



# Legal Framework for Environmental Economic Instruments to Reduce Greenhouse Gas Emissions

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**Abstract:** Abstract: Environmental damage due to greenhouse gas emissions affects forest sustainability in Bantimurung National Park, Maros. It takes the participation of all parties to overcome this. The purpose of this research is to analyze the legal framework for environmental economic instruments to reduce greenhouse gas emissions in Bantimurung National Park, Maros. This research method uses explanatory data using secondary data from Law Number 32 of 2009 concerning the Protection and Preservation of the Environment from the Ministry of Forestry and Environment; PP No. 46 of 2017 concerning Environmental Economic Instruments from the Ministry of Environment and Forestry; and Regional Regulation of the Maros Regency Government No 05 of 2009. The Maros district government has played an active role in efforts to reduce greenhouse emissions. This can be seen by funding the P4JH program through the APBD. To maximize environmental economic instruments in forest management, it is recommended to apply for funding not only from the regional budget but also from ICCTF grants. At the provincial level of South Sulawesi, it is necessary to draw up a Governor's regulation that regulates the tagging and scoring budget as a strengthening of the government's role. At the district level, it is recommended to renew the Regional Regulation which regulates the technical implementation of tree planting by civil servants starting from the selection of land locations, types of plants, and the mechanism as a condition for promotion or other matters.

**Keywords:** Bantimurung; Carbon emissions; Environmental economics; Greenhouse gases

## Introduction

The environment is facing an increasing amount of damage due to human activities. From depleting natural resources to increasing greenhouse gases in the atmosphere, our planet is becoming increasingly polluted and degraded. This environmental destruction has been accelerated by industrialization, deforestation, overpopulation, and other human activities. As a result, we are now facing more extreme weather patterns, rising sea levels, and loss of biodiversity (Dixon et al., 2023). We must take immediate action to reverse this trend to protect our planet for future generations.

Green House Gas (GHG) emissions are one of the main causes of significant environmental damage. This damage is related to the increasing concentration of

GHG in the atmosphere, which causes global climate change and has broad negative impacts (Abbass et al., 2022). The main causes of greenhouse gas emissions are caused by various human activities, including the burning of fossil fuels in transportation, industry, and power generation. In addition, deforestation, changes in land use, and industrial processes also contribute to GHG emissions.

Since the Industrial Revolution in the 18th century, greenhouse gas emissions have increased significantly. Rapid economic growth and increasing human population have increased energy demand and emission intensity in various sectors (Muzayanah et al., 2022). This causes an increase in the concentration of GHG in the atmosphere, especially carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrogen oxides (N<sub>2</sub>O). Rapid

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population growth and urbanization have led to increased demand for infrastructure, transportation, and energy in cities. Large, energy-intensive urban infrastructure often uses energy resources that contribute to greenhouse gas emissions. Despite the increase in the use of renewable energy, society, and the industrial sector are still heavily dependent on fossil fuels such as coal, oil, and natural gas. This energy source is a major source of greenhouse gas emissions.

Another cause of increased greenhouse gas emissions is agricultural activities such as the use of fertilizers, livestock selection, and changes in land use causing the release of greenhouse gases such as methane and nitrogen oxides (Grossi et al., 2019). In addition, unsustainable logging also reduces the ability of ecosystems to absorb carbon dioxide, resulting in increased greenhouse gas emissions. On the other hand, people's consumption patterns continue to increase in goods and services that require fossil energy in their production, as well as an increase in demand for private transportation, increasing individual and collective carbon footprints. Although awareness of the impact of climate change has increased, there is still a lack of effective action to reduce greenhouse gas emissions. Some governments and industrial sectors are still not very proactive in implementing sustainable policies and practices.

Apart from natural factors, forest damage can also occur due to fire. Forest fires often occur during the dry season with hot weather (Abatzoglou & Williams, 2016). However, forest fires can also be caused by human activities, such as uncontrolled land burning, forest fires to speed up land clearing, and conflicts between the government, companies, and communities regarding forest land tenure. The Bantimurung-Bulusaraung National Park in South Sulawesi also faces a similar problem. Forest destruction in this area is a major issue, not only in Bantimurung but also at the provincial level of South Sulawesi. Forest destruction in this area, which is the upstream for several surrounding areas, is marked by a reduction in the area of protected forest.

