

Economic mechanisms of environmental protection

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Abstract. This article explores the various economic mechanisms that can be implemented for environmental protection. The sustainable development of any country depends on preserving natural systems and maintaining the appropriate quality of the environment. The article discusses the history of economic thought and its impact on environmental problems, as well as the development of new concepts of sustainable development. The economic mechanisms discussed include environmental taxes, emissions trading, subsidies, environmental fees, and others. Additionally, the article explores the importance of environmental audits and impact assessments in ensuring the effectiveness of economic mechanisms in protecting the environment.

1 Introduction

At the intersection of environmental sustainability and economic growth lies a complex and often contentious terrain that demands careful navigation. While it is clear that the health of our planet is paramount, finding a balance between the needs of the environment and those of the economy has proven to be a challenging task. In recent years, however, a growing body of research has shed light on the ways in which economic mechanisms can be harnessed to drive environmentally sustainable outcomes.

The field of environmental economics seeks to understand the intersection of the economy and the environment, and to identify policy solutions that promote sustainable development. From carbon taxes to cap-and-trade systems, there are a range of economic mechanisms that have been proposed to incentivize environmentally-friendly behavior and mitigate the negative impacts of economic growth on the planet.

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The preservation of natural systems and the maintenance of an appropriate quality of the environment are essential for the sustainable development, national security, high standard of living, and public health of any country in the world. Achieving these goals requires the formation and consistent implementation of a unified state policy focused on the protection of the environment and the rational use of natural resources [1-5].

Despite the urgent need for environmental protection, traditional economic thought has largely overlooked the environmental constraints of economic development. It was not until the seventies of the last century, with the acute aggravation of environmental problems, that economic science began to grapple with the prevailing trends of ecological and economic development and the need for fundamentally new concepts of development.

In response to the global catastrophe of current economic development, the exhaustion of natural resources, and the interdependence of all ecological and economic processes on earth, concepts of world development were created. In the mid-eighties of the twentieth century, the need for economic methods of environmental management was recognized in Russia, and regulatory and methodological documents on the introduction of fees for environmental pollution began to be developed.

The economic mechanism (EM) plays a crucial role in regulating relations in the "man-nature" system, reflecting the relationship between human interests and environmental goals within the economic mechanism. Economic regulation in the field of environmental management aims to form an economic interest in compliance with environmental legislation [2, 6].

EM in the field of environmental protection is a complex and heterogeneous concept that includes various forms such as taxes, payments, subsidies, financial and credit measures, and administrative forms like environmental audit, accounting, rationing, licensing, etc., and a system of targeted reservation and funds for waste disposal. Ensuring unity and consistency in the process of both management and functioning of the entire mechanism is a significant challenge.

The economic mechanism of environmental protection, according to the Law of the Russian Federation "On Environmental Protection," includes ensuring planning and financing of environmental protection measures, legal regulation of payments for the use of natural resources, emissions and discharges of pollutants into the environment, waste disposal, and other harmful effects. It also provides tax, credit, and other benefits to environmental management entities to more effectively protect the environment.

Thus, the economic mechanism of environmental protection aims to solve several critical tasks, including planning and financing of environmental protection measures, legal regulation of payments, and the provision of benefits to environmental management entities, to effectively protect the environment and promote sustainable development [2].

2 Economic mechanisms

The economic mechanism of environmental protection sets itself the solution of the following tasks [3, 7-10]:

- planning and financing of environmental protection activities;
- setting limits, payment standards and amounts of payments for the use of natural resources, emissions and discharges of harmful substances into the environment and waste disposal, and other types of negative impacts;
- provision of tax, credit and other benefits to nature users when they introduce low-waste and resource-saving technologies and unconventional types of energy, implementation of other effective measures to protect the environment;
- compensation in accordance with the established procedure for damage caused to the environment and human health.

Thus, the established tasks of both economic and social development should be solved taking into account its sustainability, compliance with the environmental imperative in all countries of the world [4, 11].

In the course of economic activity of any state, there is a constant impact on nature, people, various objects, etc. The appearance of externalities (external effects) is connected with this effect. But, unfortunately, in relation to the natural environment, the impact on it is mostly associated with negative external effects, such as waste, pollution of the biosphere, destruction of landscapes and so on.

In general, the economic mechanism of environmental protection currently represents a coherent system with worked-out "blocks-nodes", Figure 1.

