



Survey and Assessment of Environmental Taxes in the Caribbean

**Marlene Attzs
Malini Maharaj
Gopiechand Boodhan**

**Inter-American
Development Bank**

Department of Research
and Chief Economist

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Abstract*

Although the Caribbean region relies heavily on its natural assets as sources of income, generally for tourism and in particular cases from agriculture and energy, environmental taxes in the region have been little studied. This paper therefore is intended to reflect the existing economic instruments in place for capturing the use (and abuse) of the region's environmental and natural resource assets to reflect the degree to which adopted actions have been effective. Data paucity has been highlighted as a major obstacle in permitting rigorous assessment; the report therefore draws on the available literature and experiences for guidelines. This final report presents an inventory of economic instruments with an emphasis on assessing the environmental taxes in seven Caribbean countries that are members of the Inter-American Development Bank: Belize, Bahamas, Barbados, Jamaica, Guyana, Suriname and Trinidad and Tobago.

JEL classifications: H23, N56, Q58

Keywords: Environmental taxes, Tourism, Energy, Agriculture, Caribbean

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1. Introduction

1.1. Project Overview

The interface between the economy and the environment suggests that without mechanisms such as incentives or regulations in place, environmental damage will occur. Regulatory instruments, whether command and control or market based, are the means through which market failure in the form of environmental damage might be corrected. With growing attention to and recognition of environmental issues, governments are looking for the best options for reducing environmental damage (externalities) caused by various consumption and production activities in the economy. While numerous options such as command and control policies and environmental levies exist, economists have argued that these are inefficient instruments for achieving the objective of reducing environmental damage (Baumol and Oates, 1988). OECD (2011) and Bailey (2002), for example, suggest that such “traditional” arrangements (standards, bans, etc.) are generally prescriptive and both environmentally and economically inefficient because these types of instruments impose uniform obligations on polluters, which ultimately increase compliance costs while also providing little incentive for actions to reduce negative environmental externalities below set standards.

Highlighted as part of this study is the reality that the Caribbean region is significantly challenged by a lack of comprehensive data collection that allows for thorough empirical analysis of the impact of such taxes as well as the quantitative assessment of double dividend potential. The potential benefits of environmental taxes in the Caribbean are summarized as follows:

1. Many Caribbean economies are dependent on their natural resource endowments to attract visitors, and this is the foundation of the regional tourism industry. Environmental taxes that are well coordinated and sufficiently targeted could help preserve the natural environment on which the tourism industry and overall economy depend. Management of natural resource endowments is one of the underlying tenets of sustainable tourism development.
2. Targeted environmental taxes could provide “double dividends” in Caribbean economies, that is, taxation that not only reduces negative externalities by

providing an incentive to reduce environmentally damaging actions but simultaneously also allows governments to remove distortionary taxation policies by providing additional revenue streams. Environmental taxes could drive much-needed improvements in efficiency, e.g., taxes on fuel use could improve fuel efficiency which in turn could reduce overall per capita dependence on petroleum products, reduce carbon emissions, reduce foreign exchange expenditure on the import of fuels and spur the development of alternative forms of clean energy such as solar and wind energy. There could also be an additional benefit to an energy-exporting country like Trinidad and Tobago: if taxes reduce local consumption of petroleum products, this releases quantities of petroleum product that could be exported and therefore boost government revenues and foreign exchange earnings.

Unfortunately, there are few examples of taxes that are intended to internalize a specific environmental externality. A plethora of “environmentally related” taxes do, however, exist. The primary purpose of these taxes (such as general fuel levies and import duties on motor vehicles) is clearly revenue collection and not the internalization of externalities related to their production or consumption; however, positive effects do occur. This study is of particular importance given the policy prescriptions that arise out of the recognition that environmental taxes can play a significant part in environmental management and the optimization of the use of the Caribbean region’s natural resources for economic survival and sustainable development.