The causes include the conversion of forests into residential areas, as well as agricultural and plantation lands. Global climate change can also hurt the Bantimurung-Bulusaraung National Park. Rising temperatures, changing rainfall patterns, and increasing frequency of natural disasters are exacerbating natural ecosystem problems and threatening the survival of flora and fauna in national parks. If protected forests are continuously damaged due to increased carbon emissions, there will be several adverse impacts that can occur, including: first, protection forests play an important role in reducing carbon dioxide (CO<sub>2</sub>) emissions from the atmosphere and storing them in

plant and soil biomass (Nunes et al., 2020). If the protected forest is continuously damaged, its ability to absorb carbon will decrease, so the concentration of CO<sub>2</sub> in the atmosphere will increase.

This could lead to more extreme climate changes, such as increasing global temperatures, unstable rainfall patterns, and a higher intensity of natural disasters. Both protected forests are home to a variety of unique species of flora and fauna. If protected forests are damaged, these species may lose their habitat and become endangered. This loss of biodiversity will hurt the ecosystem as a whole and can also disrupt the balance of ecosystems that depend on the existence of these species (Keenan, 2015). Protected forests also have economic and social value for the surrounding communities. Local communities often depend on protected forests to meet their subsistence needs, such as firewood, food, traditional medicines, and sources of income from ecotourism activities (Sowards & Banerjee, 2021). If the protected forest is damaged, the community will lose these resources, which can threaten their welfare.

Protected forests also play a role in reducing the risk of natural disasters such as floods, landslides, and droughts. Forests store water, control river flows, and prevent soil erosion. If protected forests are continuously damaged, the risk of natural disasters may increase, which can cause economic losses and negative impacts on human life. Payment for Environmental Service (PES) is an environmental economic law instrument that uses market mechanisms (Wang et al., 2017). PES is used to address various natural resource and environmental problems. PES is based on valuing the value of environmental services, property rights and promoting community awareness. However, operational challenges are still faced by both PES and environmental economic instruments in general, especially related to the legal framework that regulates both the regional and national levels.

These basic prerequisites are needed so that new policies can be implemented and produce real impacts. This research aims to formulate legal constructions that form the basis of environmental economic instrument mechanisms at the central and regional levels to minimize overlapping and overlapping policies related to PES environmental economic implementation plans through a case study of the forestry sector in Bantimurung Maros National Park.

## Method

In this study, we used secondary data from literature studies from various legal frameworks at the regional and national levels. The data used is Law Number 32 of 2009 concerning Environmental

Protection and Preservation from the Ministry of Forestry and Environment (KLHK); PP No. 46 of 2017 concerning Environmental Economic Instruments from the Ministry of Environment and Forestry; and Regional Regulation of the Government of Maros Regency No 05/2009. The above regulatory framework is then analyzed to obtain an overall picture of PES's environmental economic instruments.

This study uses a qualitative explanatory method with comparative regulations related to the formulation of PES environmental economic (Meyer et al., 2018). The analysis was carried out using the literature study method to obtain input regarding the implementation of the instrument in the forestry sector to reduce greenhouse gas emissions.

## Result and Discussion

### *Legal Framework for Environmental Economic Instruments Environmental Matters*

Humans and the environment are one unit, they depend on each other. The environment can provide the necessities of human life in the form of water, air, and sunlight. Meanwhile, humans play a role in maintaining and protecting the environment (Mitra et al., 2022). The realization of a good and healthy human life is a sine qua non requirement for a good and healthy environment. Every living creature has the right to a safe, healthy environment, and the 1945 Constitution of the Republic of Indonesia Article 28H paragraph 1 states: "Every person has the right to live in physical and spiritual prosperity, to have a place to live, and to receive food, clothing and care health."

In the Indonesian forestry sector, environmental rights can take the following forms: first, access and participation rights. Every individual and community has the right to fair and sustainable access to forest resources, including the right to obtain economic, social, and environmental benefits from forests (Erbaugh, 2019). In addition, they also have the right to participate in decision-making related to forest management and environmental protection. Both Customary rights and forest peoples. Indigenous peoples who traditionally inhabit and depend on forests have special rights over forest resources in their territories. Their customary rights include the right to protect and manage the forest traditionally, as well as the right to maintain their culture and identity associated with the forest.

Third the right to environmental protection, every individual and society has the right to a good and healthy environment. They have the right to get protection against environmental damage, including damage that occurs as a result of activities in the forestry sector. This right involves protecting biodiversity, clean

water, clean air, and an environment free from pollution. Fourth Right to information and transparency. Communities have the right to obtain complete, accurate, and easily accessible information regarding activities in the forestry sector. They have the right to know about forest management plans, the environmental impacts of these activities, and the right to participate in decision-making processes related to forests and the environment (Hayati et al., 2022).

