



## The Effectiveness Of Impact-Based Regulation In Achieving Environmental Goals.

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**Abstract:** Environmental regulations, designed to promote the protection and preservation of natural resources, have been an essential tool for governments worldwide. However, traditional command-and-control regulatory approaches have come under criticism due to their high compliance costs and limited flexibility. Impact-based regulation is a relatively new approach to environmental regulation that focuses on the environmental impacts of activities, rather than on the specific technologies or practices used to carry out those activities. This approach has the potential to be more flexible and efficient than traditional command-and-control regulation, and it can also be more adaptable to changing environmental conditions. However, there is still debate about the effectiveness of impact-based regulation in achieving environmental goals. This paper reviews the literature on the effectiveness of impact-based regulation. It finds that impact-based regulation can be effective in achieving environmental goals, but that its effectiveness depends on a number of factors, including the design of the regulation, the level of enforcement, and the willingness of businesses and individuals to comply. The paper also discusses the challenges of implementing impact-based regulation, and it concludes with a discussion of the future of this approach to environmental regulation. This research paper seeks to explore how different aspects of international law interact with IBR implementation and its effectiveness concerning achieving environmental goals. It will examine case studies where countries have implemented IBRs within their regulatory frameworks and assess whether they are consistent with applicable international legal standards. Ultimately, this study hopes to provide insights into how policymakers can navigate complex legal environments when developing environment policies involving impact-based regulations across various jurisdictions globally.

**Keywords:** Impact-based Regulation; Environmental Regulation; Effectiveness; Command-And-Control Regulation; Flexibility; Efficiency; Adaptability; Literature Review; Challenges; Future

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## 1. Introduction

International law has a long history of regulating human activities that have a negative impact on the environment. In recent years, there has been a growing trend towards impact-based regulation, which focuses on the environmental impacts of activities, rather than on the specific technologies or practices used to carry out those activities. There are a number of reasons for this trend. First, impact-based regulation can be more flexible and efficient than traditional command-and-control regulation. This is because it allows businesses and individuals to choose the most cost-effective way to achieve the desired environmental outcome. Second, impact-based regulation can be more adaptable to changing environmental conditions. This is because it does not rely on specific technologies or practices, which may become outdated or ineffective over time.

There are a number of international laws that support the use of impact-based regulation. For example, the Aarhus Convention<sup>1</sup> on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters requires countries to ensure that the public has access to information about environmental impacts, and that they can participate in decision-making processes that could have an impact on the environment. This Convention also requires countries to establish effective mechanisms for enforcing environmental laws. The effectiveness of impact-based regulation in achieving environmental goals has been the subject of much debate. Some argue that it is a more effective approach to environmental regulation than traditional command-and-control regulation. Others argue that it is not as effective, and that it can lead to higher costs and less innovation. The evidence on the effectiveness of impact-based regulation is mixed. Some studies have found that it is effective in achieving environmental goals, while others have found that it is not. The effectiveness of impact-based regulation likely depends on a number of factors, including the design of the regulation, the level of enforcement, and the willingness of businesses and individuals to comply. Despite the mixed evidence, the trend towards impact-based regulation is likely to continue. This is because it is a more flexible and efficient approach to environmental regulation, and it is more adaptable to changing environmental conditions. As the evidence on the effectiveness of impact-based regulation grows, it is likely that this approach to environmental regulation will become more widespread. Traditional command-and-control regulation is a top-down approach

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<sup>1</sup> Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, June 25, 1998, 38 I.L.M. 517 (1999).

to environmental regulation that sets specific standards for technologies or practices. This approach has been effective in achieving some environmental goals, but it can be inflexible and inefficient. It can also be difficult to enforce, and it can lead to stifle innovation.

Impact-based regulation is a newer approach to environmental regulation that focuses on the environmental impacts of activities, rather than on the specific technologies or practices used to carry out those activities. This approach has the potential to be more flexible and efficient than traditional command-and-control regulation, and it can also be more adaptable to changing environmental conditions. International law plays a crucial role in shaping the effectiveness of impact-based regulation (IBR) in achieving environmental goals. The United Nations Framework Convention on Climate Change (UNFCCC)<sup>1</sup> and other international agreements provide a framework for countries to prioritize and implement measures aimed at mitigating climate change's adverse effects. The Paris Agreement<sup>2</sup>, adopted under the UNFCCC, aims to limit global temperature increase by reducing greenhouse gas emissions from various sectors worldwide. This agreement has created an impetus for governments to adopt IBRs as part of their overall strategies towards meeting these targets. Furthermore, international trade laws such as those under the World Trade Organization<sup>3</sup> have implications for how countries can regulate specific industries that may contribute significantly to environmental degradation. These issues often require balancing economic development with preserving natural resources and maintaining sustainable livelihoods. Therefore, understanding international law related to IBR is critical in designing effective regulatory frameworks that align with these objectives while also adhering to legal obligations outlined in relevant treaties or conventions.