This project will survey the use and potential use of environmental taxes in selected Caribbean countries: Bahamas, Barbados, Trinidad and Tobago, Belize, Guyana, Jamaica and Suriname. The selected countries are representative of the Caribbean region in terms of a cross-section based on environmental and geographic profiles, as well as social and economic diversities. Highlighted in this project are the environmental profiles of these countries and the prevailing externalities that have been the basis for concern and hence management. In addition, the selection of the above countries also facilitates the analysis of taxation in economies that are dependent on the environment as a “Source,”¹ including “Sun, Sea and Sand,” forests and agriculture, and fossil fuels.

¹ The Environment has three interactions with the Economy via the provision of Source services vis-à-vis resources; Sink services vis-à-vis the assimilation of wastes and emissions; and the Threat interface.

Many Caribbean economies are heavily dependent on tourism (“Sun, Sea and Sand”). These countries are faced with the conundrum of either “under-taxing” their tourism product to capture a greater portion of the market, thereby running the risk of losing their entire market due to the environmental repercussion from the lack of absorptive capacity, or becoming less competitive as tourism destinations or as attractions for foreign investment in the tourism industry. Jamaica is a case in point: as a tourism-dependent economy, Jamaica’s fiscal system has been cited as “full of special provisions favoring the tourist industry,”² where the General Consumption Tax (GCT) on tourism activities is a single-digit percentage of total tourism revenue. Edmiston and Bird (2006) identified that favorable tax rates, tax credits such as the 2.95 percent tax credit on “any expense related to services rendered by a person engaged in a tourism activity” and special deductions such as a special alcoholic beverage credit equal to 133 percent of the actual GCT, allowed a lowered GCT payable by the tourism sector in 2002.³

A cross-section of Caribbean countries has been selected for assessment of their current use and potential use of environmental taxes and other economic instruments aimed at environmental management. A number of environmental instruments exist in the region, including the following:

- Trinidad and Tobago—the Green Fund Levy enacted in 2000: 0.1 percent of gross sales receipts of all companies conducting business in Trinidad and Tobago, payable at the end of each quarter;
- Jamaica—the environmental levy fee effective 2007, 0.5 percent of cost of insurance and freight value on imported products; and
- Barbados—the environmental levy in existence since 1996 at a rate of 1 percent but increased to 2 percent as of July 1, 2007. The levy is applied on goods imported in containers and empty containers made of plastic, glass or metal, paperboard. All other goods imported in containers other than plastic, glass, metal or paper board incur a 1.5 percent environmental levy. The environmental levy is also charged at varying rates on motor vehicles, tires, refrigerators, freezers, television sets, stoves and ranges. There is also the existence of differentiated tariffs for the collection of solid waste.

² Edmiston and Bird (2006: 8).

³ For further elaboration, see Appendix.

Other instruments in use include the following:

- Barbados—Deposit-reimbursement system for mass consumption of bottles; fiscal incentives for construction of rainwater holding tanks and imported equipment to save water at hotels; and fiscal exoneration of solar water heaters.
- Jamaica—User fees for volume of water extracted.
- Belize—Protected Areas Trust Fund (while not by definition an economic instrument, it can be used as a complement to or be funded by economic instruments such as conservation fees).

In addition to the above, other fiscal instruments that have can have an environmental implication without being driven by an environmental motivation exists in the Caribbean. For example:

- Jamaica—General Consumption Tax, the standard rate of which was increased on January 1, 2010 from 16.5 percent to 17.5 percent (Tax Administration of Jamaica, 2010). The gas tax, however, was reduced from 15 percent to 10 percent in 2011 (*Jamaica Gleaner*, 2011).
- Trinidad and Tobago—A fuel subsidy which amounted to US\$443.81 million in 2010 (Look Kin, 2011).

The relevance of this study is based on the overarching implications of economic activities surpassing the regenerative, absorptive and assimilative capacities of the natural environment without proper mechanisms in place to guide and motivate sustainable economic behaviors. For the Caribbean region in particular, as small (and island) developing states in most instances, there are key interrelationships between economic and environmental vulnerabilities.⁴ The environmental vulnerability index illustrates that, with the exceptions of Guyana and Suriname, the selected case study countries range from being at risk to highly vulnerable.⁵ The

⁴ Huber, Ruitenbeek, and Serôa da Motta (1998: 47) identifies that the approaches to the development of market based instruments for the Caribbean region should reflect “stylized facts” which includes the fact that “[Caribbean] small-island vulnerabilities and institutional opportunities are conceptually different from those in larger riparian countries.”