Fifth Right to Compensation. If there is a loss or a negative impact on the environment as a result of activities in the forestry sector, the community has the right to receive fair and proper compensation. This right includes restoration and rehabilitation of damaged environments, as well as obtaining equitable economic and social benefits from the management of forest resources (Pukkala, 2021). The Indonesian government has the responsibility to recognize, protect and fulfill these rights in the forestry sector. This is reflected in various regulations and policies, including Law No. 32 of 2009 concerning Environmental Protection and Management and regulations related to forest management and indigenous peoples.

Environmental rights based on the constitution of Indonesia are regulated in Article 28H Paragraph (1) of the 1945 Constitution. The article states: "Everyone has the right to live in physical and spiritual prosperity, to have a place to live, to have a good and healthy environment, and to receive health services." Article 28H Paragraph (1) of the 1945 Constitution recognizes the right of every individual to live in a good and healthy environment, which includes the right to an appropriate environment, free from pollution, and supports physical and mental well-being. This right is granted to all people in Indonesia without discrimination. This article emphasizes that the right to a good and healthy environment is part of human rights that must be guaranteed and protected by the state (Tang & Spijkers, 2022). The government has the responsibility to fulfill these rights through policies, regulations, and concrete actions to maintain and protect the environment.

In addition, Article 33 Paragraph (3) of the 1945 Constitution also stipulates that "Earth, water and the natural resources contained therein are controlled by the state and used for the greatest prosperity of the people." This article emphasizes the importance of managing natural resources, including the environment, for the welfare of the people and the public interest (Lee et al., 2021). The Indonesian Constitution also provides the basis for environmental protection through laws and regulations governing the management and protection of the environment, such as Law No. 32 of 2009 concerning Environmental Protection and Management. This law establishes the principles of environmental

protection, regulations regarding environmental management, and sanctions for violations of the environment.

Thus, environmental rights based on the constitution of Indonesia underline the importance of a good and healthy environment as a human right that must be guaranteed and protected by the state. The government must maintain and protect the environment and provide adequate health services for the community. In the theory of Utilitarianism, it is argued that the right action or policy is the one that provides the greatest benefit to as many people as possible (Fadri, 2021). In the context of environmental and human rights in the forestry sector, utilitarianism will emphasize the importance of preserving forests and the environment to fulfill the interests and welfare of humans as a whole.

In this case, environmental and human rights are seen as interrelated units. Relevant to this, the Theory of Environmental Justice also emphasizes the importance of considering the fair distribution of environmental losses and benefits (Menton et al., 2020). In the context of the forestry sector, environmental justice theory will highlight the need to pay attention to the impact of forestry policies and activities on communities, especially those who are directly dependent on forests. Environmental and human rights are understood as part of environmental justice which includes access, participation, compensation, and remedy for those who are negatively affected.

The rationale for environmental rights was stated by Christopher Stone in 1972 that "we give legal rights to forests, oceans, rivers, and others called 'natural objects in the environment-indeed to the natural environment as a whole'. Christopher further stated: "The reason for this little discourse on the unthinkable, the reader must know by now, if only from the title of the paper, I am quite seriously proposing that we give legal rights to forests, oceans, rivers, and other so-called natural objects in the environment indeed, to the natural environment as a whole".

The environment provides natural resources, such as water, air, and soil, which are necessary for the continuation of human life (Shah et al., 2022). Therefore, environmental rights are seen as fundamental human rights. Environmental rights are also based on concern for the welfare of future generations. It is our responsibility to maintain a good and healthy environment today to ensure that future generations can also enjoy a similar environment (Cima, 2022). Environmental rights involve protecting and preserving the environment for long-term sustainability.

This premise recognizes that environmental rights involve all living things, not just humans. Biodiversity and ecosystem balance are considered important in

maintaining the sustainability and survival of all living things on Earth. Environmental rights involve the protection of species and ecosystems, and recognizing the intrinsic value of all forms of life. Environmental rights are based on the principle of sustainability which requires the responsible use of natural resources and the maintenance of a balanced ecosystem. This principle emphasizes the importance of integrating environmental aspects in economic, social, and political decision-making to maintain long-term sustainability (Fallah Shayan et al., 2022).

