

## **Impact of the tax collection of the Redeemable Tax on Plastic Bottles for environmental conservation. Case of bottling and marketing companies in Machala**

### **Impacto de la recaudación tributaria del Impuesto Redimible a las Botellas Plásticas para la conservación ambiental. Caso empresas embotelladoras y comercializadoras del cantón Machala**

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**DOI:** 10.35429/JM.2021.9.5.1.10

Received July 10, 2021; Accepted December 30, 2021

#### **Abstract**

This research focuses on analyzing the impact generated by the tax collection of the taxable tax on plastic bottles, through the search and collection of statistical data in official sources, for environmental conservation, in the bottling and marketing companies of the Machala canton. The methodology applied is qualitative-descriptive, based on the bibliographic review and data obtained from reliable sources for their respective analysis depending on the object of study. The results obtained through the research give as a response that the tax collection of the IRBP has increased with the passage of time and that together with the figures of the refunds reached can be taken as a measure that has contributed to improve environmental conservation and this is equivalent to 43,137 tons of non-polluting plastic bottles to the environment that have been recycled; it is advisable a deep socialization by the tax entity, on the end of this tax. The research contributes to visualize how a tax policy contributes to conserving the environment through the establishment of an environmental tax on plastic bottles with a fee of \$ 0.02 to promote recycling and the mechanics of return to those who collect such plastic bottles.

**Tax collection, Redeemable tax on plastic bottles, Environmental conservation**

#### **Resumen**

La presente investigación se centra en analizar el impacto que se genera por la recaudación tributaria del impuesto redimible a las botellas plásticas, mediante la búsqueda y recolección de datos estadísticos en fuentes oficiales, para la conservación ambiental, en las empresas embotelladoras y comercializadoras del cantón Machala. La metodología aplicada es de enfoque cualitativo-descriptivo, sustentada en la revisión bibliográfica y datos obtenidos de fuentes confiables para su respectivo análisis en función del objeto de estudio. Los resultados obtenidos a través de la investigación dan como respuesta que la recaudación tributaria del IRBP se ha incrementado con el paso del tiempo y que junto a las cifras de las devoluciones alcanzadas se puede tomar como medida que ha contribuido a mejorar la conservación ambiental y esto equivale a 43.137 toneladas de botellas plásticas no contaminantes al medio ambiente que han sido recicladas; es recomendable una socialización profunda por parte del ente tributario, sobre el fin de este impuesto. La investigación contribuye a visualizar como una política tributaria coadyuva a conservar el medio ambiente a través de la instauración de un impuesto ambiental a las botellas plásticas con una tarifa de \$ 0.02 a promover el reciclaje y la mecánica de devolución a quien recolecten dichas botellas plásticas.

**Recaudación tributaria, Impuesto redimible a las botellas plásticas, Conservación ambiental**

**Citation:** YÁNEZ-RÍOS, Katerine Alexandra, CASTILLO-MACAS, Lizbeth Margarita and GUTIÉRREZ-JARAMILLO, Néstor Daniel. Impact of the tax collection of the Redeemable Tax on Plastic Bottles for environmental conservation. Case of bottling and marketing companies in Machala. *Journal-Microeconomics*. 2021. 5-9:1-10.

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**Introduction**

For some decades, developed countries have given way to a complex and long road to the application of environmental taxes in order to help preserve the environment, of which, according to several environmental studies, catastrophic damage was already predicted. Thanks to the international agreements that were agreed at world summits such as the commitment of the Paris Agreement and the awareness they have taken regarding environmental degradation and, more importantly, climate change, developing countries have chosen to start implementing environmental taxes in their states. In this case we can highlight that Latin American countries have not been indifferent to this propensity and many countries have implemented these taxes to contribute to environmental conservation (Rius, 2016).

Environmental taxes can be differentiated from others because they are intended to reduce the problems that threaten the conservation of the environment, the proceeds of which are earmarked for a particular purpose. To analyze the collection of environmental taxes in different countries, which are considered as a global strategy to face the environmental crisis worldwide, it is necessary to address the conceptualization and objectives that these taxes pursue in the place where they have been applied. The application of these taxes in many Latin American countries makes polluters pay a fee according to the level of pollution that the activity carried out causes. It is essential that the regulatory body exercises and applies the current regulations in order to reduce the risk of manipulation of information by polluting companies. Finally, although no greater revenue is generated with this type of tax, the idea is that these are considered an environmentally successful tax (García López, 2018).