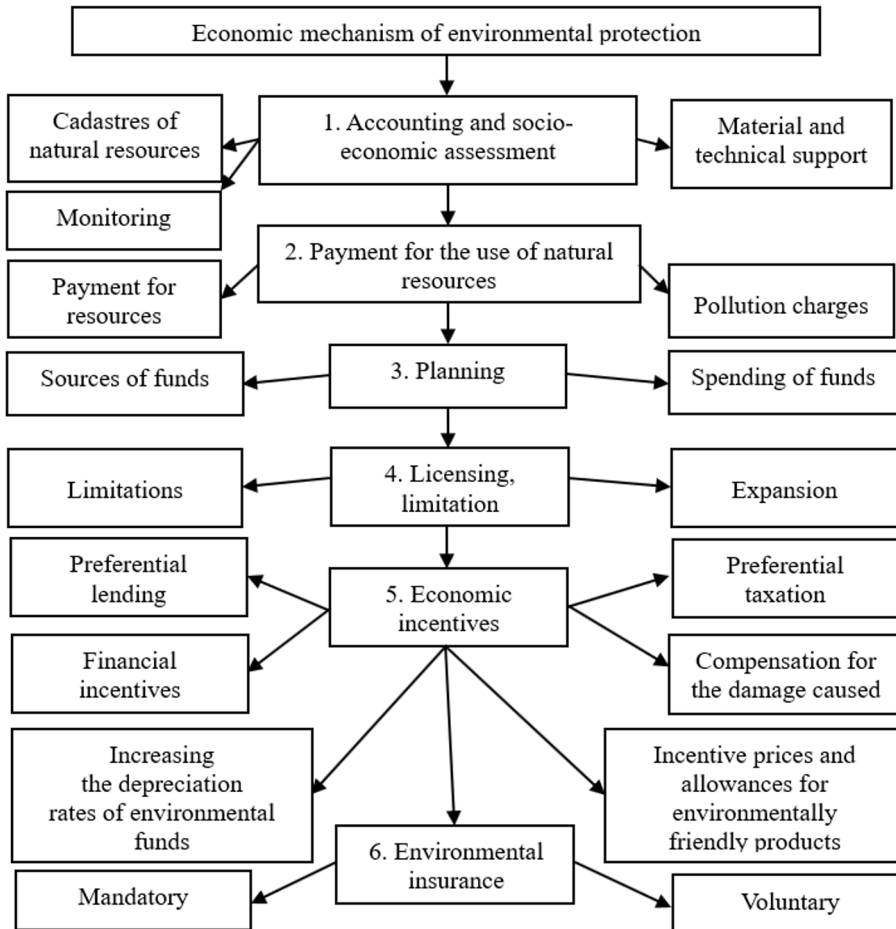


Fig 1. Components of the economic mechanism for regulating environmental protection measures

Let's move on to the description of economic mechanisms for environmental protection. Table 1 presents the main mechanisms with a description of their actions.

Table 1. The main economic mechanisms for environmental protection

Economic Mechanism	Description
Environmental taxes	Taxes imposed on companies that pollute the environment to incentivize them to reduce emissions and promote cleaner production.

Emissions trading	A market-based system where companies can buy and sell permits for the right to emit pollutants. This creates a financial incentive for companies to reduce emissions as those who emit less can sell their unused permits to those who need them.
Subsidies	Financial incentives provided to companies or individuals that engage in environmentally friendly practices or use eco-friendly technologies.
Environmental fees	Fees charged to companies for using natural resources or producing waste. This incentivizes companies to reduce resource use and waste generation.
Deposit-refund systems	A system where consumers pay a deposit on a product and receive a refund when they return the product for recycling. This incentivizes consumers to recycle and promotes the circular economy.
Green bonds	Bonds issued to finance environmentally sustainable projects such as renewable energy or green infrastructure.
Tradable permits	Similar to emissions trading, tradable permits are used to control pollution. However, instead of purchasing the right to emit a certain amount of pollution, companies purchase the right to extract a certain amount of natural resources.
Pollution control equipment subsidies	Subsidies provided to companies to install pollution control equipment to reduce their emissions.
Environmental audit	A review of a company's operations to identify opportunities for reducing environmental impacts and improving resource efficiency.
Environmental impact assessment	A study of the potential environmental impacts of a proposed project or development, including measures to mitigate or prevent any negative impacts.

There are three main types of economic mechanisms for nature management: market-based, command-and-control, and mixed mechanisms [12-15].

Market-based mechanisms rely on the market to regulate environmental protection. One example of a market-based mechanism is emissions trading, where companies are allowed to buy and sell permits for the right to emit pollutants. The idea behind this mechanism is that companies with low emissions can sell their permits to companies with high emissions, thus incentivizing the reduction of emissions. Another example is environmental taxes, where companies are taxed based on their environmental impact. The idea is that this will encourage companies to find more environmentally friendly practices, as it will save them money.

Command-and-control mechanisms are regulations put in place by the government to control the environmental impact of companies. One example is a limit on the amount of pollutants a company is allowed to emit. The government sets a limit, and companies must comply or face fines and other penalties. Another example is the requirement to use certain types of equipment or technologies to reduce environmental impact.

Mixed mechanisms combine market-based and command-and-control mechanisms. For example, a government may set a limit on the amount of pollutants a company is allowed to emit, but also allow companies to trade permits for the right to emit. This combination provides companies with flexibility while still regulating their environmental impact [6].

In summary, market-based mechanisms rely on the market to incentivize companies to reduce their environmental impact, while command-and-control mechanisms use regulations to directly control environmental impact. Mixed mechanisms combine both approaches to provide companies with flexibility while still regulating their impact on the environment.

3 Instruments of ecological and economic regulation

There are several tools of environmental and economic regulation that can be used to manage the impact of human activities on the environment. These tools can be divided into two main categories: financial and legal.