⁵ See Environmental Vulnerability Index (http://vulnerabilityindex.net/EVI_Country_Profiles.htm).

economic vulnerability index for Barbados and Jamaica also indicates high levels of economic vulnerability (Briguglio and Galea, 2003).

Tourism remains a key industry in the Caribbean context.⁶ This has been attributed mainly to the increase in leisure-related activities of visitors. Moreover, the tourism sector has become the one of the most economically viable industries, based on the general topography of the islands of the Caribbean and its natural appeal to foreigners. In Belize, for example, 75-80 percent of all coastal land has been obtained by foreigners, and it will ultimately be converted into facilities for the tourism sector.⁷ This being said, most of the countries identified in the study rely (to varying degrees) on the tourism sector (Pantin and Attzs, 2008, 2009).

To place Caribbean tourism in a larger context, the world tourism industry has significantly grown since the 1950s, to the benefit of many destination countries by the improvement of their production levels, flow of income, employment rates, and foreign exchange reserves. In the midst of all such benefits, it is imperative that the unaccounted economic, social and environmental costs also referred to as negative externalities be both confirmed and internalized. The unaccounted economic costs arise from opportunity costs, social costs from negative imbalance between Government tourism expenditure and government revenue from the specific industry and the difficulty of calculating the cultural and environmental repercussions of economic activities in the tourism industry (Archer and Cooper, 1995).

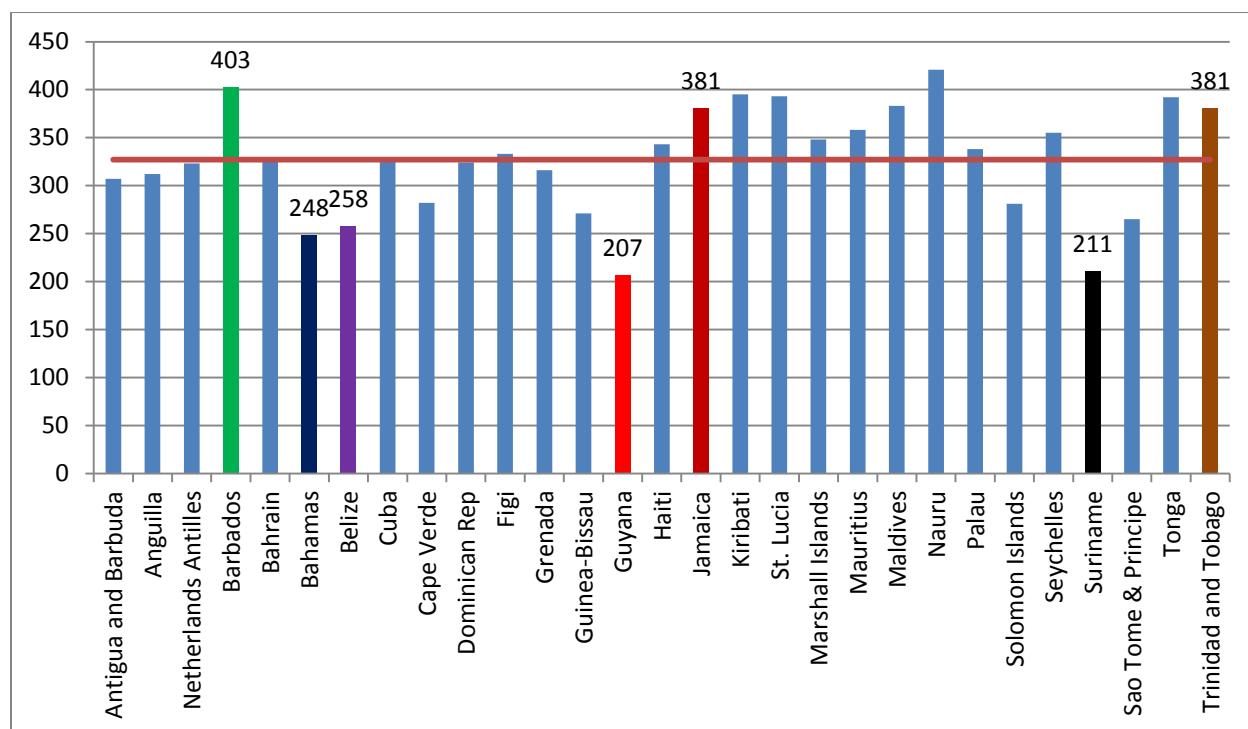
The natural environment is the main component of the tourism product and, as such, many economies have derived economic benefits that can potentially contribute to sustained growth and to some greater extent the continued sustainable development of these extremely vulnerable countries. This is evidenced by their Environmental Vulnerability Index (EVI), comprising values 381, 248, 403 and 381 for Jamaica, Bahamas, Barbados and Trinidad and Tobago, respectively. It should be noted that among small island states, the general range of the EVI is between “At Risk” and “Extremely Vulnerable.” In the Caribbean region, Guyana’s EVI of 207 classifies the country as “Resilient.” Figure 1 below illustrates that the selected case study countries have significant variability in terms of the EVI. Of 29 selected Small Island Developing States (SIDS), Barbados, Jamaica and Trinidad and Tobago have greater than the

