciplinary research to assess the impact of pollution on health (World Bank 2016; Revich 2018). Consequently, in practice, these costs are often minimized or completely disregarded.

In today's context, assessing the economic consequences of the negative impact of a polluted environment on public health is of practical importance. Consequently, methods for obtaining such estimates are being developed and applied by the World Health Organization, the European Union, and the US Environmental Protection Agency. The World Bank, in particular, plays a significant role and places substantial emphasis on studying the relationship between environmental conditions, health, and the economy during the implementation of its projects. The issuance of the «Social and Environmental Principles of the World Bank» reflects the Bank's approach in these interrelated areas (World Bank 2017). In fact, the World Bank's approach aligns closely with the principles of ESG, reflecting a comprehensive commitment to sustainability and responsible corporate practices. Among the ten primary social and environmental standards of the World Bank, according to the authors, at least three can be highlighted:

- Assessment and Management of Social and Environmental Risks and Impacts
- Efficient Resource Use and Pollution Prevention
- Ensuring the Safety and Health of the Population

Indicator approach to assessing the consequences of pollution

Indicators of sustainable development can be valuable tools for reporting and forecasting in connection with ESG initiatives (UNCTAD 2021; BNP Paribas 2022). An indicator-based approach to ESG is essential for setting accurate goals in critical socio-environmental areas related to the environment and health, as well as for monitoring and controlling the achievement of these goals. This is particularly evident in the activities of Russian public companies, especially in the environmental component of ESG (Russian Institute... 2022).

Taking into consideration the previous developments by Bobylev et al. (2015), it is possible to expand and restructure the classification of indicator groups that establish connections between public health and the state of environmental pollution as follows:

- 1) levels of morbidity and mortality resulting from environmental pollution.
- 2) proxy indicators related to the impact on health.
- 3) economic assessment of willingness to pay for environmental quality and disease prevention.
- 4) direct economic damage to public health caused by environmental pollution.
- 5) comprehensive indicators linking the state and pollution of the environment with the health of the population in monetary terms.

Let's briefly focus on the available estimates of health damage arising from environmental pollution, with particular attention to the fourth group of indicators - direct economic damage, which will be discussed in the following paragraph.

The indicators within the first group, which connect morbidity and mortality levels with environmental pollution, largely rely on expert assessments due to the absence of a sufficient statistical and scientific foundation and comprehensive monitoring of pollution in many regions worldwide, including Russia. Nevertheless, the significance of the existing damage is evident. For instance, according to A. Popova, the head of Rospotrebnadzor, environmental pollution is associated with 15% to 35% of diseases in the country (TASS 2021). Within the context of environmental degradation, one of the most critical issues is the deterioration of ambient air quality. There is substantial evidence to support that air pollution significantly impacts health. According to the World Health Organization (WHO), over 4.2 million premature deaths occur worldwide each year due to air pollution, with 99% of the global population exposed to air that fails to meet safety standards (WHO 2023). WHO estimates suggest that premature mortality from air pollution in Russia could reach 77,500 people (Our World in Data 2023).

For the second group of proxy indicators utilized to assess the connection between environmental pollution and public health, we can refer to the Sustainable Development Goals (SDGs) adopted by the UN in 2015, which are applicable to all countries globally and adapted for Russia by Rosstat (UN 2015, Rosstat 2022). These indicators have been methodologically well-developed and possess comprehensive statistical coverage. In Table 1, the authors emphasize specific key proxy indicators within the SDGs that illuminate the impact of environmental pollution on health. In total, across the framework of seventeen SDGs, dozens of such indicators can be identified (Sachs et al. 2022; Halkos and Argyropoulou 2022; Matheson 2020).

Among the objectives included in individual SDGs, the following are noteworthy:

- SDG 3 («Good health and well-being»), target 3.9: «By 2030, substantially reduce the number of deaths and illnesses resulting from hazardous chemicals and air, water, and soil pollution and contamination.»
- SDG 6 («Clean water and sanitation»), target 6.1: «By 2030, achieve universal and equitable access to safe and affordable drinking water for all.»
- SDG 6 («Clean water and sanitation»), target 6.3: «By 2030, improve water quality by reducing pollution, eliminating dumping, and minimizing the release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and substantially increasing recycling and safe reuse globally.»
- SDG 11 («Sustainable cities and communities»), target 11.6: «By 2030, reduce the adverse per capita environmental impact of cities, including by giving special attention to air quality and municipal and other waste management.»