Financial tools include taxes, fees, subsidies, and grants. Taxes and fees are used to discourage certain behaviors that have a negative impact on the environment, such as pollution. Subsidies and grants, on the other hand, are used to incentivize behaviors that have a positive impact on the environment, such as the adoption of renewable energy sources [7].

Legal tools include regulations, permits, and licenses. Regulations are put in place to control the impact of human activities on the environment. Permits and licenses are issued to companies that are allowed to engage in certain activities, such as mining or construction, and are used to ensure that these activities are carried out in a way that minimizes their impact on the environment.

Other tools include education and public awareness campaigns, which can be used to inform people about the impact of their actions on the environment, and encourage them to adopt more environmentally friendly behaviors. Environmental audits and assessments can also be used to measure the impact of human activities on the environment, and identify areas where improvements can be made [3, 5].

In summary, the tools of environmental and economic regulation include financial tools such as taxes and subsidies, legal tools such as regulations and permits, as well as education and public awareness campaigns, environmental audits, and assessments. By using these tools in a strategic and coordinated way, it is possible to manage the impact of human activities on the environment and promote sustainable economic growth.

Also, the instruments of environmental and economic regulation can be categorized into three types:

- incentive measures, coercive measures, and compensatory measures;
- incentive measures, also known as the "carrot method," include preferential taxation of eco-friendly products, preferential lending and subsidizing of eco-projects, subsidies for the purchase of environmental equipment, accelerated depreciation of environmental equipment, and bonuses based on the results of environmental activities;
- coercive measures, or the "whip method," include payments for natural resources, emissions of pollutants, waste disposal, fines for violating environmental legislation, reduction of subsidies for nature-intensive and non-ecological industries, and increased taxation on "non-ecological" products;
- finally, compensatory measures involve compensating for damage caused, creating environmental funds, and environmental insurance [8].

4 Green taxes

Green taxes are an example of economic instruments used for environmental regulation. The practice of green taxes varies from country to country.

In Russia, the implementation of green taxes has been limited. In 2018, a new tax was introduced on the disposal of solid municipal waste, but it is not strictly a green tax, as the revenue is not earmarked for environmental protection. The government has also discussed introducing taxes on carbon emissions, but so far, no concrete steps have been taken [9].

In contrast, many countries in the European Union have implemented green taxes. For example, in Sweden, there is a carbon tax on fuels, which has been effective in reducing greenhouse gas emissions. In Denmark, there is a tax on plastic bags, which has led to a significant reduction in their use. In the UK, there is a landfill tax, which has been effective in reducing waste disposal in landfills.

Outside of Europe, countries such as Japan, South Korea, and Taiwan have also implemented green taxes. In Japan, there is a tax on gasoline, and in South Korea, there is a tax on emissions of air pollutants. Taiwan has a tax on plastic bags, which has led to a significant reduction in their use.

Overall, the implementation of green taxes varies widely between countries, with some countries being more successful in their implementation than others. Green taxes are an effective tool in promoting environmentally friendly behavior and reducing the negative impact of economic activities on the environment.

Russia should introduce green technologies for several reasons. Firstly, the country's heavy reliance on fossil fuels and inefficient energy use has led to high levels of air and water pollution, which have a detrimental impact on public health and the environment. By transitioning to cleaner energy sources and implementing green technologies, Russia could significantly reduce its carbon footprint and improve the quality of life for its citizens [5].

Secondly, the global trend towards green technologies and sustainable development means that Russian businesses that fail to adopt these practices risk falling behind their international competitors. By embracing green technologies, Russian companies can improve their efficiency, reduce costs, and access new markets.

Finally, the transition to green technologies presents an opportunity for Russia to diversify its economy and reduce its dependence on oil and gas exports. By investing in renewable energy and other sustainable industries, Russia can create new jobs and strengthen its economy in the long term.

Overall, the introduction of green technologies in Russia is essential for improving the country's environmental and economic sustainability and ensuring its competitiveness in the global market.

5 Conclusion

The economic regulation of environmental protection faces several challenges that hinder its effectiveness. One of the main problems is the lack of coordination between different regulatory bodies, leading to inefficiencies in implementing environmental policies. Another issue is the lack of awareness and understanding of the importance of environmental protection among businesses and the public.

To address these challenges, there is a need for better cooperation and coordination between regulatory bodies and stakeholders, as well as increased education and awareness campaigns to promote eco-consciousness. One solution is to establish a centralized agency responsible for environmental regulation and enforcement, with the authority to implement and monitor policies effectively.

Another solution is to introduce economic incentives such as taxes and subsidies to encourage environmentally friendly practices. For instance, offering tax breaks for businesses that invest in green technologies, as well as imposing fines on companies that violate environmental regulations. Furthermore, promoting the development of eco-friendly industries through public-private partnerships, and providing financial support to small and medium-sized enterprises that adopt sustainable practices can also contribute to the effective regulation of environmental protection.

Overall, a comprehensive approach that combines economic incentives, educational campaigns, and coordinated regulation and enforcement is necessary to ensure effective economic regulation of environmental protection.

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