IMPLEMENTATION OF THE 'POLLUTER PAYS' PRINCIPLE IN KAZAKHSTAN'S STATE ENVIRONMENTAL REGULATION

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Abstract. Protection of atmospheric air from pollution remains a critical issue for public administration in Kazakhstan, as evidenced by the deteriorating environmental conditions in several major cities. Atmospheric air pollution results in adverse health effects, diminishes the quality of life for the population, and disrupts ecosystem stability. This study aims to assess the effectiveness of the “Polluter Pays” Principle in the legal regulation of environmental relations. To achieve this objective, authors employed a mixed-method research approach. This involved the analysis of secondary data on atmospheric air quality and a comprehensive examination of regulations pertaining to the implementation of the legal principle under consideration. The findings indicated that, despite some positive trends in atmospheric air quality from 2017 to 2022, emissions of certain pollutants, including arsenic, copper, and hydrocarbons, saw significant increases. Concurrently, Kazakhstan remains in the international rankings as one of the countries where permissible pollution standards are exceeded by 3 to 5 times. The analysis of the legislative framework supporting the “Polluter Pays” Principle revealed several weaknesses and legislative gaps that hinder the achievement of the strategic goal of reducing harmful atmospheric emissions.
Keywords: ecology, air pollution, principle, polluter pays, environmental regulation, emissions, Kazakhstan

Аңдатпа. Атмосфералық ауаны ластанудан қорғау Қазақстандағы мемлекеттік басқарудың өзекті мәселелері болып қала береді, бұған елдің бірқатар ірі қалаларындағы экологиялық жағдайдың нашарлауы дәлел. Атмосфералық ауаның ластануы адам денсаулығына теріс әсер етеді, халықтың өмір сүру сапасын төмендетеді, экожүйенің тұрақтылығын бұзады. Бұл зерттеудің мақсаты "ластаушы төлейді"экологиялық қатынастарды құқықтық реттеу принципінің тиімділігін бағалау болып табылады. Осы мақсатқа жету үшін аралас зерттеу әдісі қолданылды. Атмосфералық ауа сапасының жай-күйі бойынша қайталама деректерге талдау, сондай-ақ жоғарыда аталған құқықтық реттеу қағидатын іске асыруға байланысты нормативтік-құқықтық актілерге талдау жүргізілді. Нәтижелер 2017-2022 жылдардағы атмосфералық ауа жағдайының оң динамикасына қарамастан, мышьяк, мыс, көмірсутектер сияқты жекелеген ластаушы заттардың шығарындылары айтарлықтай өскенін көрсетті. Бұл ретте, атмосфералық ауаның сапасы бойынша халықаралық рейтингте Қазақстан ластану бойынша рұқсат етілген нормативтерден 3-5 есе асатын елдер арасында өз орнын сақтайды. "Ластаушы төлейді" қағидатын енгізу бойынша заңнамалық базаны талдау атмосфераға зиянды шығарындыларды азайту жөніндегі стратегиялық мақсатқа қол жеткізуге кедергі келтіретін бірқатар әлсіздіктер мен заңнамалық олқылықтарды ашты.
Түйін сөздер: экология, ауаның ластануы, принципі, ластаушы төлейді, Экологиялық реттеу, шығарындылар, Қазақстан

Аннотация. Защита атмосферного воздуха от загрязнения продолжает оставаться актуальным вопросом государственного управления в Казахстане, о чем свидетельствует ухудшающаяся экологическая обстановка в