Table 1. Sustainable development goals and public health. Selected proxy indicators for Russia

SDGs	Indicators	2020 – 2021
<i>Proxy indicators related to health impact</i>		
SDG 3	Sanitary condition of atmospheric air, percentage of samples not meeting hygienic standards (as a percentage of the total number of samples tested)	City / village 0.82 / 0.54
SDG 3	Sanitary condition of the soil, percentage of samples not meeting hygienic standards (as a percentage of the total number of samples tested)	According to sanitary and chemical indicators / according to microbiological indicators 4.88 / 4.34
SDG 6	Share of the population provided with high-quality drinking water from centralized water supply systems	87.35
SDG 6	Share of standard treated wastewater (%)	18.7
SDG 11	Population living in unfavorable environmental conditions (in cities with high and very high levels of air pollution) (million people)	9.6

Source: compiled by the authors based on (UN 2015; Rosstat 2022).

The third group of indicators, which reflects the relationship between environmental pollution and public health, enables us to assess the population’s willingness to pay for environmental quality and disease prevention. This is primarily attributed to the increased value placed on human life in recent decades, prompting governments worldwide, with the support of their populations, to allocate economic resources to preserve life and health (Kalabikhina 2020). While this approach is well-established in economic theory, its practical application presents challenges, primarily due to the absence of a “market” for a hazardous or safe environment. Nevertheless, through human behavior, economic supply and demand mechanisms can influence the price of environmental services based on their condition and quality. This is most evident in the context of housing costs, considering the environmental factor. For instance, in areas with better environmental quality, housing prices tend to be higher compared to regions with polluted air, water, soil, or noise pollution. As an example, in Moscow, according to real estate agencies, all other factors being equal (such as access to social infrastructure and transportation), the price per square meter in the western and southwestern parts of the city can be 20-30% higher than in the eastern and southeastern areas, where the environmental conditions are worse. This illustrates that people are willing to incur additional expenses for a better living environment as a preventive measure against health deterioration caused by poor environmental conditions.

The “price” of pollution

In this paragraph, we will examine the indicators that establish a connection between the population’s health and the state of environmental pollution from the fourth and fifth groups of the aforementioned classification, along with their economic assessment.

The fourth group of indicators enables us to evaluate the direct economic harm to health resulting from environmental pollution. However, it's important to note that within modern economic science, a consensus has not yet been reached regarding the acquisition of accurate estimates of the impact of environmental pollution on public health (see, for example, (Medvedeva et al. 2017)).

Significantly, a substantial portion of the economic damage to health arises from air pollution, while the damage from water, waste, and soil pollution is comparatively less significant. This observation is supported by medical, epidemiological, and economic research worldwide. The increase in morbidity and premature mortality attributed to deteriorating air quality results in substantial economic losses. The World Bank estimates the economic cost of air pollution to be 5.1% of GDP in Europe and Central Asia, and 7.5% of GDP in East and South Asia (World Bank 2016). Furthermore, the World Bank assesses the health and welfare costs stemming from air pollution at \$5 trillion, with lost revenues reaching approximately \$225 billion (World Bank 2023a).

The fourth group of indicators can also encompass specific metrics related to individual pollutants, various economic standards, and specific damages. For instance, an evaluation of health damage in specific countries caused by emissions of suspended particulate matter PM2.5 can be cited as an example (refer to Table 2). Such an assessment is of fundamental importance since medical and epidemiological studies demonstrate that pollution with PM2.5 and PM10 has a substantial adverse impact on human health (World Bank 2016; Revich 2018). As evident from Table 2, India and China exhibit the highest levels of air pollution with PM2.5, where nearly the entire urban population resides in conditions exceeding WHO standards. This results in damages ranging from \$33–69 billion. In Russia, the level of such air pollution is considerably lower than in its Asian BRICS counterparts. Nonetheless, according to World Bank estimates, over 90% of Russia's urban population lives in conditions of elevated PM2.5 pollution, with damages exceeding \$2 billion.

