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Conceptualization of economic-financial instruments for environmental management in Cuba

Conceptualización de instrumentos económicos financieros para la gestión ambiental en Cuba

Conceitualização de instrumentos econômico-financeiros para gestão ambiental em Cuba

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ABSTRACT

There are numerous factors that today have a direct impact on the environment, affecting and deteriorating it more and more. The economic and productive activities carried out by man that involve highly polluting industrial processes and procedures are fundamental agents that have an impact on the visible deterioration of the environment. Precisely from this arises the need for the industrial and business sector, as well as the private sector, to be aware of the damage caused by the emissions derived from their actions. The State, in turn, is responsible for using economic and financial instruments to encourage these agents to use environmental management in each process in a responsible manner. The proposed objective is to define the concept of economic and financial instrument for environmental management in Cuba based on the theoretical foundations studied. The inequality of definitions given by the preceding authors is synthesized through the analysis of

the recommended bibliography on the subject and the recapitulation of the aspects consulted, induction and deduction, as well as the historical-logical method provides a concept of financial economic instruments for environmental management, which becomes the fundamental axis of the research entitled: "Conceptualization of financial economic instruments for environmental management in Cuba", in which the theoretical elements that sustain the financial economic instruments in the environmental context are defined, which encourage the use of the same in Cuba to contribute to the reduction of environmental pollution.

Keywords: financial economic instruments; environmental management; environment.

RESUMEN

Son numerosos los factores que hoy inciden de manera directa en el medioambiente, afectándolo y deteriorándolo cada vez más. Las actividades económicas y productivas realizadas por el hombre que involucra procesos y procedimientos industriales altamente contaminantes son agentes fundamentales que inciden en el visible deterioro del ambiente. Precisamente de ahí surge la necesidad de que se tome conciencia por parte del sector industrial, empresarial, como por el privado, del daño que provocan las emisiones derivadas de su actuar. Es el Estado, a su vez, el encargado de utilizar instrumentos económicos y financieros que incentiven a estos agentes a hacer uso de la gestión medioambiental en cada proceso de manera responsable. El objetivo propuesto es definir el concepto de instrumento económico financiero para la gestión ambiental en Cuba a partir de los fundamentos teóricos estudiados. La desigualdad de definiciones dadas por los autores precedentes se sintetiza mediante el análisis de la bibliografía recomendada sobre el tema y la recapitulación de los aspectos consultados, la inducción y deducción, así como el método histórico-lógico brinda un concepto de instrumentos económicos financieros para la gestión ambiental, el cual se convierte en el eje fundamental de la investigación titulada: "Conceptualización de instrumentos económicos financieros para la gestión ambiental en Cuba", en la cual se definen los elementos teóricos que sustentan los instrumentos económicos financieros en el contexto ambiental, que incentivan la utilización de los mismos en Cuba para contribuir a la reducción de la contaminación del medioambiente.

Palabras clave: instrumentos económicos financieros; gestión ambiental; medioambiente.

RESUMO

Atualmente, existem inúmeros fatores que têm impacto direto sobre o meio ambiente, afetando-o e deteriorando-o cada vez mais. As atividades econômicas e produtivas realizadas pelo homem, que envolvem processos e procedimentos industriais altamente poluentes, são agentes fundamentais que impactam na visível deterioração do meio ambiente. Justamente por isso, surge a necessidade de que o setor industrial e empresarial, bem como o setor privado, estejam cientes dos danos causados pelas emissões resultantes de suas ações. O Estado, por sua vez, é responsável por utilizar instrumentos econômicos e financeiros para incentivar esses agentes a fazer uso responsável da gestão ambiental em cada processo. O objetivo proposto é definir o conceito de instrumentos econômicos e financeiros para a gestão ambiental em Cuba, com base nos fundamentos teóricos estudados. A desigualdade de definições dadas pelos autores anteriores é sintetizada por meio da análise da bibliografia recomendada sobre o assunto e a recapitulação dos aspectos consultados, a indução e a dedução, bem como o método histórico-lógico, fornecem um conceito de instrumentos econômico-financeiros para a gestão ambiental, que se torna o eixo fundamental da pesquisa intitulada: "Conceitualização de instrumentos econômicos financeiros para a gestão ambiental em Cuba", na qual se definem os elementos teóricos que sustentam os instrumentos econômicos financeiros no contexto ambiental, os quais incentivam o uso dos mesmos em Cuba para contribuir com a redução da poluição ambiental.