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ряде крупных городов страны. Загрязнение атмосферного воздуха приводит к негативным последствиям для здоровья человека, снижает качество жизни населения, нарушает устойчивость экосистемы. Целью данного исследования является оценка эффективности принципа правового регулирования экологических отношений «загрязнитель платит». Для достижения данной цели, был применен смешанный метод исследования. Проведен анализ вторичных данных по состоянию качества атмосферного воздуха, а также анализ нормативно-правовых актов, связанных с реализацией вышеуказанного принципа правового регулирования. Результаты показали, что несмотря положительную динамику состояния атмосферного воздуха за 2017-2022 годы, значительно возросли выбросы отдельных загрязняющих веществ, таких как мышьяк, медь, углеводороды. При этом, в международном рейтинге по качеству атмосферного воздуха Казахстан сохраняет позицию среди стран с превышением допустимых нормативов по загрязнению в 3-5 раза. Анализ законодательной базы по внедрению принципа «загрязнитель платит» раскрыл ряд слабостей и законодательных пробелов, препятствующих достижению стратегической цели – снижения вредных выбросов в атмосферу.
Ключевые слова: экология, загрязнение воздуха, принцип, загрязнитель платит, экологическое регулирование, выбросы, Казахстан.

Introduction

The issue of air quality has gained particular relevance over the past decade, as evidenced by the United Nations (UN) 2030 Agenda for Sustainable Development. Within the framework of Goal 11, “Sustainable cities and communities,” one of the indicators is “reducing the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management, by 2030” [1]. According to some estimates, problems caused by air pollution result in up to 7 million deaths annually [2]. Air pollution levels in Asia far exceed acceptable levels for human health. The situation is slightly better in Europe, where a large part of the population is also exposed to air pollution concentrations that significantly exceed the parameters recommended by the World Health Organization (WHO) [3].

In general, poor air quality significantly reduces the quality of life, especially in large metropolitan areas where most of the world's population is concentrated. Moreover, polluted air is the main trigger of global warming, which has much more serious consequences for all humanity [4].

In Kazakhstan, the air quality situation continues to be alarming and requires immediate action. This is especially true for industrial regions and centers of labor resource attraction. Among the regions with the most polluted air are the cities of Astana, Karaganda, and Zhezkazgan. Morbidity indicators associated with poor air quality in these regions also show negative dynamics (Beisenova et al., 2023) [5]. Other risk regions include the oil and gas producing areas of Kazakhstan. Analyzing the medical indicators of the population and qualitative and quantitative air parameters in one of the villages in the Aktobe region, Aitmaganbet et al. (2020) identified correlations. In particular, a relationship has been established between certain air pollutants and diseases among the population [6]. Additionally, the cities of Almaty and Shymkent suffer from air pollution due to high industrial and transport loads. Examining data for the regions of Kazakhstan from 1990 to 2022, Kanat et al. (2024) found that energy consumption and air quality were inversely related to long-term life expectancy [7].

Thus, the relevance of ensuring adequate air quality in Kazakhstan is beyond doubt. The health of the nation, the country’s main strategic resource, as well as the prosperity and well-being of Kazakhstani citizens, depend on this.

Today, the government of Kazakhstan is taking measures to improve the mechanisms of state environmental management. One of the recent initiatives designed to improve air quality and reduce atmospheric emissions is the “polluter pays” principle of legal regulation of environmental relations. The Polluter Pays Principle (PPP) is an economic and environmental principle that states that the costs of preventing, managing, and eliminating environmental pollution should be borne by those who cause it. The principle also covers other environments susceptible to pollution (soil, water). PPP is fundamental in the environmental policies and legislation of many countries and international organizations. In theory, it means that the agent causing the pollution must compensate all other agents who suffer from such pollution [8].

In practice, things are not so straightforward, and it is often difficult to determine who the polluter and the affected party are. Organization for Economic Co-operation and Development (OECD) countries use PPP in many of its forms. Some developing countries also use it, although more as a government responsibility rather than a polluter's responsibility [9]. Aspects

such as the economic responsibility of the polluter and incentives to reduce pollution can characterize the application of PPP. In addition, society does not bear the financial burden in the form of taxes for damage caused to the environment by the polluter. In practice, the implementation of PPP is carried out through the development and implementation of environmental taxes, fees, fines, emission quotas, and other economic instruments for state environmental management. However, the introduction of regulatory instruments does not guarantee their effectiveness.