In the Ecuadorian context, the National Assembly of Ecuador in 2011 arranges actions with the environment creating the redeemable tax on non-returnable plastic bottles, consolidating itself as a pioneer when a tax that stimulates the environmental culture of recycling, reducing and reusing comes into force; positively affecting the control and reduction of solid wastes that pollute the planet causing a problematic situation that the State wants to avoid with this tariff (Bedoya Jara *et al.*, 2017).

As an economic instrument to the environmental damage caused by this waste sets a value that will be canceled by bottlers and importers, this fee of 0.02 cents for each bottle, starts the creation of microenterprises that will receive with the required documentation the return of the same and the recyclers will transform the solid waste into material or reused product that generate an environmental and economic benefit, with a view to sustainability in the development and care of the environment. It should be noted that the application of the tax yielded positive results in 2019, data presented by the SRI in the collection of the rate of the companies obliged to declare the tax, although there are still shortcomings in the operation, collection and return due to the surplus of plastic bottles, where it is intuited that they are illegally entered into the territory of neighboring countries, therefore it is necessary to analyze and provide solutions to any inefficiency (Garabiza Castro & Zavala Soledispa, 2018).

The research is aimed at analyzing the impact that is generated by the tax collection of the tax redeemable to plastic bottles, through the search and collection of statistical data from official sources, for environmental conservation, in the bottling and marketing companies of the Machala canton; in this way, the conservation of the environment has taken a lot of force, due to the drastic climate changes that are occurring, for this reason measures have been taken to reduce the negative impact.

In Ecuador there is approximately a total of sixty-two bottling companies, marketers, collection centers and recyclers of which in the Machala canton there are two bottlers and marketers, four recyclers and collection centers which represents 9.68% nationally.

The study will be carried out from a qualitative-descriptive approach, based on a documentary literature review, which consisted of the search, selection and analysis of sources of information published on official pages, scientific articles and online books related to the object of study.

Environmental protection is the backbone that is required for sustainable development before any economic model and is the result of the adoption of measures taken by the Ecuadorian government from a social, economic and environmental point of view.

For this reason, the State adopted the environmental policy in order to raise awareness and regulate the excessive consumption of plastic bottles by companies and the population, aimed at the conservation of the environment.

### **Tax collection and environmental conservation**

Environmental taxes are part of the precautions with which governments intend to reduce the impact that certain activities generate on the environment, and as a protective measure to stop the effects caused by pollution. In short, taxes can be defined as those levies that have a collection purpose, and are aimed at managers to control their conduct, in terms of the execution of activities harmful to nature, without prejudice to the funds collected (Salassa Boix, 2016).

According to the literature on environmental taxes, taxes of this nature obey Pigou's logical reasoning, since he considers it imperative that whoever is dedicated to producing a good or service, and as an effect of his activity causes pollution, should internalize the cost of this negative effect (Navarro Schiappacasse, 2019).

It is necessary to be clear about the environmental damage that exists in Ecuador, either by emission of polluting gases or by contamination of solid waste, reasons that triggered on the part of the State to the application of environmental standards that entails to adapt protection measures in companies for the damages that they may cause to the environment and demand judicially the reparation of this damage, in addition to the personnel in case of having suffered as a result of environmental deterioration. Environmental taxes are specifically designed to achieve an environmental purpose with the purpose of conservation and protection of the environment, maintaining the levels of collection for the best distribution of the public resource (Matus Fuentes, 2015).

For the declaration and return of the IRBP by the bottling companies, importers, recyclers and collection centers, evidence that, the bases of this tax were established under the conception of a deposit, return and return system, where the units produced with a monetary value are involved in order to stimulate their return, however, this return does not refer specifically by consumers, but to the bottlers, collection center and others legally recognized and qualified. The most advisable thing would be to determine an effective system, with more rigorous characteristics, that limits the fraudulent declarations that have been presented by some bottling companies in the IRBP declaration (Pinos Flores *et al.*, 2018).