Palavras-chave: instrumentos econômico-financeiros; gestão ambiental; meio ambiente.

INTRODUCTION

The environment is seen as a set of basic conditions that surround human beings in their integrality and force them to assume a coherent and responsible attitude, capable of resulting in concrete actions of protection that strengthen the balance that must exist between the elements of nature that make possible the prolongation of life on Earth, where the subjective right to enjoy a healthy environment needs a type of culture immersed in this problematic to understand the scope of its role (Koellner et al., 2019).

It is therefore imperative that renewable natural resources be used below their annual renewal rate, respect the assimilation margins of the environmental vectors (air, water and soil) and, in addition,

that their use be environmentally integrated with economic development. The problem of environmental deterioration and transboundary pollution has reached such a crucial point that there is no room for lamentation or mutual blame. The damage has been done and the only thing left to do is to seek strategies and mechanisms to mitigate its impact, even beyond economic limitations. The dilemma that remains is: to be or not to be (Vargas et al., 2019).

Latin America and the Caribbean have natural capital (land, forests) and non-renewable resources (oil, gas and minerals) that contribute 17% to the growth of its wealth, making it the region with the second highest contribution of natural capital to its wealth, after the Midwest and North Africa region. This natural capital is not only important for the region's economic growth, but represents considerable global capital when taking into account that, although the region represents only 16% of the planet's landmass, it provides and safeguards important natural resources and ecosystem services (Durango et al., 2019).

Among the international organizations that promote the adoption and implementation of specific documents aimed at strengthening the environmental protection approach, the United Nations Environment Program stands out, with an impact on marine protected areas in an integrated coastal and marine management approach, as well as the United Nations Development Program, which provides countries with tools for capacity building and enhances knowledge in environmental management with an integrated approach to achieve sustainable development. The United Nations Educational, Scientific and Cultural Organization through the Intergovernmental Oceanographic Commission is a key promoter of research that contributes to the management of the seas and coasts (Vázquez Sosa et al., 2020).

Society must learn to live in harmony with ecosystems, since in the modern world all exploitation of the products and services they provide is expressed in impacts on them. It is extremely necessary to incorporate the importance of the care and conservation of coastal ecosystems into the conscience of citizens, as well as all institutions that can provide solutions through which this problem does not become a danger to human survival, as well as other species that are at risk.

Today, the environmental issue is identified with the most important concerns of humanity, where it occupies a central place both in the theoretical debate and in the decision-making process.

In Fidel Castro's socioeconomic thinking in the 1990s, two key ideas stand out: the first refers to the link between the environment and development, and the second to the need to observe and be consistent with the laws of nature, that is, to make rational use of natural resources.

Environmental degradation is the set of damages suffered by the environment in reference to the natural surroundings and each of its components, and is directly related to the way a country develops its economic activities and the procedures it uses to exploit its natural resources. The accelerated and increasing deterioration of the environment is today possibly the most serious long-term danger facing the entire human species as a whole.

Economic science also faces the search for solutions, to the environmental problematic based on multidisciplinarity, with the purpose of protecting and conserving the services offered by ecosystems (Molina & Rodriguez and Silva, 2019).

Environmental economics is a subdiscipline of knowledge that analyzes the adverse environmental effects of the processes of production and consumption of goods and services from an economic perspective and proposes economic instruments for the prevention and treatment of environmental impacts. It draws on macroeconomics and microeconomics to combat the causes and consequences of the degradation of the natural environment by human activity (Canova et al., 2019; Pérez Calderón, 2010).