Thus, in environmental law, where regulatory impact assessment and PPP coexist, contradictions may arise. These contradictions (system errors) are due to preliminary restrictions on possible participants, opportunistic behavior, management problems, and a number of other multiple factors (Schmidtchen et al., 2021) [10].

Since 2018, the Government of Kazakhstan has been implementing the Polluter Pays Principle (PPP) initiative as part of an agreement with the United Nations (UN) under the project “Reforming the Environmental Payment System: Analysis of Compliance with the Polluter Pays Principle in Kazakhstan” for 2018-2019 [11]. The principles of PPP have been considered when amending the Environmental Code. Currently, the Environmental Code is the primary legislative act regulating environmental issues in Kazakhstan. It includes provisions that obligate enterprises and organizations to comply with environmental standards and bear responsibility for pollution.

The purpose of this study is to assess the effectiveness of the legislative regulation of the PPP principle in Kazakhstan. Such an analysis of effectiveness concerning this subject has not been previously conducted. Assanov et al. (2021), examining emission limit data from power plant and smelter permits, concluded that the current emission permitting system had not reduced emissions as of 2019. The authors attribute this to loopholes in the legislation, and a lack of monitoring and enforcement [12]. Chursina (2023), considering individual cases of compensation for environmental damage within the framework of PPP, points to the strengthening of the procedure for recognizing the presence of excess emissions into the environment in connection with the adoption of new environmental legislation [13].

This article aims to contribute to the study of this issue. The authors analyze the effectiveness of the measures taken in terms of their impact on air quality and analyze legislative gaps.

Materials and methods

This article employs a mixed research method using an exploratory sequential design, based on the classification by Creswell and Plano Clark (2011) [14].

At the first stage, the authors use secondary data to study the dynamics of the environment. The AirVisual information platform, managed by a Swiss company specializing in air quality technology, provided air quality data for Kazakhstan from 2017 to 2023. IQAir's air quality information platform leverages artificial intelligence (AI) to calibrate and validate data from numerous governmental and non-governmental air quality monitoring stations.

Additionally, official statistical data for 2017-2022 on the indicator “Pollutant emissions” were obtained from the website of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan [15]. This indicator is compiled following the approved methodology for forming environmental statistics indicators [16].

In the second stage, a regulatory analysis was conducted to contextualize the results obtained from the quantitative data. The information and legal system of regulatory legal acts of the Republic of Kazakhstan, “Adilet,” served as the source of qualitative data.