### **IRBP rate**

The tariff established to the IRBPNR is called as a collection cost in the presence of polluting elements such as plastic bottles in Ecuador, due to the high consumption of plastic; the purpose of implementing a fee for non-returnable plastic bottles is to reduce pollution and promote good environmental practices through recycling, even if the fee to be canceled for collecting, returning is low (Encalada Encarnación & Ruiz Quesada, 2017).

In this matter, it is important to establish an appropriate measure regarding the rate established for the payment of the IRBP, which is why it will be advisable to propose a higher value of the tax, since currently the rate to be paid the USD 0.02 which does not represent an incentive or attraction factor to promote the return of the packaging that is purchased by consumers, this relating to the fact that in other countries there is a greater motivation for the return of the container. In addition, there is no guarantee that only the containers that are declared in the IRBP are recovered, because there is evidence of the illegal incorporation of bottles from neighboring countries in which no environmental regulation has been proposed to promote recycling (Pinos Flores *et al.*, 2018).

### 'Polluter pays' principle

This principle was created as a measure of prevention and control of environmental pollution, so that it does not occur and that the polluter assumes the costs to reduce and avoid. It is worth mentioning another principle of cost distribution "who benefits pays" where the subject receives or expects to receive benefits for control activities in conservation actions; if natural resources are limited or subject to their economic value, whoever benefits from it must pay (García López, 2018).

Within the literature on the polluter pays principle, it is used as an economic instrument, which is used to implement environmental policy in many countries, such is the case in Mexico where it is the means for the conduct and formulation of environmental policy and legislation, where it establishes that the person who performs activities that affect the conservation of the environment, is in the duty to prevent, minimize and repair the damage caused by such activity, in the same way the person is encouraged to take care of and make reasonable use of natural resources (García López, 2018).

### Reuse of plastic material

This is posed as a global challenge, considered one of the biggest problems to be faced, environmental pollution, and its effects as a result of the generation of solid waste. This also implies a difficult reality for individuals engaged in the work of collecting plastic materials, which has become a topic of discussion for the State. That is why it is essential to carry out an evaluation that allows the government to strengthen the positive points and work on the negative effects that are caused by the inadequate handling of plastic materials on the well-being of society and nature (Sanmartín Ramón *et al.*, 2017).

Recycling in this case plays an indispensable role to achieve the objectives of the implementation of environmental taxes, which is why people have been motivated to reuse packaging, which has given way to a new form of awareness in individuals since in one way or another awareness of the protection of the environment has been achieved (*Ruiz Guajala et al.*, 2015).

Ecuador gave way to the implementation of environmental taxes in 2011, the same q governed at the beginning of 2012 see table 1, with the purpose of conserving the environment as provided by the Constitution of the Republic of Ecuador in its article 14.

Environmental taxes	Environmental tax on vehicular pollution	Redeemable tax on non-returnable plastic bottles
Date created	November 2011	
Date of implementation	Since 2012	
Elimination	August 16, 2019, published in the Second Supplement to the Official Registry No. 19	In effect
Collected from 2012-2019	889.927,57	-
Collected from 2012-2021 Ene/April	-	245.770,75

**Table 1** Implementation of environmental taxes  
*Source: Own elaboration [Excel] with data from the Internal Revenue Service (2021)*

### Collection of the Redeemable Tax on Non-Returnable Plastic Bottles

Solid waste pollution in the country is a major problem that affects the environment, in the field of progress actions were taken such as the creation of the redeemable tax as a change to the environment using a strategy to achieve an increase in the green tax and thus mitigate the environmental impact to non-returnable plastic bottles; as a collection system that generates a fund for the State to carry out the management and control in the bottling and marketing companies for the payment of the tax, it is worth mentioning the primary characteristic of the collection is the conservation and preservation of the ecosystem so Ecuador establishes this tax (Reinoso-Haro & Mantilla-Falcón, 2020).

With the aim of reducing the environmental pollution produced by the late degradation of plastic components and encouraging the practice of the reuse of recyclable materials in Ecuador, executing the Redeemable Tax on Plastic Bottles, which was created in order to encourage recycling, reducing the great negative effects, and inquire about a change in the behavior of consumers and producers (Pinos Flores *et al.*, 2018).