Table 2. Damage to health from particulate matter emissions by country, in % of GNI, in billion dollars

Country	Ambient PM2.5 air pollution (micrograms per cubic meter)	PM2.5 air pollution, population exposed to levels exceeding WHO guideline value (% of total)	Local pollution damage (% of GNI)	Adjusted savings: particulate emission damage (billion dollars)
Norway	7.0	2.0	0.01	0.048
Germany	12.0	89.2	0.1	2.53
USA	7.4	3.3	0.1	14.97
Japan	11.7	76.8	0.1	4.03
Russia	16.2	91.6	0.1	2.12
India	90.9	100	1.3	33.09
China	52.7	100	0.5	69.31

Source: compiled and calculated by the authors based on World Development Indicators (World Bank 2023b).

Note: The economic damage from local pollution is calculated by multiplying the damage from local pollution (as a percentage of GNI) by the GNI value.

Significant damages and costs to public health resulting from environmental pollution, in several cases, demonstrate the rationale for integrating socio-environmental approaches for their utilization within the framework of implementing the ESG concept.

According to the authors' calculations, in Russia, the damage solely from atmospheric emissions falls within the range of 1.9-4.9% of GDP, equivalent to 2,123-5,415 billion rubles, depending on the type of pollutant (NO_x, SO₂, NH₃, PM_{2.5}, and PM₁₀) (Bobylev et al. 2022). These calculations were based on research data from the UK Department for the Environment, Food, and Rural Affairs (DEFRA 2019), considering indicators such as the value of a statistical life (VSL) and purchasing power parity for the ruble (PPP). The concept of "the value of a statistical life" was introduced by the 2005 Nobel laureate, Thomas Schelling, in his work "The life you save may be your own" (Schelling 1968). Researchers use revealed and stated preferences to determine the economic value of an average life, examining decisions people make to reduce risks to their lives, as well as conducting various sociological surveys.

A comprehensive assessment of health damage resulting from air and water pollution can also be proposed. According to medical estimates, the share of damage from water pollution in the total health damage due to environmental pollution can range from 20-25% (Ustochivoe razvitiye...2011). Therefore, considering the author's assessment mentioned above, the total environmental damage to the health of Russia's population can be estimated in the range of 2.3-6.1% of GDP.

Health-related costs stemming from environmental pollution in Russia vary significantly between regions. Calculations involving the authors, based on the European EcoSense model, indicate that health harm due to environmental factors can reach 8-10% of GRP (Gross Regional Product), particularly in the Ural regions and the Kemerovo region (Mekush 2011).

Among the integral indices reflecting the connection between health and environmental pollution (the fifth group), three can be distinguished, in the authors' opinion:

- World Bank Adjusted Net Savings Index: This index considers economic, social, and environmental aspects, including the economic damage caused by PM_{2.5} pollution, as shown in Table 2. The index is calculated internationally for all countries worldwide.
- UN Planetary Pressures-Adjusted Human Development Index: The classical Human Development Index previously indirectly incorporated the environmental factor through the life expectancy sub-index. Since 2020, the UN Statistics Department has explicitly introduced the environmental component (UNDP 2020). Thus, it can be said that the index now offers a more comprehensive reflection of the ESG concept.
- SDG Index (Sachs et al. 2022): The methodology and calculations for this index were proposed by renowned economist J. Sachs and colleagues. It aims to integrate all seventeen SDGs, with a significant focus on health and environmental goals.

Conclusions

In the field of economic theory and within the realm of socio-economic decision-making processes, the growing recognition of the necessity to account for and evaluate the repercussions of environmental pollution on public health is becoming increasingly evident. This recognition plays a pivotal role in facilitating the transition toward sustainable development. This imperative is articulated on a global and national scale, as underscored by the UN Sustainable Development Goals, with particular emphasis on SDG 3 (Good Health and Well-

being), 6 (Clean Water and Sanitation), and 11 (Sustainable Cities and Communities). The globally prevalent ESG (Environmental, Social, Governance) approach should effectively integrate both environmental and social dimensions of the impact of environmental pollution on health, which should be a priority for governments and businesses alike.

Within this context, five indicator approaches can be proposed to establish links between the health of the population and the state of environmental pollution. Among these approaches, the development of indicators that quantify the impact of pollution on health in monetary terms stands out. The direct economic damage to health resulting from environmental pollution can reach up to 6% of GDP, with even higher damage observed in regions characterized by adverse environmental conditions. A substantial portion of this harm to the population is attributed to air pollution caused by particulate matter PM_{2.5}, amounting to approximately 140 billion rubles in the case of Russia.

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