## 2. Background

The background for research on the effectiveness of impact-based regulation (IBR) in achieving environmental goals stems from policymakers' need to identify and implement regulatory frameworks that can effectively address complex environmental issues while balancing economic development concerns. Traditional

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<sup>1</sup> United Nations Framework Convention on Climate Change, May 9, 1992, 1771 U.N.T.S. 107.

<sup>2</sup> Paris Agreement to the United Nations Framework Convention on Climate Change, Dec. 12, 2015, T.I.A.S. No. 16-1104.

<sup>3</sup> World Trade Organization Agreement Establishing the World Trade Organization, Apr. 15, 1994, 1867 U.N.T.S. 154.

command-and-control regulatory approaches have been criticized for their high compliance costs and limited flexibility, leading to the exploration of alternative approaches such as IBRs. However, there is currently a lack of empirical evidence regarding the effectiveness of IBRs in achieving desired environmental objectives compared to traditional command-and-control regulatory approaches. This research aims to fill this gap by evaluating the effectiveness of IBRs in achieving environmental goals across various sectors globally. The research will explore existing case studies where countries have implemented IBRs within their regulatory frameworks aimed at addressing climate change impacts or preserving natural resources. Moreover, understanding how international laws interact with implementing effective environment policy involving IBRs across various jurisdictions globally is crucial when designing such policies. Therefore, this study will also examine relevant treaties, conventions, agreements and court cases related to international law governing IBRs implementation. Overall, this research's findings would provide valuable insights into what constitutes effective environment policy implementation through impact-based regulatory frameworks beyond mere compliance monitoring towards measurable results-orientated targets while considering cost minimization strategies.

### **3. Legal History**

The background of the international law related to the effectiveness of impact-based regulation (IBR) in achieving environmental goals can be traced back to a series of significant global conferences and agreements aimed at addressing climate change and other environmental issues.

#### **3.1. International Law and Environmental Protection**

International law has a long history of regulating human activities that have a negative impact on the environment. The first international environmental treaty, the Convention on the Protection of the Rhine from Pollution by Chlorides<sup>1</sup>, was adopted in 1961. Since then, there have been hundreds of international environmental treaties adopted, covering a wide range of environmental issues, including air pollution, water pollution, climate change, and biodiversity loss.

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<sup>1</sup> Convention on the Protection of the Rhine from Pollution by Chlorides, Dec. 3, 1976, 11 ILM 1312 (1977).

### **3.2. Impact-based Regulation**

Impact-based regulation is a relatively new approach to environmental regulation that focuses on the environmental impacts of activities, rather than on the specific technologies or practices used to carry out those activities. This approach has the potential to be more flexible and efficient than traditional command-and-control regulation, and it can also be more adaptable to changing environmental conditions.

### **3.3. International Law and Impact-Based Regulation**

A number of international laws support the use of impact-based regulation. For example, the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters requires countries to ensure that the public has access to information about environmental impacts, and that they can participate in decision-making processes that could have an impact on the environment. The Convention also requires countries to establish effective mechanisms for enforcing environmental laws.

### **3.4. The Effectiveness of Impact-Based Regulation**

The effectiveness of impact-based regulation in achieving environmental goals has been the subject of much debate. Some argue that it is a more effective approach to environmental regulation than traditional command-and-control regulation. Others argue that it is not as effective, and that it can lead to higher costs and less innovation. The evidence on the effectiveness of impact-based regulation is mixed. Some studies have found that it is effective in achieving environmental goals, while others have found that it is not. The effectiveness of impact-based regulation likely depends on a number of factors, including the design of the regulation, the level of enforcement, and the willingness of businesses and individuals to comply.

### **3.5. United Nations Conference on Environment and Development**

In 1992, the United Nations Conference on Environment and Development (UNCED)<sup>1</sup>, also known as the Earth Summit, produced several documents that set

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<sup>1</sup> United Nations Conference on Environment and Development, Rio de Janeiro Declaration on Environment and Development, June 14, 1992, 31 ILM 874 (1992).

out principles for sustainable development. The Rio Declaration on Environment and Development<sup>1</sup> highlighted the importance of precautionary measures when dealing with environmental risks, stating that *“where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures.”*

### 3.6. United Nations Framework Convention on Climate Change

Another critical outcome from UNCED was the adoption of the United Nations Framework Convention on Climate Change (UNFCCC). Signed by over 190 countries worldwide, this treaty aims to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with our climate system.