On the other hand, ecological economics is not a pure branch of the economic sciences, but a multidisciplinary field of study. The basic problem it studies is the sustainability of the interactions between the economic system and the natural macrosystem. Such sustainability understood within environmental limits (Canova et al., 2019).

To address the root causes of the environmental problem, it is necessary to adopt measures in the decision-making process that integrate the costs and benefits of altering the environment. This can be achieved by different means, such as establishing regulations, convincing and involving all stakeholders (entities, government, Ministry of Science, Technology and Environment (Citma) and the population in general), or through economic instruments of environmental policy that can contribute to minimize or repair the effects caused by man.

In Cuba, Citma governs the National Biodiversity Strategy, which establishes, among its guiding principles, the development and application of environmental economics with the objective of

applying economic instruments and social incentives for decision making (Monzón Aldama et al., 2022).

Economic instruments constitute a category within Environmental Regulatory Instruments, which affect the costs and benefits attributable to various courses of action faced by different economic agents, affecting, for example, the profitability of alternative processes or technologies or the relative price of a product and, consequently, the decisions of producers and consumers.

In other words, the systems of economic instruments for the environment are a state mechanism of intervention in the economy, with the sole purpose of influencing, on the one hand, the price structure, the levels of profitability or affordability, as the case may be and, therefore, the competitiveness of enterprises and, on the other hand, producers and consumers, aiming to modify their negative behavior towards the environment, as well as demand (Biointropic, 2022).

From the microeconomic point of view, the application of the instruments should lead polluters to correct prices to include the social costs generated. It is also expected that consumers will make adjustments and demand fewer polluting products and modify their consumption patterns (Damania et al., 2020).

Taxation of polluting goods or services can be expected to generate price increases and, consequently, inflation. That is, when polluters introduce true social costs into private costs, this increase is usually passed on to consumers. It is also possible that they lead to a loss of competitiveness for high-cost sectors because they include social costs and pass them on to consumers. But it is also possible that environmental fiscal instruments may encourage technological change and innovation, orienting production towards more efficient processes in the use of raw materials and waste disposal.

Hence, the option of employing economic instruments that contribute to minimizing environmental impacts, confronting climate change and, in particular, protecting and conserving ecosystems, has played an important role, since it provides the possibility of creating financial economic mechanisms to support environmental management models in vulnerable environments (Vihervaara et al., 2019).

In this sense, it is vital to understand the concept of economic financial instrument as a way to encourage its use in optimal conditions for environmental protection and conservation and the preparation of scenarios for its application. Therefore, the objective is: To define the concept of

economic and financial instrument for environmental management in Cuba, based on the theoretical foundations studied.

MATERIALS AND METHODS

In order to obtain results in this research, dissimilar methods of the theoretical and empirical level were applied, starting from a dialectical-materialist approach, which provided the analysis of the recommended bibliography on the subject and the recapitulation of the aspects consulted, determining the main contradictions and links between the elements of the object of study, leading the research to the search for new regularities and the unification of concepts.

Induction and deduction are two fundamental theoretical methods for the research to achieve the justification of the importance of conceptualizing financial economic instruments in environmental management.

Among the methods of the theoretical level, the historical-logical method was applied in the research, which made possible the analysis of the theoretical references associated with the economic-financial instruments for environmental management in Cuba and in the world, which allowed revealing their essence, definitions, categories, classification for management, as well as their use in Cuba and their current importance at the national and international level.

As for the empirical methods used in the research, the bibliographic review stands out, where documents, reports, books that explicitly cover the topics addressed by the research were reviewed, through which the definition of financial economic instruments, their current influence and the need for the use of financial economic instruments in environmental management could be confirmed.

RESULTS AND DISCUSSION

Economic activities have consequences that affect not only those who decide to carry them out, but also third parties. These consequences are called externalities. These refer to the behavior of certain economic agents that cause costs or benefits (negative or positive externalities) to third parties in compensation for this. In these cases, the goods and services markets where these externalities act do not allocate resources efficiently, since prices do not reflect this phenomenon, causing what is called a market failure. Within this framework, the public sector and the authorities are justified in acting to solve the problem and achieve the economic-social efficiency of these activities where the

phenomenon is manifested (Acquatella, 2001), trying to modify the behavior (rational, based on the information processed) of the agents that cause environmental degradation.