**Regulations governing the redeemable tax**

In the case of Ecuador, the National Assembly in 2011 in the legal basis takes corrective actions with the environment in order to enact environmental conservation, the law creates the Redeemable Tax on Non-Returnable Plastic Bottles with the criterion of "positively influencing the control and reduction of environmental inoculation and on the other hand stimulate good environmental practices such as: recycle, reduce and reuse" (*García-Álvarez et al.*, 2020,p.2).

The Environmental Development Law issued in 2011 the redeemable tax on plastic bottles, based on the Constitution of the Republic of Ecuador that indicates the recognition of the right to nature where its inhabitants can live in a balanced ecosystem and in a healthy environment. In addition, the Constitution clarifies the need for the tax law to aim at promoting environmentally friendly practice (*Bedoya Jara et al.*, 2017).

**Environmental culture**

It is important to create an environmental culture in the inhabitants of the populations to promote the development of people's critical ethics for the mitigation of environmental impacts. How it is possible to mitigate but is through preparation, promotion in education that is promoted in the awareness of values, habits, capacities, on the problem and environmental change, to achieve sustainable development without affecting natural resources and obtain a quality of life of future generations (*Gonzaga Figueroa*, 2017).

Environmental education is the main tool, where people must become aware of how essential it is to preserve the natural environment and be able to improve their living conditions, values and behavior, as well as expand their knowledge to promote the action of preventing and mitigating the problems that exist currently and future, therefore, environmental education must be practiced. Learning is important in the educational system is invited to reflect on the change that must be made in the environment based on a globalized culture about the sustainability of the environment together with society (*Severiche Sierra et al.*, 2016).

**Tax evasion**

In Ecuador, as in many countries have become aware of the environmental pollution caused by solid waste, the environmental culture has been promoted that, if you pollute you are obliged to pay, but a problem that occurs is tax evasion we observe in the smuggling of non-returnable plastic bottles that enter the country illegally. Although the state's efforts have been insufficient, for the payment of taxes which affects public revenues by not being taxed and taking advantage of the lack of territorial controls (*Delgado-Olaya et al.*, 2017).

Tax evasion is the payment that must be made by the taxable person but that violates the tax rule which results in the total or partial reduction of the payment of taxes provided for by law. These events of non-compliance with the values that the State imposes to pay in the tax regulations; in theory it is based on the contribution declared by the taxpayer of which the value of the income will not be declared, tax evasion declines with the possibility of it being detected and the amount of the penalty (*Paredes Floril*, 2016).

Tax avoidance and evasion is one of the main impediments to the use of public resources for sustainable development in the country, tax non-compliance by the taxpayer is equivalent to large losses, if it is possible to collect that missing income could achieve the economic and social goals that are integrated into the Sustainable Development Goals (*CEPAL*, 2019).

**Mitigation of environmental impacts**

One of the processes for the mitigation of environmental impacts is the process of culture and education to the environment in the taxpayer, being evidence of the change of individual and social consciousness in the human being, in a system of attitude, knowledge, value and feeling to the problem that the planet lives by pollution, there are many organizations around the world that have extended actions to mitigate the environmental problem (*Gonzaga Figueroa*, 2017).

It is necessary to curb pollution by solid waste and mitigate the impact it causes to the environment that greatly raises climate change, being a serious problem to the planet and therefore to the human being, we must increase actions in favor of the climate; Ecuador with the commitment to mitigate these effects creates the redeemable tax to compensate for the damages caused by the contamination of non-returnable plastic bottles (González Ordóñez, 2016).

### Methodology to be developed

The focus of this research is qualitative-descriptive, since it uses the collection of reliable information or data depending on the object of study, in order to process the information obtained for the purpose of general analysis of the research. According to Corona Lisboa (2016) he points out that the qualitative method is most often used in the "social and related sciences" (p.82), based on qualities or interpretation of information in a subjective way close to reality.

The information obtained as a final result of this research was extracted from specialized scientific journals; Of scientific recognition, search for information in leyes, books, and other written or electronic documents in relation to the collection of green taxes on plastic bottles to conserve the environment; it is worth mentioning that the data were collected mainly from the Internal Revenue Service.