⁶ The sector remains the key economic activity for several Caribbean countries even in light of the events of 2001 and the recent financial crisis.

⁷ Flomenhoft, Cayetano and Young (2007).

average vulnerability of these SIDS (327.03), while Bahamas, Belize, Guyana and Suriname have below average EVI scores.

Figure 1. Environmental Vulnerability Index for Selected SIDS



Source: Generated from data accessed at http://vulnerabilityindex.net/EVI_Country_Profiles.htm.

UNDESA (2010) has also identified that among Small Island Developing States (SIDS), Jamaica, Belize and Suriname have above-average scores for economic crisis vulnerability, while Barbados and Trinidad and Tobago have below-average scores.

Endowments loom large in the macroeconomic indices of the selected countries. Jamaica, Bahamas and Barbados, for example, rely on the tourism sector for a significant proportion of GDP earnings. According to the World Tourism and Travel Council, direct and indirect activities account for 24 percent, 47 percent and 47 percent of GDP, respectively. Trinidad and Tobago depends heavily on the exploitation of various hydrocarbon resources. Based on the *Annual Economic Survey 2010* (Central Bank of Trinidad and Tobago, 2011), data indicate that the contribution of the oil and gas sector revenue remains high, at almost 43 percent of total revenue of Trinidad and Tobago for that fiscal year. An interesting point of contrast is the “resilient” environmental vulnerability indicator for Guyana and Suriname (207 and 211,

respectively), which provides a basis for elaborating on the heterogeneity of the countries chosen. Guyana, for example has benefitted from a partnership with Norway to protect Guyana's tropical rainforest; the mechanism through which Guyana is supposed to reduce forest-based greenhouse gas emissions is known as the Guyana REDD and Investment Fund.⁸

The above shows the continued dependence of the case study countries on sectors that are traditionally not known to be in tune with sound environmental management practices but simultaneously highly dependent on natural resources and the environment. Moreover, for those countries reliant on tourism revenue, the preservation of natural environment resources, specifically coastal water and beach quality, is essential to the maintenance of tourism arrivals and revenue. It should be noted that, in some of these countries, land-based effluent discharges are having negative coastal impacts such as on the viability reefs and turbidity of seawater where tourists congregate. If these negative coastal impacts are left unabated then the viability of the tourism industries could be severely impacted. Given the validity of economic instruments for environmental management in the region, several factors challenge the usefulness of such instruments. Kraemer et al. (2003) have identified, for the (Latin American and) Caribbean region, impediments to the implementation of economic instruments that include the following: i) institutional and administrative challenges, ii) human resources constraints, iii) financial challenges, iv) lack of data and v) social challenges. The countries that have been selected provide a comprehensive understanding of the current and potential use of environmental taxes in economies of the Caribbean with varying ranges of environmental profiles, as they are affected by individual inherent vulnerabilities, climate change impacts, political and economic institutions and social norms.