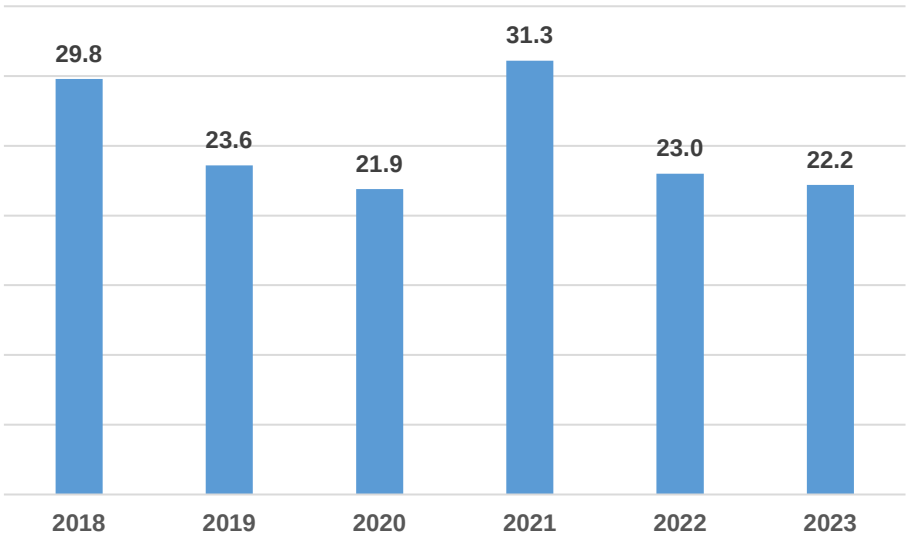
Results

Air Pollution in the Republic of Kazakhstan

IQAir annually surveys 134 countries and territories, rating them on a scale from 0 to 100 based on air pollution levels, with 0 indicating no pollution and 100 indicating maximum pollution. The highest rankings are occupied by the most polluted countries, while the least polluted, environmentally friendly countries are ranked lower on the list.

In the 2023 survey, Kazakhstan was ranked 40th, where 1st place represents the highest level of pollution and the last place indicates the lowest. Figure 1 illustrates the dynamics of air pollution levels in Kazakhstan from 2017 to 2023.

Figure 1. Trends in Air Pollution Levels in Kazakhstan (2017-2023)



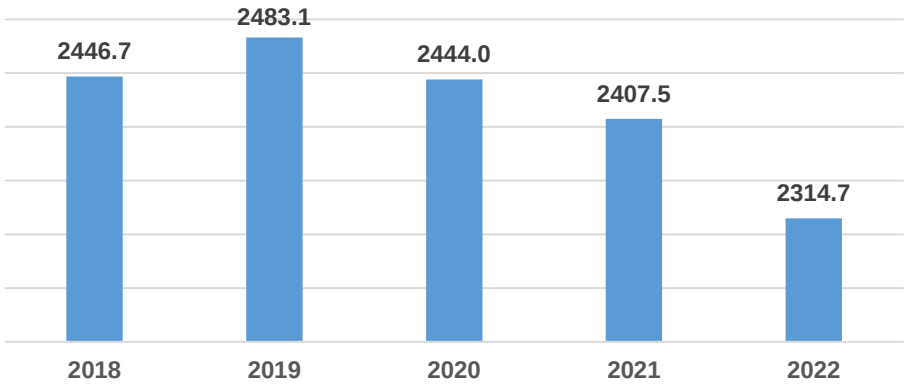
Source: https://www.iqair.com/ru/world-most-polluted-countries

As can be seen from Figure 1, the dynamics of air pollution levels in Kazakhstan over the period under review are not stable. The decline to 21.9 can be attributed to the COVID-19 period, after which the situation worsened again in 2021, reaching a record level of 31.1. According to the IQAir classification, this level of pollution corresponds to exceeding permissible standards by 3-5 times. This group includes 38 countries (ranked from 33 to 70), primarily developing nations in Europe, Asia, Africa, South America, and the Middle East. Countries with air quality closest to Kazakhstan include Malaysia, Mongolia, Montenegro, and Madagascar.

The main indicators of atmospheric air quality reported by the Bureau of National Statistics of the Republic of Kazakhstan include emissions of pollutants into the air, air quality in cities, and consumption of ozone-depleting substances. The total volume of pollutant emissions into the atmosphere is calculated as the sum of emissions from both stationary and mobile sources, based on primary reports from enterprises.

Figure 2 shows the dynamics of pollutant emissions into the atmospheric air in the Republic of Kazakhstan.

Figure 2. Pollutant Emissions into the Atmosphere in the Republic of Kazakhstan (thousand tons)



Source: https://stat.gov.kz/ru/industries/environment/stat-eco/

Overall, Figure 2 illustrates a gradual reduction in emissions starting from 2019. However, the emission levels during this period are comparable to those of 2009-2010, when annual emissions amounted to approximately 2200-2300 thousand tons. Regionally, the highest volumes of atmospheric pollutants in the Republic of Kazakhstan were recorded in the Pavlodar and Karaganda regions (Table 1).