The protection of the environment is a challenge for humanity that entails a firm commitment by society, governments and organizations to carry out actions for its protection, which underlies the need for environmental management within all organizations.

Hence, the importance of government management, supported by science and innovation, aimed at addressing the major challenges facing the country, which seeks to strengthen decision-making at all levels and in all areas with the support of expert knowledge, while allowing experts to find more expeditious ways to advance their proposals (Díaz-Canel Bermúdez et al., 2020).

There are many definitions of the concept of economic instruments. Most of these definitions follow the Organization for Economic Cooperation and Development (2020), which indicates that economic instruments are mechanisms that influence the costs and benefits of the different options offered to economic agents and seek to modify behaviors in an environmentally friendly way.

Financial economic instruments aim to close the gap between private and social costs by internalizing all external costs (both depletion and pollution costs) to their sources: the producers and consumers of the commodities that deplete and pollute the resources (Panayotou, 1995).

An economic financial instrument is any tool or method used by an organization to achieve general development objectives in the production or regulation of material resources. Economic financial instruments are fiscal and economic incentives and disincentives to incorporate environmental costs and benefits into household and business budgets. The aim is to encourage environmentally sound and efficient production and consumption through full-cost pricing. Economic instruments include effluent taxes or charges on pollutants and wastes, deposit-refund systems, and tradable pollution permits. In all cases, they aim to value ecosystem services and seek the internalization of environmental externalities by the potential polluter or user of an environmental resource (Morrissey, 2020).

According to the authors, economic instruments are incentives designed by all levels of government within the scope of their competences, with the purpose that legal or natural persons show changes in their behavior and assume the costs related to the actions they carry out as a consequence of the

ecosystem goods and services from which they benefit, directly or indirectly for their productions or services.

An economic instrument for managing the environment is a policy or combination of policies that provides financial economic incentives for users of natural resources to pay the social costs of that use (Vraèareviæ, 2014).

Economic instruments, including taxes on effluents or charges on pollutants and wastes, are tools for improving management efficiency and can be linked to the development of environmental policies under cost-benefit and cost-efficiency criteria, with the development, at the same time, of self-financing capacity.

They are defined as financial and fiscal measures that help to encourage, motivate or incentivize the behavior of individuals to reduce pollution and degradation of natural resources. Two important functions are assigned to these instruments: the incentive to reduce pollution and to promote research and development of clean technologies (Barragán Muñoz & de Andrés García, 2020).

They regulate social interventions in the market economy. It is the result of the combination of financial means, technical knowledge and human skills.

Financial or market economic instruments are considered to be those through which people assume the benefits and costs related to climate change mitigation and adaptation, encouraging them to carry out actions that favor compliance with the objectives of the national policy on the subject.

The design of these financial economic instruments is based on the principles of environmental law of whom pollutes, pays prevention, precaution, participation and access to information, to mention the most important ones, constitutes the basis for their design and are considered from a legal and economic point of view, since they imply the polluting agent to assume the costs of prevention and environmental remediation, with differentiated responsibilities.

These are certain financial and fiscal measures that help to encourage, motivate or incentivize the behavior of individuals to reduce pollution and degradation of natural resources. These instruments are assigned two important functions: that of an incentive to reduce pollution and that of promoting research and development of clean technologies. They have been organized into three types: a)

those that have been translated into fiscal policy tools and generally punish polluters; b) subsidies coupled to production; and, c) payments to reward environmentally desirable behavior.

Economic and financial instruments can be used to change people's behavior towards desired policy objectives, typically encompass a wide range of designs and implementation approaches, and include traditional fiscal instruments, including, for example, subsidies, taxes, fees and fiscal transfers. In addition, instruments such as tradable pollution permits or tradable land development rights depend on the creation of new markets. Other instruments represent conditional and voluntary incentive schemes such as payments for ecosystem services.