The rationale for environmental rights assumes that the government and society have a shared responsibility to protect and maintain the environment. The government has an important role in establishing policies, laws, and regulations that support environmental protection, while the community has a role in fighting for environmental rights, participating in decision-making, and implementing sustainable practices in everyday life (Piscitelli & D'Uggetto, 2022). This rationale is the basis for recognizing the importance of environmental rights as an integral part of human rights. Protection and maintenance of a good and healthy environment are considered a prerequisite for sustainable human life and the welfare of future generations.

This environmental right is then referred to as an Eco right by Somja AnnJozef Baelaert-Suominen and Anron Lercher. In his writings, Anron Lercher states: "I argue that there is an environmental right against being subjected to pollution. The argument briefly, is that by assuming that we have an environmental right against pollution, we can explain the ethical justification or lack of justification for various actions. As the title suggests, this paper extends H.L.A. Hart's argument in 'Are There Any Natural Right? (1955). Like Hart, "I shall argue conditionally that if there are any moral rights, then there is an environmental right against pollution, this avoids some questions about where such right come from, or what their ontological status is in".

The expert from Indonesia, Munadjat Danusaputro, stated that for a right to have meaning, it must fulfill several conditions. First, environmental rights must be recognized explicitly and clearly in the country's laws and constitution. This legal recognition provides a strong basis for protecting environmental rights and provides legitimacy in making decisions related to the environment. Both States have a primary responsibility in protecting and promoting environmental rights. The state must take effective action in preventing, reducing, and overcoming negative impacts on the environment, and ensuring fair access to sustainable natural resources.

Third, active and inclusive participation of the community in making decisions related to the



environment is very important (Sattayapanich et al., 2022). Communities must have fair access to environmental information, be able to participate in decision-making processes and have mechanisms to voice concerns and input related to the environment. Fourth Environmental protection requires an interdisciplinary approach involving various sectors and disciplines. Cooperation between government, society, law enforcement agencies, scientists, and other stakeholders is necessary to understand and address environmental challenges holistically (Avilés Irahola et al., 2022).

Fifth Education and public awareness about the environment and environmental rights are important for building collective awareness and environmentally responsible behavior (Mohiuddin et al., 2018). Inclusive and sustainable environmental education must be strengthened to promote sustainable understanding and action regarding the environment. Sixth, Compliance and Law Enforcement: Compliance with environmental laws and effective enforcement of violations of environmental rights is essential. Strict and effective sanctions must be put in place to prevent violations and ensure compliance with environmental laws.

The environment depends on humans in defending their rights. This is because the environment cannot declare its rights. so the conservators must be actively involved in it. The main task of an environmental conservator is to maintain a balance between the use of natural resources and environmental protection for long-term sustainability. Laws of Environmental Economics in Reducing Greenhouse Emissions. To address greenhouse emissions globally, the international legal framework is known as the Kyoto Protocol. The Kyoto Protocol introduces three flexibility mechanisms that aim to help countries achieve their emission reduction targets more economically. These mechanisms include the Clean Development Mechanism (CDM), Joint Implementation (JI), and Emission Trading Scheme (ETS). CDM allows developed countries to invest in emission reduction projects in developing countries, while JI allows developed countries to undertake joint projects among themselves. ETS allows the trading of emission permits between member countries (Mohiuddin et al., 2018)

Indonesia welcomes this and has implemented it in the following forms: first, Law No. 32 of 2009 concerning Protection and Management of the Environment: This law regulates the protection and management of the environment as a whole. This regulation covers various aspects, including controlling greenhouse gas emissions and climate change mitigation efforts. Second Government Regulation No. 61 of 2011 concerning Air Pollution Control: This regulation regulates the control

of greenhouse gas emissions and other pollutants that cause air pollution. The purpose of this regulation is to maintain good air quality and reduce negative impacts on the environment and human health.

Third Government Regulation No. 46 of 2012 concerning Water Pollution: This regulation regulates the control of water pollution and the protection of water resources. This regulation also refers to controlling greenhouse gas emissions from water-related activities, such as industrial and agricultural waste. The Fourth Regulation of the Minister of Environment and Forestry No. P.17/MENLHK/SETJEN/KUM.1/9/2017 concerning the National Action Plan for Reducing Greenhouse Gas Emissions: This regulation is the implementation of the National Action Plan for Reducing Greenhouse Gas Emissions (RAN-GRK) in Indonesia. This document contains concrete steps that must be taken to achieve the target of reducing greenhouse gas emissions.