Table 1. Pollutant Emissions from Stationary Sources into the Atmosphere (thousand tons)

	2017	2018	2019	2020	2021	2022
Kazakhstan	**2 357.8**	**2 446.7**	**2 483.1**	**2 441.0**	**2 407.5**	**2 314.8**
Pavlodar	609.8	709.3	721.5	723.0	736.1	724.2
Karaganda	598.7	587.5	641.3	627.7	569.7	469.0
Aktobe	169.5	158.1	136.6	135.1	137.4	136.5
Atyrau	177.0	172.3	164.5	153.9	160.3	132.1
Kostanay	114.8	124.0	130.5	123.4	137.9	121.4
Ulytau						105.0
East Kazakhstan	129.3	130.7	128.8	127.2	128.1	83.3
Mangystau	62.6	65.5	64.5	72.5	75.2	78.7
Akmola	86.9	84.5	76.7	77.2	77.3	69.5
Astana	59.2	56.4	65.1	62.4	62.2	57.7
Zhambylskaya	51.9	52.1	55.8	55.0	55.8	52.9
North Kazakhstan	76.4	75.5	74.7	76.0	61.2	52.7
Almaty	41.1	43.0	46.1	44.5	40.8	41.5
Abai						39.0
Shymkent		33.4	29.8	29.6	33.2	35.0
Almaty	43.4	50.2	48.1	46.3	47.9	28.8
West Kazakhstan	41.5	48.2	41.2	30.8	26.0	25.8
Turkestan		30.0	33.5	28.1	29.0	25.2
Kyzylorda	27.5	26.0	24.4	28.3	29.2	23.4
Zhetisu						13.1
South Kazakhstan	68.2					

Source: https://stat.gov.kz/ru/industries/environment/stat-eco/

Between 2017 and 2022, emissions from stationary installations into the atmospheric air saw significant increases in arsenic (6.8 times), copper (3.1 times), hydrocarbons (3 times), and non-methane volatile organic compounds (NMVOCs) (1.8 times). Conversely, emissions of cadmium decreased by 5 times, while benzo pyrene decreased by 2 times. Additionally, there were notable reductions in dichloroethane emissions (by 36.4%) and naphthalene emissions (by 32.7%) (Table 2).

Table 2. Dynamics of Emissions of Specific Pollutants into the Atmospheric Air in the Republic of Kazakhstan from Stationary Installations, 2017-2022

Types of chemical compounds	%, 2022 / 2017
Arsenic	677.4
Copper	312.1
Hydrocarbons (CH)	296.5
Non-methane volatile organic compounds (NMVOCs)	179.8
Naphthalene	67.3
Dichloroethane	63.6
Benz(a)pyrene	48.6
Cadmium	21.5

Source: https://stat.gov.kz/ru/ecologic-indicators/28426/air_pollutant_emissions/

The industrial sector accounts for the majority of pollution, constituting 88.6% of the total emissions. Within this sector, nearly 40% of emissions originate from enterprises engaged in electricity, heat, steam, and water production and distribution, while over 30% stem from manufacturing industries. Contributions from other sectors of the economy to the overall pollution volume are minimal, collectively amounting to less than 5% [17].

Regulatory Framework of the Republic of Kazakhstan in the Implementation of the PPP

As part of the agreement signed in 2018 between the Government of the Republic of Kazakhstan and the OECD on the implementation of the project “Reforming the Environmental Payment System: Analysis of Compliance with the ‘Polluter Pays’ Principle in Kazakhstan” for 2018-2019, a goal was set to improve the economic mechanism of environmental management by reforming the system of environmental payments. The project involves both Kazakhstani and international parties. On behalf of Kazakhstan, the Ministry of Energy acted as the coordinator, with the Ministries of Finance and National Economy and the National Board of Entrepreneurs “Atameken” as interested parties. One of the project's outcomes was the development of a roadmap for introducing legislative changes and additions based on the results of an analytical report [11].