In principle, all of these can be used to correct policy or market failures and restore full-cost pricing. They aim to reflect the social costs or benefits of the conservation and use of biodiversity and ecosystem services of a public good nature. Economic instruments do not necessarily imply that they promote the merchandizing of environmental functions. In general, they are intended to change the behavior of individuals (e.g., consumers and producers) and public actors (e.g., local and regional governments).

Economic financial instruments influence environmental performance by changing the cost and benefits of alternative actions available to economic agents (OECD, 2020).

Economic and financial instruments aim to provide signals and incentives to stimulate behavioral change throughout the value chain and generate benefits (Adelegan & Itesi, 2019), using integrated economic valuation of ecosystem goods and services as a tool for decision making at different levels, related to legal, policy and institutional frameworks in key sectors, optimizing the generation of global environmental benefits

Economic instruments are tools for improving management effectiveness and can be subject to the development of environmental policies under cost-benefit and cost-efficiency criteria, with the development, at the same time, of self-financing capacity (Vidal Hernández et al., 2021).

These mainly seek to change the behavior of regulated agents to achieve environmental objectives (pollution abatement, efficient use of natural resources, among others), through market signals or taxes, for example, economic incentives, tax benefits, fees and taxes, among others, these are aimed at recognizing actions that generate positive effects for society (increase positive externalities) and avoid and control the unfavorable impacts of certain actions (decrease negative externalities), in

addition to directing, collecting and executing resources to finance the policy, programs or plans or to cover the risks of the activities with positive impact that are expected to be promoted. This group includes the financial products and services of the main private and public financial entities, credit lines and financing funds (Biointropic, 2022).

Economic instruments are essential mechanisms for financing conservation, since many environmental services and costs are external to the finances of private companies. Economic instruments are efficient means for governments to bring these externalities to market prices (Cepal, 2022).

Economic financial instruments are a tool that primarily seeks to incentivize, compensate, benefit, support or induce a change in the agents involved by charging or assigning an economic value represented in a fee, price or cost. They have been applied primarily to respond to specific situations, generally driven by a mix of ecological and economic considerations (Monzón Aldama et al., 2022). They use market forces to integrate economic and environmental decisions. They should provide tariffs, prices or costs to help decision makers recognize the environmental implications of their actions with the aim of minimizing ecological damage.

Table 1. Concepts of economic and financial instruments for environmental management

Author	Year	Concept
Panayotou	1995	Financial economic instruments aim to close the gap between private and social costs by internalizing all external costs (both depletion and pollution costs) to their sources: the producers and consumers of the commodities that deplete and pollute resources.
Vračarević	2014	An economic-financial instrument for managing the environment is a policy or combination of policies that provides economic-financial incentives for users of natural resources to pay the social costs of that use.
Adelegan and Itesi	2019	Economic and financial instruments aim to provide signals and incentives to stimulate behavioral change throughout the value chain and generate benefits.

Barragán Muñoz and de Andrés García	2020	Economic instruments are certain financial and fiscal measures that help to encourage, motivate or incentivize the behavior of individuals to reduce pollution and degradation of natural resources. These instruments are assigned two important functions: to provide incentives to reduce pollution and to encourage research and development of clean technologies.
OECD	2020	Economic and financial instruments influence environmental performance by modifying the cost and benefits of alternative actions available to economic agents.
Vidal Hernández et al.	2021	Economic instruments are tools for improving management effectiveness and can be subject to the development of environmental policies under cost-benefit and cost-efficiency criteria, with the development, at the same time, of self-financing capacity.
Biointropic	2022	They mainly seek to change the behavior of regulated agents to achieve environmental objectives through market signals or taxes aimed at recognizing actions that generate positive effects for society and to avoid and control the unfavorable impacts of certain actions.
Monzón Aldama et al.	2022	Economic instruments are a tool that primarily seeks to incentivize, compensate, benefit, support or induce a change in the agents involved by charging or assigning an economic value in the form of a fee, price or cost. They have been applied primarily to respond to specific situations, generally driven by a mix of ecological and economic considerations.