### Results

In Ecuador, the Redeemable Tax on Non-Returnable Plastic Bottles was created, forming a friendly and awareness-raising behavior with their environment; the impact produced by this tax is the application of a less polluting environmental culture by consumers and companies, opening up a recycling process for plastic containers through the incentive of the return and return of the tariff designated by the State, to those who collect, deliver and return non-returnable plastic bottles.

The difficult environmental situation that is currently visualized, its constant wear and tear and the need to protect and care for the environment, Ecuador took advantage of an environmental tax policy that fulfills two functions first of collecting the tax when bottling non-returnable plastic bottles and their deaduanization at the time of import; and secondly, as a conservation incentive, the return of the value paid to the collection centers and recyclers for collecting, delivering and returning plastic packaging. Since the tax was introduced, the collection has obtained effective revenues exceeding the budgetary goal, likewise the refund obtained a considerable increase mitigating the impact of polluting consumption and creating an environmental culture of recycling (Yáñez Sarmiento et al., 2017).

For his part, Jiménez-Vargas (2016) states that there is little political will to take advantage of environmental taxation as a way to obtain resources that allow to sustain a situation of well-being both for the environment and for the state coffers.

The Internal Revenue Service (SRI) is the regulatory body in charge of collections for environmental taxes, when analyzing what was collected in relation to the redeemable tax on non-returnable plastic bottles it is evident that in 2019 it was 35,906.77 below the collection target with a 99% compliance being satisfactory, while for the first quarter of 2021 it was 11,104.01 significantly exceeding the collection target with 112% see table 2, it denotes an increase in the goal compared to what was collected, because the bottlers and marketers at the country level reactivated their economic activities.

Indirect tax IRBP	Collection periods		
	2019	2020	2021 January- April
Collection goal	36.155,88	27.505,87	9.911,66
Collection	35.906,77	29.014,35	11.104,01
Compliance of the goal	99%	105%	112%

**Table 2** Collection of the redeemable tax on plastic bottles nationwide: Ecuador (In thousands of dollars)  
*Source: Own elaboration [Excel] with data from the Internal Revenue Service (2021)*

This tax collection helps environmental conservation through the recycling of non-returnable plastic bottles. From 2019 to 2020, the collection of the redeemable tax on non-returnable plastic bottles has fallen by 5.45% due to the pandemic that the country is going through due to COVID19, while in the first quarter of 2021 the collection is lower compared to the previous years of said tax in the Machala canton see table 3.

Year	Tax redeemable non-returnable plastic bottles
2019	3.292,36
2020	3.112,68
2021 January- April	224,14

**Table 3** Collection of the redeemable tax on plastic bottles in the Machala canton (In thousands of dollars)

Source: Own elaboration [Excel] with data from the Internal Revenue Service (2021)

From another perspective, Mogrovejo Jaramillo (2017) points out that in Ecuador environmental taxation demonstrates a promiscuous development. The sectors in which the State has paid the most attention due to its economic activity have been involved with the protection of the environment; with a vehicle tax and another aimed at non-returnable plastic bottles. The aforementioned tax has evidenced a public initiative to address the problem of waste, specifically plastic bottles made with polyethylene terephthalate. Promoting recycling through a recirculation method with benefits for the actors involved in the cycle and for the environment.

Just as this environmental tax is collected through the declarations by the bottlers and the marketers through the desaduanización, the Internal Revenue Service (SRI) returns the fee of 0.02 cents for the weight in kilograms to the collection centers and recyclers by prior request so that not all the declared non-returnable plastic bottles are returned in their entirety, in table 4 it is observed that in 2020 the refund of said environmental tax to non-returnable plastic bottles was 12,941,156.87, demonstrating a decrease of 57% compared to 2019 due to the effects of the pandemic at the beginning of March onwards, because the economy at the national level declined due to confinement, forcing to paralyze the sources of work.

Indirect tax IRBP	Return periods		
	2019	2020	2021
Refund of redeemable tax on plastic bottles	22.518.086,93	12.941.156,87	-

**Table 4** Refund of the redeemable tax on plastic bottles nationwide: Ecuador (In millions of dollars)

Source: Own elaboration [Excel] with data from the Revenue Service (2020)

The refund of the redeemable tax on non-returnable plastic bottles for recycling nationwide by recyclers and collection centers for 2019 was 75,060.29 tons, in 2020 of 43,137.19 tons, considering an average decrease of 31,923.10 representing approximately 39% per year see table 5. The purpose of the return is to reduce environmental pollution and stimulate the recycling process in the country.