The basis of the use of environmental taxes will be discussed, highlighting in each particular case study country the externalities and associated environmental challenges that require environmental management. Within the scope of surveyed economic instruments, a review of existing "environmental taxes" that meet the definitional criteria (OECD, 2011; Eurostat, 2001) is intended to illustrate firstly, environmental taxes that exist in the Caribbean BMCs and secondly, the impact, if any on the specific environmental issues and their associated fiscal and economic implications. In addition, other taxes that have underlying or indirect

⁸ See <http://www.economicinstruments.com/index.php/land/other/article/260->

environmental objectives, motivations or impacts are also considered to address how such taxes have been able to reconcile the interaction between the economy and the environment.

1.2 Objectives

The report focuses on four broad objectives:

1. To identify environmental challenges/externalities faced by the respective case study countries as a basis for the use of environmental taxes and other instruments;
2. To comprehensively survey all existing instruments for environmental management in each of the case study countries, identifying particular characteristics of such instruments including the magnitude and governance framework (where such exists) for the use of funds, etc.;
3. To review the empirical literature on the economic and fiscal impacts of economic instruments by sector (where secondary sources are available) and qualitatively assess the likely applicability and effectiveness of these instruments in the case study countries;
4. To determine the extent of data gaps that exist in the case study countries to facilitate the aforementioned assessments and to suggest how these gaps might be filled.

In addition to the abovementioned four objectives, the study will also entail a review of the political economy for the implementation of such instruments, which will provide a contextual framework for policy prescriptions and recommendations.

The preliminary questions that this Study seeks to answer are the following:

- What, if any, are the existing environmental taxes utilized in the selected Caribbean countries?
- What are the fiscal revenues collected from these taxes?
- What are the possible environmental impacts of these taxes, inclusive of sectoral impacts?
- What environmental improvements or behavior have these taxes incentivized?

- What are the potential uses for environmental taxes in selected Caribbean countries—that is, how environmental taxes can be utilized as more than revenue generating tools but also as tools for addressing environmental concerns?
- What are the possible micro and macroeconomic impacts of these taxes?
- What are the data gaps that exist and how might these gaps be filled?

1.3 Scope and Methodological Approach of Report

Based on the terms of reference and the stated objectives, the Study will involve the following framework:

- A review of the literature on economic instruments for environmental and natural resource management and the assessment of these economic instruments in developing countries.
- Identification and classification of economic instruments for environmental protection and natural resource management in the Caribbean region, inclusive of their scope, remit, etc.
- Survey of national environmental and government agencies in the respective countries to fully appreciate their national circumstances with respect to their actual or potential fiscal environment for the adoption and implementation of environmental taxes. The national surveys will be complemented by reviews of regional policy making institutions and special interest groups such as the Caribbean Tourism Organization and the CARICOM Secretariat.
- Qualitative assessment of taxes in relation to their environmental benefits and their outcomes in light of the political and institutional framework and other challenges of the case study countries.

2. Literature Review

2.1: What Are Environmental Instruments?

Traditional economics has neglected the role of the environment which has led to institutional, market and policy failures evidenced by environmental degradation and mismanagement. Environmental degradation is therefore a result of the failure of markets to capture the use and damage of the natural environment by firms and individuals who do not pay for its use and abuse (Mintz and Olewiler, 2008). Policy failures result in marginal production costs lower than social opportunity costs which encourage inefficient and excessive use of inputs that are subsidized (Panayotou, 1994). Institutional failures have been described as “*open access and insecure tenure*” which also undervalues the resources, as do market failures. This is usually as a result of poor signals that lead to over-production and over-consumption of resource depleting commodities and under production and under consumption of resource saving commodities (Panayotou, 1994). Where the market has failed, economic instruments have been developed to incorporate the role and functions of the environment in rational economic decision making, and thereby assign “value” to the once neglected public good.