Source: Own elaboration based on the works previously mentioned

Based on the information compiled in the table above, the concept of economic and financial instruments for environmental management can be defined, unifying the criteria of the different authors, as described below:

Economic and financial instruments are a combination of policies composed of tools, methods and actions that primarily seek to incentivize, compensate, benefit, support or induce a change in the agents involved by charging or assigning an economic value represented in a fee, price or cost. They are applied primarily to respond to specific situations, generally driven by a mix of ecological and

economic considerations to encourage environmentally sound and efficient production and consumption.

Classification of financial economic instruments applicable to environmental management

According to Monzón Aldama et al. (2022), economic-financial instruments are classified into the following categories (Figure 1):

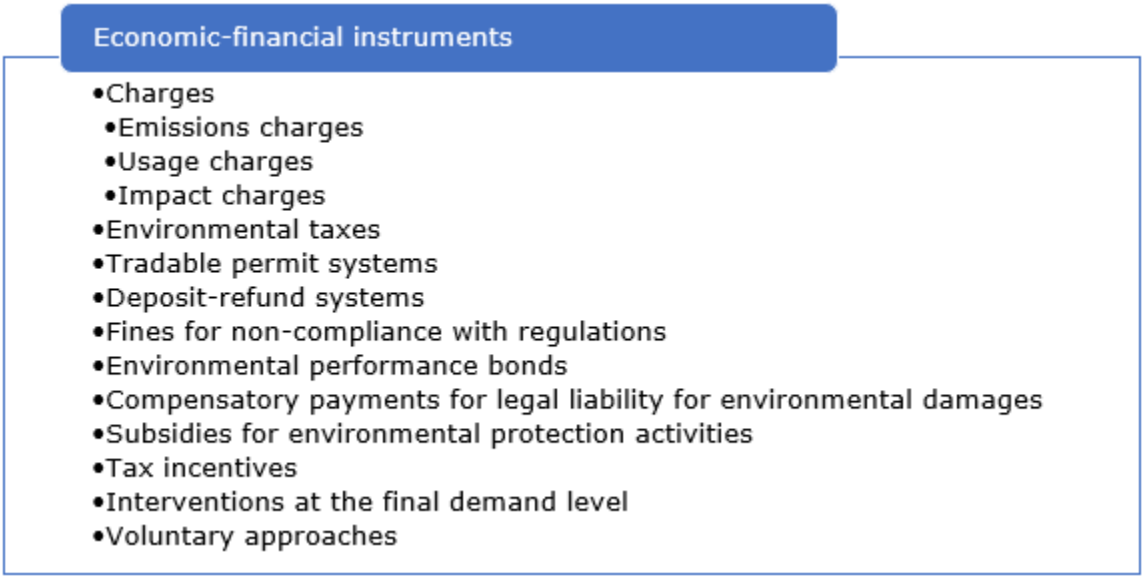

Figure 1. Classifications of economic and financial instruments
Source: Own elaboration

For each type of instrument, Biointropic (2022) defines an internal classification according to its nature and from the point of view of environmental management as presented in the following table the classifications considered for each instrument typology.

Table 2. Classifications for each type of instrument

Typology	Categories	Definition
Economic instruments	Taxes (Contributions and discounts)	These refer to different types of taxes or levies that are expected to generate a specific behavior of the agents so as not to cause them or if they are caused, and generate a positive impact, they are discounted or refunded. There are environmental taxes that help finance environmental policy by charging for actions that have a negative impact on the environment, mainly seeking to change the behavior of the regulated agents. There are also tax incentives understood as tax benefits for individuals or legal entities for behavior or investment with positive impacts on the environment or natural resource management.
	National income	This corresponds to all the income received by a given population over the course of a fiscal year, and is converted into the national budget, with the possibility of earmarking it for specific items, in this case for processes to promote and consolidate green businesses.
	Market	They are those created for economic agents to trade the positive or negative externalities generated by their activities through markets (Examples: conservation banks, environmental offsets, tradable permits, carbon market, among others), seeking to change behaviors and reach permitted levels of pollution, without the need to impose command and control mechanisms.
	Economic incentives	They are those that encourage people to improve in certain aspects, motivating the sustainable production that comprises a green business. It can be considered as an economic benefit (in money or in kind) to be granted to people after fulfilling a