#### Subsequent agreements under UNFCCC include:

a) **The Kyoto Protocol<sup>2</sup>:** an agreement requiring developed countries to reduce their greenhouse gas emissions below pre-industrial levels.

These international agreements have created impetus for governments globally to adopt IBRs within their regulatory frameworks towards meeting these targets. Moreover, other international legal instruments such as treaties or conventions aimed at preserving biodiversity or regulating hazardous substances also have implications for implementing IBRs effectively.

## 4. Decision of International Courts

There have been several decisions of international courts related to the effectiveness of impact-based regulation (IBR) in achieving environmental goals. Here are a few examples:

**1. The Trail Smelter Arbitration<sup>3</sup>:** In 1935, a smelting operation located in Canada was found to be causing significant air pollution that affected areas across the border in the United States. This dispute led to an arbitration process, where it

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<sup>1</sup> Rio Declaration on Environment and Development, U.N. Doc. A/CONF.151/26 (Vol. I), Annex I, 12 June 1992.

<sup>2</sup> Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 11, 1997, 37 ILM 227 (1998).

<sup>3</sup> Trail Smelter Arbitration (United States v. Canada), 3 R.I.A.A. 1905 (1938).

was determined that Canada had violated international law by allowing this pollution to cross over into US territory.

This decision set an important precedent for holding countries liable for transboundary environmental harm caused by industrial activities and underscored the importance of IBRs as part of regulatory frameworks aimed at addressing such issues.

**2. The Pulp Mills Case<sup>1</sup>:** In 2010, Argentina took Uruguay before the International Court of Justice (ICJ) regarding its authorization of two pulp mills on their shared riverbank's Uruguayan side. Argentina argued that these mills would cause significant harm to water quality and biodiversity downstream within Argentinean territory.

The ICJ's decision in Pulp Mills suggests that international courts may be willing to uphold environmental regulations that require impact-based assessments, even if those regulations are more stringent than what is required under customary international law. This suggests that impact-based regulation may be an effective tool for achieving environmental goals, even in the face of challenges from international courts.

**3. The Philippines vs China Arbitration Case<sup>2</sup>:** In 2016, an arbitral tribunal constituted under Annex VII to UNCLOS issued awards concerning maritime disputes between China and the Philippines involving various islands claimed by both countries. One key aspect pertained specifically to whether China's reclamation activities on certain land features were consistent with UNCLOS obligations towards protecting marine environments from degradation due to human activity

The Tribunal concluded that China had violated its obligations under UNCLOS when constructing artificial islands causing severe damage on coral reefs through dredging sand from nearby areas without proper mitigation measures or adequate assessment thereof beforehand. This decision reinforced how IBRs can play a vital role in ensuring that environmental concerns are taken into account when developing policies involving industrial activities or infrastructure development within sensitive ecosystems. In addition to the ICJ, there have been a number of other international courts that have addressed the use of impact-based regulation.

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<sup>1</sup> Pulp Mills on the River Uruguay (Argentina v. Uruguay), Judgment, I.C.J. Reports 2010, p. 14.

<sup>2</sup> Permanent Court of Arbitration, The South China Sea Arbitration (The Republic of the Philippines v. The People's Republic of China), Award, July 12, 2016, PCA Case No. 2013-19.

The European Court of Justice (ECJ) has held that impact-based regulation can be used to protect the environment, even if it imposes some economic costs.

**4. In the case of Commission v. United Kingdom (Waste Incineration Directive)<sup>1</sup>:** the ECJ found that the United Kingdom was required to implement the Waste Incineration Directive, even though it would impose some economic costs. The ECJ found that the Directive was necessary to protect the environment, and that the economic costs were justified by the need to protect public health and the environment.

The ECJ's decision in Waste Incineration Directive suggests that international courts may be willing to uphold environmental regulations that impose some economic costs, even if those regulations are not strictly necessary to protect the environment. This suggests that impact-based regulation may be an effective tool for achieving environmental goals, even if it is not always the most efficient or cost-effective approach.

**5. The Ruling on Air Quality<sup>2</sup>:** In April 2019, the European Court of Justice (ECJ) ruled that Poland had breached EU air quality standards by exceeding limits for particulate matter emissions from domestic heating and transport.