Economic instruments have been identified in the literature (Perch, 2000; UNEP, 2003; Paquin and Sbert, 2004; Panayotou, 1994) as tools of policies that alter or guide behavior through price signals and other incentives towards the achievement of environmental objectives, the core of which is to reduce or eliminate over use and damage of the environment in the pursuit of meeting the ecological objectives of sustainable development.⁹ These instruments have incentive functions- creating the necessary incentives for behaviour modification, fiscal and financial functions- increasing revenue (where earmarked revenue should be distinguished from general government budgeted revenue), and other “soft functions” (Kraemer et al., 2003). The soft functions of economic instruments include capacity building and improvements in implementation.

Panayotou (1994) identifies that economic instruments [as part of the environmental policy toolkit] aim to reconcile private and social costs through the internalization of externalities and their associated external costs, a process described by Panayotou (1994) as full cost pricing. The alignment of private and social costs ensures that externalities become part of

⁹ For more, see World Commission on Environment and Development (1987) and Principle 16 of the Rio Declaration (United Nations Conference on Environment and Development, 1992).

the decision-making process (Perch, 2000). Among the economic instruments applicable to environmental management are tariffs for pollution, the creation of negotiable market permits, and payment for environmental services (UNEP, 2003), the removal of distortionary subsidies, secure property rights, user charges, pollution taxes, refundable deposits and tradable emission permits (Panayotou, 1994). These instruments can be used as substitutes of command and control instruments or can be used as complements in the attainment of environmental policy objectives.

Command and control policy tools are regulatory measures that seek to directly discourage behavior with negative environmental impacts (Perch, 2000) but have shortcomings in that there are reliant on monitoring and evaluation, enforcement capacity and administration (Perch, 2000) in the form of laws, regulations, standards, permits, licenses, sanctions, etc. (Paquin and Sbert, 2004). Economic instruments on the other hand offer the advantages of introducing greater flexibility through incentives based on prices and costs and of obtaining income/revenue which can be used for financing environmental management objectives (UNEP, 2003). It is also suggested that the success of economic instruments lie with the efficiency of markets and the existence of an institutional platform with a capacity for implementation at varying levels (UNEP, 2003).

For developing countries, experience (cited by Paquin and Sbert, 2004) has indicated that selecting and designing effective environmental management instruments should incorporate the following criteria:

1. Choosing an instrument adapted to the context (UNEP, 2004, further elaborates on this criterion as essential in formulating an ideal policy package for dealing with the environmental problem and fitting with the institutional capabilities of the country);
2. Influencing behavior;
3. Achieving cost-effectiveness; and
4. Limiting private costs and economic impacts.

This process also involves the selection and designing of compliance promotion and law enforcement tools, monitoring and review, institutional capacity and sustainability and public participation (Paquin and Sbert, 2004; UNEP, 2004).

Policy options for environmental management have been categorized traditionally as either market-based or command and control. Kumar (2006), however, offers a more “meaningful” classification where instruments are categorized into four types: Using Markets, Creating Markets, Environmental Regulations and Engaging the Public. Panayatou (1994) classifies economic instruments for environmental protection and natural resource management into the following categories:

- Property Rights;
- Market Creation;
- Fiscal Instruments;
- Charge Systems;
- Financial Instruments;
- Liability Systems; and
- Bonds and Deposit refund systems.¹⁰

It has been asserted that the success of economic instruments is dependent on adequate design for meeting specified objectives and the existence of the basic conditions of a “modern” market, which include information, property rights, and a reliable legal system (Paquin and Sbert, 2004). Cultural and social perspectives, however, can challenge the effectiveness of economic instruments, as can the possibly undesirable regressive nature of some economic instruments. Paquin and Sbert (2004), for example, note “in Caribbean countries economic instruments have very low political acceptance because people believe them to affect the poor.”¹¹ They add that, as a concern for developing countries, environmental taxes are constrained by design flaws, lack of institutional capacity, political will for monitoring and enforcement—especially for levying taxes that are sufficiently high to have any environmental impact.

2.2 Defining the Environmental Tax

The literature includes several definitions of environmental taxes. According to Panayatou (1994), environmental taxes are subsets of fiscal instruments and take the form of:

- Pollution taxes (effluent and emission);

¹⁰ In addition to the above, Paquin and Sbert (2004) also include payments for environmental services.