		certain action. Therefore, an incentive is something that motivates people to achieve environmental objectives.
Financial instruments	Credit	It is a loan of money given to a natural or legal person with the commitment to repay the amount received, plus a percentage of interest to be paid within a certain period of time, which is defined between the creditor and the debtor. In this case, the creditor is the person or enterprise that lends the money and has the right to collect it. And the debtor is the individual or organization that owes the amount of money lent (plus interest) and is obliged to pay it.
	Environmental and productive trust funds	They are vehicles for channeling aid funds from governmental (multi- or bilateral aid) and non-governmental donors, which are administered by a fiduciary organization. Trust funds are dedicated to financing activities agreed upon by the trustee organization and the donor(s). The activities to be financed can be linked to global programs or to specific projects, in this case those aimed at financing activities related to the promotion and consolidation of green businesses.
	Environmental impact investment funds	They are a collective investment institution composed of a group of participants, where individuals or legal entities pool money to invest it in financial assets, in order to obtain an economic return, while maintaining the security and liquidity of their capital. Therefore, investment funds with environmental impact can be understood as those that offer various types of returns on the investment of the available capital, one is the traditional financial return, another is the environmental return by contributing to improving the quality of life, for example, investment to reduce the emission of greenhouse gases and a reputational return by contributing to the fulfillment of public agendas and development objectives.

Promotional tools	Technical training programs	They aim to prepare people in specific areas of the productive sectors of green business and develop specific technical competencies related to the consolidation of the business individually or collectively.
	Programs to promote production and marketing	Their purpose is to encourage enterprises interested in the production and commercialization of goods and services associated with green businesses, through different spaces and promotional mechanisms, which seek to increase the attraction of investment and job creation.
	Recognition programs	They are a strategy to promote the generation of goods and services with positive environmental, social and environmental impacts, based on the granting of recognitions, awards, certifications, etc., which represent a guarantee of the work carried out in order to obtain greater benefits with commercial partners.

Source: Biointropic (2022)

The different classifications of economic and financial instruments that have been used in environmental matters have, in general, proven to be a good complement to the regulatory action of the State. Their good design makes it possible to adequately internalize externalities, generate the appropriate incentives in the different actors of society and favor the efficient use of resources.

Economic and financial instruments for environmental management regulated in Cuba

Effective environmental management achieves the protection of the environment and the reduction of its increasingly evident deterioration. Economic instruments play an important role since they focus on the economic interest of the actors and usually act before the undesired effect takes place (Monzón Aldama et al., 2022).

Economic regulation as a management tool and even as an instrument to promote the rational use of natural resources has made its presence felt in our country.

The legal and more general support for the use of economic instruments in Cuba is provided by the Draft Law of the Natural Resources and Environment System (Law 150/2022), approved by the National Assembly of People's Power in May 2022, which legally supports the policy outlined by the National Environmental Strategy of the same year and develops the general legal framework for its application.

This, according to Article 3, paragraph b, has among its specific objectives to establish the principles and obligations that guide the actions of natural and legal persons in environmental matters, including coordination mechanisms for efficient environmental management, as well as (paragraph c) to establish the institutional framework for the protection of the environment and ensure conservation, protection and rational use of natural resources and to perfect the instruments (paragraph f) of environmental policy, control and management, in its conception and expansion in development schemes, with emphasis on mechanisms of an economic and social nature, aimed at the solution of environmental problems.

Article 10.1 states that Citma is responsible for: (paragraph j) designing and promoting the implementation of economic instruments aimed at protecting the environment and natural resources and recognizing the value of ecosystem goods and services.