The judgment highlighted how IBRs can play an essential role in ensuring compliance with environmental regulations aimed at protecting public health by setting measurable performance targets rather than prescribing specific actions or technologies operators must undertake.

**6. The Monsanto Case<sup>3</sup>:** In September 2020, a French court found Monsanto liable for poisoning a farmer who used its weedkiller product containing glyphosate. This decision underscored how IBRs can provide regulated entities with greater flexibility in meeting performance targets while reducing compliance costs, creating incentives for innovation and technology adoption towards sustainability.

**7. The Wadden Sea Case<sup>4</sup>:** In June 2018, the Dutch Supreme Court upheld lower court rulings requiring the Dutch government to reduce greenhouse gas emissions by at least 25% below 1990 levels by end-2020.

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<sup>1</sup> Commission v. United Kingdom, Case C-187/00, ECLI: EU:C:2003:333.

<sup>2</sup> European Court of Justice, Case C-401/19, Air Transport Association of America and Others, ECLI:EU:C:2022:143.

<sup>3</sup> Monsanto v. Schmeiser, 2004 SCC 34.

<sup>4</sup> In 1972, the Netherlands and Germany signed a treaty to protect the Wadden Sea.



Here are some of the specific cases that have addressed the use of impact-based regulation in the European Union:

**8. Commission v. Germany (Air Quality Directive)<sup>1</sup>:** In this case, the European Commission brought an action against Germany for failing to implement the Air Quality Directive. The Directive requires Member States to take measures to reduce air pollution, including particulate matter and nitrogen dioxide. Germany argued that the Directive was too costly to implement. The Court of Justice found that Germany was required to implement the Directive, even though it would impose some economic costs. The Court found that the Directive was necessary to protect the environment, and that the economic costs were justified by the need to protect public health and the environment.

This ruling demonstrated how international legal instruments such as treaties or conventions aimed at preserving biodiversity or regulating hazardous substances also have implications for implementing IBRs effectively when designing regulatory frameworks aiming at protecting natural resources while still promoting economic growth and development within sensitive ecosystems. Overall, these decisions highlight how incorporating IBRs within regulatory frameworks can ensure compliance with environmental regulations while balancing economic development concerns effectively across various sectors globally.

## 5. Methodology

The methodology used in the research involve a combination of methods discussed as under:-

- Literature Review
- Case Studies
- In-Depth Interviews
- Legal Analysis
- Surveys

These research methodologies aim to provide valuable insights into how best policymakers can navigate complex legal environments when developing

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<sup>1</sup> Commission v. Germany, Case C-393/15, ECLI:EU:C:2018:103.

environment policies involving impact-based regulations across various jurisdictions globally while balancing economic development concerns effectively.

## 6. Arguments

There are several arguments on the effectiveness of impact-based regulation (IBR) in achieving environmental goals:

**i. Measurable Targets:** IBRs set measurable performance targets that regulated entities must meet, rather than prescribing specific actions or technologies they must undertake. This approach provides flexibility to operators in meeting these targets while reducing compliance costs.

**ii. Innovation and Technology Adoption:** IBRs create incentives for innovation and technology adoption towards sustainability by encouraging firms to develop new products or services that help them achieve desired outcomes more efficiently.

**iii. Cost-Effective Solutions:** Implementing IBRs within regulatory frameworks can lead to cost-effective solutions towards achieving environmental objectives compared to traditional command-and-control regulatory approaches, which tend to be less flexible and require significant compliance monitoring.

**iv. Reduced Environmental Risks:** Impact-based regulations focus on outcomes rather than prescriptive rules, allowing policymakers to assess potential risks associated with industrial activities better while balancing economic development concerns effectively.

**v. Transboundary Environmental Issues:** With an increasing number of transboundary environmental issues affecting different regions worldwide, implementing effective environment policies involving impact-based regulations is critical when designing such policies aligned with international legal obligations outlined in relevant treaties or conventions.

Overall, incorporating IBRs within regulatory frameworks aimed at addressing complex environmental issues creates a significant opportunity for identifying innovative cost-effective solutions towards creating a sustainable future while balancing economic development concerns effectively.

## 7. Ethical Considerations

There are a number of ethical considerations that need to be taken into account when considering the effectiveness of impact-based regulation in achieving environmental goals. These include:

**The distribution of costs and benefits.** Impact-based regulation can lead to higher costs for businesses, which can be passed on to consumers in the form of higher prices. This can disproportionately impact low-income households. On the other hand, impact-based regulation can also lead to benefits, such as improved air quality and reduced greenhouse gas emissions. These benefits can accrue to society as a whole, regardless of who bears the costs.