Between 2019 and 2021, the Government of the Republic of Kazakhstan introduced several changes and additions to the legislation regulating environmental issues [18]. Some of these changes and additions pertain specifically to the implementation of the “polluter pays” principle, particularly regulatory instruments concerning air emissions (Table 3).

Table 3. Amendments and Additions to the Environmental Legislation of the Republic of Kazakhstan

Regulatory legal act	Amendments / Additions
Environmental Code, Article 5	The conceptual framework of the “polluter pays” principle was introduced. According to this definition, any individual or entity that has caused or is capable of causing environmental damage in any form is responsible for bearing all costs associated with preventing, controlling, and mitigating these consequences.
Environmental Code, Article 136	The responsibility of the polluter to remediate the components of the natural environment that have caused environmental damage has been established.
Environmental Code, Article 339	The responsibility of the polluter is established for the management of waste before it is transferred into the possession of the person responsible for disposal.
Tax code, Articles 573-579	The categories of payers, payment rates, and the procedure for calculating and paying for negative impacts on the environment have been determined.

Note: compiled by authors based on [20] and [21]

All amendments regarding the “polluter pays” principle were incorporated into the new Environmental Code adopted in 2021 [19]. Additionally, the current Tax Code of 2021 includes adjustments to the section on payments for negative environmental impact, effective from January 1, 2022 [20].

Discussion and Conclusion

An analysis of atmospheric air quality and harmful substance emissions in the Republic of Kazakhstan over the past five years reveals no significant improvements. While emissions of certain pollutants do not critically exceed permissible standards, the overall dynamics remain concerning. Regulatory Framework and Key Issues in Environmental Policy. A review of the regulations underpinning PPP in environmental regulation highlights several key issues.

1. Terminology Issues

In global practice, a primary challenge in implementing PPP is accurately defining the polluter, the nature of pollution, and the extent of financial liability for the polluter. Bleeker (2009) identified difficulties in both defining the polluter and ensuring the proportionality of punishment for environmental damage through judicial interpretation of the "polluter pays" principle in EU countries [22]. Similarly, Yang et al. (2015) stressed the importance of clearly identifying pollutants and ensuring that polluters bear the full costs of pollution control [24].

In the Environmental Code of the Republic of Kazakhstan, the "polluter pays" principle is introduced, but a polluter is defined not as an entity causing pollution, but as a “substance or group of substances harmful to the environment, life, or human health due to their properties and as a result of their introduction into the environment.” These substances are listed for reporting by industry under rules for maintaining a register of releases and transfers of pollutants [19]. This definition creates ambiguity regarding the entities responsible for compensating environmental damage. Ambec and Ehlers (2016) argue that agents can be polluters, victims of pollution, or both, complicating the quantitative assessment of emission impacts for all stakeholders [20]. Without a clear definition of stakeholders, achieving fair and adequate compensation for environmental damage remains challenging.

2. Compensation for Negative Impacts

Conceptually, emissions taxes should reflect the true cost of environmental damage, known as a Pigouvian tax, as noted by Khan (2015) [9]. However, accurately assessing environmental damages, particularly from greenhouse gas emissions, is complex. Consequently, many countries adopt a pragmatic approach, setting tax rates designed to influence taxpayer behavior as an economic incentive rather than precisely reflecting damage costs [9].

This analysis highlights the necessity for more precise regulatory definitions and effective economic instruments to address air quality issues and ensure fair compensation for environmental damages in Kazakhstan.

Considering the changes and additions made to the tax legislation of the Republic of Kazakhstan in connection with the implementation of PPP, it becomes evident that only a nominal adjustment of the wording occurred. Paragraph 4 of the Tax Code, "Payment for negative impact on the environment," has not undergone substantial changes in terms of tax payment rates. Until 2021, these rates were referred to as "environmental emissions charges." The economic component of PPP does not serve as a sufficient and effective incentive to reduce the negative impact on the environment because the payment amounts are not commensurate with the potential costs for enterprises undertaking environmental activities. Additionally, these payments are inadequate to finance the necessary scale of environmental activities, particularly regarding air pollution. In practice, payments for negative environmental impact legitimize the activities of polluting companies without encouraging them to adopt more environmentally friendly technologies. Zhang (2021) notes that obstacles to implementing the polluter pays principle in developing countries include low standards for collecting environmental taxes, which are insufficient to compensate for the economic and environmental losses caused by pollutants emitted by fossil energy sources, and fail to raise the relative benefits of clean energy [23].