Article 21.1 defines that Citma, without prejudice to the powers of the Ministry of Agriculture with respect to wild flora and fauna and of the Ministry of Food Industry, in relation to the production of hydrobiological resources, directs actions aimed at: (item r) adopting or proposing the adoption, as appropriate, of economic and social incentives and instruments for the conservation and rational use of biological diversity.

In turn, Article 22 states that natural and legal persons, in charge of the administration of natural resources for the conservation, rational use and access to biological diversity, have, as appropriate, the responsibility to: (item h) implement economic instruments that stimulate the conservation of biological diversity.

Article 72 establishes that it is incumbent upon Citma, in its role as the governing body of the Environmental Resources and Environment System, to execute, as appropriate, the promotion (subsection d) of the development of economic and financial instruments that discourage the generation of waste and encourage best practices to reduce pollution and save natural resources.

Article 106 explains that the present Law and its complementary provisions are implemented through environmental management instruments of an economic nature (subsection k).

Similarly, Article 169 states that Citma, with respect to the processes of economic valuation of ecosystem goods and services, coordinates the work for their gradual introduction in the country, starting with:

Subsection b: Design or improve methodologies for the economic valuation of environmental damages in the event of extreme events.

Subsection c: Incorporate the results of economic valuation studies in planning, the design of public policies and in the decision-making process on projects, plans, policies in strategic development sectors, as well as in the economic valuation of environmental damage from extreme events.

Subsection d: to serve as a basis for the foundation of the economic and financial mechanisms that so require.

This Law defines economic regulation as an instrument of environmental management based on two principles: the principle of prevention and the principle commonly known as "the polluter pays", which, unlike what is normally understood, is not mainly referred to payment, to which a sanction refers the possible violator, but is basically a principle of cost allocation, so that the environmental costs are borne by those responsible for the pollution and not charged to society.

As a result, the prices of goods can be expected to reflect the real cost of production, including that associated with pollution, resource degradation and environmental damage in general (Monzón Aldama et al., 2022).

It is considered a law based on the ecosystemic approach to management, where its main objective is to ensure the implementation and operation of the Natural Resources and Environment System, as a condition to achieve the prosperous and sustainable development of the country and, in turn, respond to the socialist development model advocated by each and every Cuban and the call made by the country's leadership. Its institutional framework strengthens Citma's role before the rest of the agencies and entities that manage natural resources, while recognizing the competencies that they must assume in these matters.

The purpose of Law No. 113/2012 on the Tax System is to establish the taxes, principles, rules and general procedures on which the Tax System of the Republic of Cuba is based.

To solve the environmental problems facing the country, it is necessary to use all available tools. The mission of solving the complex problems of deforestation, soil erosion, overexploitation of aquifers, and water and air pollution will require changes in the behavior of households, enterprises and governments, because the economic decisions of these three agents are the most important force in the transformation and use of natural resources. It will also require the definition of economic and financial instruments for their subsequent application and appropriate use.

It is important that they be pushed forward decisively and that polluters face the costs of their decisions: increasing the cost of using dirty fuels, increasing the cost of polluting water or the cost of improperly disposing of waste.

Likewise, conservation and environmental care activities should be rewarded through preferential credits; subsidies should be granted to sustainable activities (with the objective of promoting them) through economic aid, such as organic agriculture and recycling plants, among others.

Economic agents (consumers, businessmen, government, etc.) need to change their behavior and incorporate the social costs of their actions. Just as the employer and the worker have a remuneration, nature must have its own, and this must be adequate to replenish the almost three centuries of intensive exploitation.

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Conflict of interest

Authors declare that they have no conflicts of interest.

Authors' contribution

Yenisleidys Monzón Aldama and Sheila Pérez Díaz designed the study, analyzed the data and prepared the draft.

María Leandra Pascua Migueles was involved in data collection.

Mercedes Marrero Marrero and Maritza Petersson Roldán were involved in data collection, analysis and interpretation.

All the authors reviewed the writing of the manuscript and approve the version finally submitted.