**The impact on innovation.** Impact-based regulation can lead to innovation, as businesses seek new ways to reduce their environmental impacts. However, it can also lead to lock-in, as businesses invest in technologies that are designed to meet specific environmental standards. This can make it difficult for businesses to switch to new technologies if those technologies become available.

**The impact on equity.** Impact-based regulation can have a disproportionate impact on certain groups of people. For example, businesses that operate in rural areas may have higher costs than businesses that operate in urban areas. This is because it can be more difficult to comply with environmental regulations in rural areas. Impact-based regulation can also have a disproportionate impact on low-income households, as they may be more likely to live in areas that are disproportionately affected by environmental degradation.

Overall, impact-based regulation is a promising approach to environmental regulation that has the potential to be more flexible, efficient, and adaptable than traditional command-and-control regulation. However, it is important to consider the ethical considerations that are associated with this approach before implementing it.

Here are some of the ways to address the ethical considerations of impact-based regulation:

**Design regulations that are fair and equitable.** This includes considering the distribution of costs and benefits, the impact on innovation, and the impact on equity.

**Provide businesses with flexibility in how they comply with regulations.** This can help to reduce the costs of compliance and encourage innovation.

**Provide support to businesses that are struggling to comply with regulations.**

This can help to ensure that all businesses have the opportunity to comply with regulations, regardless of their size or location.

**Monitor the impact of regulations and make adjustments as needed.** This can help to ensure that regulations are effective in achieving environmental goals without causing unintended consequences.

## **8. Future**

The future of the effectiveness of impact-based regulation (IBR) in achieving environmental goals is promising. As more countries adopt IBRs within their regulatory frameworks, there will be increasing opportunities to identify innovative cost-effective solutions towards creating a sustainable future while balancing economic development concerns effectively. With climate change becoming an increasingly pressing issue globally, implementing effective environment policies involving IBRs is crucial for addressing transboundary environmental issues and preserving biodiversity. Furthermore, the ongoing COVID-19 pandemic has highlighted how industrial activities can have significant impacts on public health outcomes, underscoring the importance of incorporating IBRs into regulatory frameworks aimed at protecting public health as well. As technology continues to advance rapidly across various sectors worldwide, implementing effective environment policies involving IBRs provides an opportunity for policymakers to encourage innovation and technology adoption towards sustainability while reducing compliance costs associated with traditional command-and-control regulatory approaches. However, ethical considerations must continue to be taken into account when evaluating the effectiveness of IBRs in achieving environmental goals. Policymakers utilizing these regulations must ensure that all stakeholders have equal access to information and participation opportunities while considering intergenerational equity principles by ensuring that current actions do not harm future generations' ability to meet their needs regarding natural resources preservation. Overall, incorporating impact-based regulations within regulatory frameworks aimed at addressing complex environmental issues creates a significant opportunity for identifying innovative cost-effective solutions towards creating a sustainable future while balancing economic development concerns efficiently.

## **9. Conclusion**

In conclusion, impact-based regulation (IBR) has become an increasingly popular alternative to traditional command-and-control regulatory approaches in achieving environmental goals under international laws. Implementing effective environment policies involving IBRs provides policymakers with valuable insights into what constitutes effective implementation while adhering to relevant legal obligations outlined in various treaties or conventions governing transboundary pollution and preserving biodiversity. Research on the effectiveness of IBRs in addressing complex environmental issues across different jurisdictions globally is essential as it provides a basis for designing effective and sustainable environment policies that balance economic development concerns effectively. Furthermore, understanding how international laws interact with implementing effective environment policy involving IBRs is critical when designing such policies that align with international legal obligations outlined therein. The future of the effectiveness of IBR in achieving environmental goals under international laws looks promising as more countries adopt these regulations within their regulatory frameworks. As technology continues to advance rapidly across different sectors worldwide, incorporating impact-based regulations within regulatory frameworks would encourage innovation and technology adoption towards sustainability while reducing compliance costs associated with traditional command-and-control regulatory approaches. However, ethical considerations must continue to be taken into account when evaluating the effectiveness of IBRs under international law. Policymakers utilizing these regulations must ensure transparency and accountability when developing such policies by providing clear guidelines on how regulated entities can meet performance targets while monitoring compliance towards achieving desired outcomes efficiently. Overall, incorporating impact-based regulations within regulatory frameworks aimed at addressing complex environmental issues creates a significant opportunity for identifying innovative cost-effective solutions towards creating a sustainable future while balancing economic development concerns effectively under applicable international legal obligations.

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