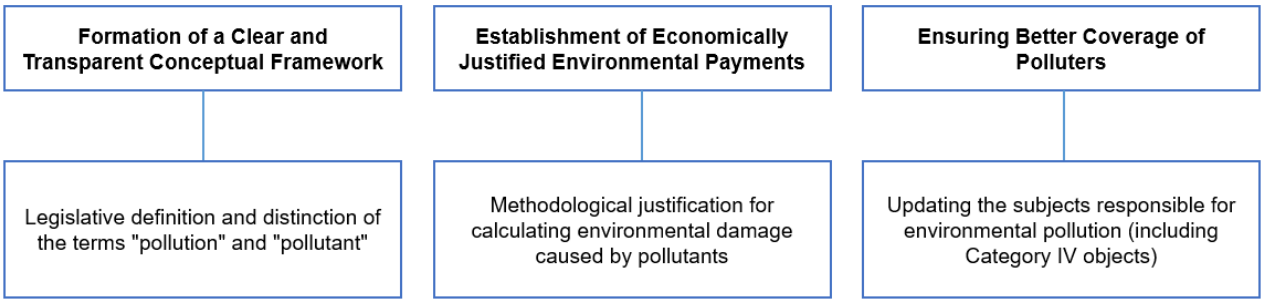
This analysis highlights the necessity for more precise regulatory definitions and effective economic instruments to address air quality issues and ensure fair compensation for environmental damages in Kazakhstan.

3. Fairness principles

Current standards include operators of facilities of categories I, II, and III, as defined in the Environmental Code of the Republic of Kazakhstan [21]. Facilities categorized as IV, which have minimal negative environmental impact, are excluded from the list of entities required to make payments for negative environmental impacts [19]. The criteria for classifying an object into category IV, as outlined in the Instructions for determining the category of an object that has a negative impact on the environment, include the scope of activity, limits on emissions, and noise levels [25]. While this exception reduces the tax burden on businesses with minimal environmental impact, it may violate the principle of fair distribution of responsibility for environmental damage. Moulin (1990) argues that the presence of other pollutants creates a negative group externality, meaning that the cumulative impact of minimally impactful pollutants can be significant at a regional or national level [26].

Taken together, research shows that the polluter pays principle, when effectively implemented and supported by other measures, can positively affect air quality. Carratù et al. (2019) highlighted the potential trade-off between public finances and air quality, with fiscal consolidation policies potentially limiting the positive impact of fiscal policy on pollution [27]. Cook (2002) noted a shift in air pollution control policies toward greater support for market-based regulatory instruments [28]. Therefore, to significantly improve air quality, more effective legislative measures aligned with OECD principles are needed.

Figure 3. Proposals for improving environmental regulation



First, it is essential to establish a clear and transparent conceptual framework for 'pollution' and 'polluter.' Second, the rates of environmental charges for pollution must be methodologically justified. Third, the categories of subjects responsible for environmental pollution, including Category IV objects, need to be reconsidered. Implementing these improvements in environmental regulation is a complex task and should be carried out step by step, with detailed consideration and input from all stakeholders involved in the process.

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ҚАЗАҚСТАНДА "ЛАСТАУШЫ ТӨЛЕЙДІ" МЕМЛЕКЕТТІК ЭКОЛОГИЯЛЫҚ РЕТТЕУ ҚАҒИДАТЫН ІСКЕ АСЫРУ

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