Direct tax IRBP	Units returned in tonnes	Units returned in tonnes		
		2019	2020	2021
Collected non-returnable plastic bottles	75.060,29	43.137,19	-	

**Table 5** Return of non-returnable plastic bottles collection center and recyclers nationwide: Ecuador

Source: Own elaboration [Excel] with data from the Internal Revenue Service (2020)

Recyclers and collection centers that are certified by the Ministry of Industries and Productivity (MIPRO), as well as bottlers and importers, when they cannot calculate the exact number of non-returnable plastic bottles, recovered or collected in a given period, to make the settlement of the tax to be paid or refund of the tax, may consider the following values:

Year	Period	Resolution	Rate \$ per kg	Number of plastic bottles
2018	January	NAC-DGERCGC17-00000615	0,42	21 plastic bottles
	July-December	NAC-DGERCGC18-00000256	0,42	21 plastic bottles
2019	January	NAC-DGERCGC18-00000430	0,42	21 plastic bottles
	July-December	NAC-DGERCGC19-00000029	0,30	15 plastic bottles
2020	January	NAC-DGERCGC19-00000058	0,30	15 plastic bottles
	July-December	NAC-DGERCGC20-00000045	0,30	15 plastic bottles
2021	January	NAC-DGERCGC20-00000076	0,28	14 plastic bottles

**Table 6** Conversion of plastic bottles to kilos

Source: Own elaboration [Excel] based on resolutions of the Internal Revenue Service (2021)

The recovery of plastic bottles subject to the redeemable tax of the Internal Revenue Service (SRI), by official resolution has resolved the creation of a table of conversion values with non-returnable plastic bottles, recovered or collected at their equivalent in kilograms, which is updated semi-annually. Table 6 shows the different updates of the conversion values of non-returnable plastic bottles in kilograms from 2018 to the first half of 2021.

For his part, Valdivieso Ortega (2016) states that the Constitution of the Republic determines a healthy environment as a right and duty of citizens, since it is not enough to recognize it, but each person is obliged to take care of it. As for taxes, the taxable event of the same must manifest an economic capacity, the author defines it as an unrelated tax aimed at indivisible services, which makes it an optimal resource to be used as a measure of protection to the environment.

In relation to the redeemable tax on plastic bottles, it is clear that this has a purpose that is focused on reducing pollution, however, although there is a latent collection, its applicability as a tax is not clear, because its purpose of collection is null, since the nature of the taxes is to generate income to the treasury. In consideration, the tax is undoubtedly an excellent instrument used for the conservation of the environment, and since it is established in the Constitution of Ecuador it is considered as a constitutional guarantee mechanism with the purpose of conserving and protecting the planet (Valdivieso Ortega, 2016).

### Conclusionis

Since 2012 when the IRBPNR was created, the taxpayer did not perceive a direct impact of an increase or decrease of a polluting container, as happens with other taxes that were created based on the volume of products introduced to the environment; the impact generated by tax collection and environmental conservation since the entry into force of the tax has registered positive growth values in the beverage sector, as well as the greater number of bottles recovered or collected.

Therefore, the policy of this redeemable tax is to collect a monetary value for each plastic bottle to promote environmental conservation, which has been impaired by the excessive consumption of plastic; the tribute implemented gender sources of work in the recycling sector, since its applicability has increased the greater number of people who are dedicated to collecting plastic bottles.

Based on the results obtained, it is evident that the collection of the IRBPNR at the country level by the bottlers and marketers through prior declaration has been satisfactory compared to the proposed collection target, that is to say that it met with 99% for 2019, 105% for 2020 and for 2021 with 112%; on the other hand in the Machala canton there is a gradual decrease between 2019 and 2020 with 5.45% and for the first quarter of 2021 it is considerably lower in the presence of COVID-19; as for its return in the last year is null as there is no prior submission of application by the collection centers and recyclers that for reasons of pandemic have stopped their commercial activities of receiving non-returnable plastic bottles, however, the Internal Revenue Service has the expectation that, as well as manufactured they will be totally returned.

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