Fifth Regulation of the Minister of Environment and Forestry No. P.75/MENLHK/SETJEN/KUM.1/11/2017 concerning Measurement, Reporting, and Verification of Greenhouse Gases: This regulation regulates the process of measuring, reporting, and verifying (MRV) greenhouse gas emissions in Indonesia. This is important to ensure transparency and accountability in the reporting of greenhouse gas emissions (Milanés Montero et al., 2020). In Indonesia, there is an Emission Trading System (ETS) which is one of the environmental economic instruments used to reduce greenhouse gas emissions. ETS is a market mechanism that enables companies or other entities to trade greenhouse gas emission permits (Dechezleprêtre et al., 2023). The implementation of the emission trading system in Indonesia is based on various government regulations and policies. One of the important regulations is the Regulation of the Minister of Environment and Forestry No. 2 of 2018 concerning the Determination of Entrepreneurs and Activities Required to Control Air Pollution. This regulation stipulates certain entrepreneurs or activities that are required to have emission permits and be involved in the emission trading system.

#### *Pay of Environmental Service in Bantumurung Maros*

Implementation of Payment for Environmental Services (PES) in Indonesia has been carried out through several programs and initiatives (Suich et al., 2017). The Payment Program for Forest Ecosystem Services (P4JH), of which aims to provide incentives to forest owners to protect and maintain forest ecosystems that are important for the provision of environmental services. The government provides payments to forest owners in

cash or non-cash forms, such as technical assistance, project financing, or infrastructure development.

The Payment for Forest Ecosystem Services Program in Bantimurung Maros, South Sulawesi is an effort to conserve and manage forest ecosystems that are important for the provision of environmental services in the region. In implementing this program, the local government is working with the Ministry of Environment and Forestry to identify and define forest areas that have a strategic interest in providing environmental services in Bantimurung Maros. This area may include a conservation forest, water catchment area, or important habitat for endangered species. Forest owners or managers who wish to participate in the program in Bantimurung Maros must register as participants. The registration process involves the verification and validation of forest owners or managers who have the eligibility and commitment to maintain the sustainability of forest ecosystems.

Participants who fulfill the requirements and are committed to protecting the forest ecosystem will receive payments in return for the ecosystem services they provide (Pham et al., 2021). These payments can be in the form of cash or non-cash, such as technical assistance, financing of conservation projects, or other agreed incentives. After the participants are registered, an assessment of the value of the ecosystem services they provide is carried out. This assessment involves determining the economic value of the environmental services produced by the forests in Bantimurung Maros. For example, an assessment may be conducted to determine the economic value of conserving biodiversity, controlling erosion, or providing clean water.

Participants who fulfill the requirements and are committed to protecting the forest ecosystem will receive payments in return for the ecosystem services they provide. These payments can be cash or non-cash, such as technical assistance, conservation project financing, or other agreed incentives. PES program implementation in Bantimurung Maros also involves periodic monitoring and evaluation. The purpose of this monitoring is to ensure that participants maintain and maintain the environmental services that are the object of payment. The evaluation was carried out to evaluate the success of the program and its impact on forest and ecosystem preservation in Bantimurung Maros. Through the payment program for forest ecosystem services in Bantimurung Maros, it is hoped that economic incentives will be created for forest owners or managers to maintain the sustainability of forest ecosystems and increase awareness of the importance of environmental preservation.

## Conclusion

The Maros district government has played an active role in efforts to reduce greenhouse emissions. This can be seen by funding the P4JH program through the APBD. the local government is committed to overcoming the problem of forest propagation with a command and control approach using environmental economic instruments in the form of PES. This instrument is a cash transfer from government funding sources. This is a concrete step to accelerate the reduction of greenhouse emissions. PES itself can change forest management so that it covers more effectively and targets emission reductions (Bayrak & Marafa, 2016). To maximize environmental economic instruments in forest management, it is recommended to apply for funding not only from the regional budget but also from ICCTF grants. At the provincial level of South Sulawesi, it is necessary to draw up a Governor's regulation that regulates the tagging and scoring budget as a strengthening of the government's role. At the district level, it is recommended to renew the Regional Regulation which regulates the technical implementation of tree planting by civil servants starting from the selection of land locations, types of plants, and the mechanism as a condition for promotion or other matters. The involvement of the local community as their participation must be strengthened by the use of transfer funds that prioritize local communities and communities.

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## Author Contributions

Conceptualization: A. Melantik Rompegading, data curation: Sri Handayani, funding acquisition A.Melantik Rompegading, methodology: Sri Handayani, visualization: A.Melantik Rompegading, writing-original draft:: Sri Handayani, writing-review & editing: A.Melantik Rompegading, Sri Handayani.

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## Conflicts of Interest

No Conflicts of interest.

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