¹¹ Paquin and Sbert (2004: 32).

- Input taxes;
- Product Taxes;
- Export Taxes;
- Import Tariffs; and
- Tax differentiation.

According to Kumar (2006), environmental taxes and charges are instruments that are classified as “Using Markets.”

Alternatively, an environmental tax has been defined as: “A tax whose tax base is a physical unit (or a proxy of it) of something that has a proven, specific negative impact on the environment,” which includes all taxes on energy and transport (Steinbach et al., 2009: 3; Eurostat, 2001: 4). The motives of such taxes remain unspecified as either fiscal or environmental, with greater emphasis on the physical unit of the tax (Steinbach et al., 2009). This is further emphasized by the OECD/EC guideline which stipulates that the: “environmental effect of a tax comes primarily through the impact it has on the relative prices of environmental related products and activities, in combination with the relevant price elasticities (OECD, 2000: 8). In some instances, the term “environmental tax” is specified as an “environmental related tax” which is defined as: “any compulsory, unrequited payment to general government levied on tax bases deemed to be of particular environmental relevance. Taxes are unrequited in the sense that benefits provided by government to taxpayers are not normally in proportion to their payments” (Steinbach et al., 2009: 4). Further to the above view, the environmental impact of such taxes is considered in terms of what happens to producer and consumer prices. Steinbach et al. (2009) identified that Eurostat (2001) has categorized environmental taxes into four main groups: energy taxes, transport taxes, pollution taxes and resources taxes. Table 1 illustrates the tax bases included in the environmental tax statistics framework.

Table 1. Tax Bases Included in the Environmental Tax Statistics Framework

Tax Base	Descriptions/Examples
Measured or estimated emissions to air	Measured or estimated NO _x emissions
	SO ₂ content of fossil fuels
	Other measured or estimated emissions to air
Ozone-depleting substances (e.g., CFC or halon)	
Measured or estimated effluents to water	Measured or estimated effluents of oxidizable matters (BOD, COD)
	Other measured or estimated effluents to water
	Effluent collection and treatment, fixed annual taxes
Certain non-point sources of water pollution	Pesticides (based on, e.g., chemical content, price or volume)
	Artificial fertilizers (based on, e.g., phosphorous or nitrogen content or price)
	Manure
Waste management	Waste management in general (e.g., collection or treatment taxes)
	Waste management, individual products (e.g., packaging, beverage containers)
Noise	e.g., aircraft take-off and landings
Energy products	Energy products used for transport purposes: Unleaded petrol, Leaded petrol, Diesel, Other energy products for Transport purposes (e.g., LPG or natural gas)
	Energy products used for stationary purposes: Light and Heavy fuel oil, Natural Gas, Coal, Coke, Biofuels, Other fuels for stationary purposes, electricity consumption, electricity production, district heat consumption, district heat production
Transport	Motor Vehicles, one-off import or sales taxes
	Registration or use of motor vehicles, recurrent (e.g., yearly) taxes
Resources	Water abstraction
	Extraction of raw materials (except oil and gas)
	Other resources (e.g., forests)

Source: Compiled from Eurostat (2001).

Eurostat (2001) also identifies distinctions between charges, fees, levies and environmental taxes. Charges and fees are payments for a service and, unlike taxes, are therefore required payments. Levies concern all kinds of compulsory payments (Eurostat, 2001).

Some, however, have asserted that environmental taxes and environmentally-related taxes cannot be considered interchangeable. For example, Soares (undated) highlights the cases of Portugal, Denmark, and The Netherlands to illustrate that so-called “environmental taxes” have not proven as successful in expected environmental improvement impacts as they have been in the generation of revenue. The common theoretical perception of environmental taxes therefore does not always meet with what is implemented in reality. Soares (undated) suggests that the definition of an environmental tax should take as its reference point the effects of the tax and not the tax base so as to differentiate between environmentally-related taxes and environmental taxes. Environmentally-related taxes (taxes raised on polluting bases) are geared as financial instruments with an environmental side effect, but they can be redesigned to meet the concept requirements of an environmental tax (Soares, undated). Consideration of whether a tax fits into either of the categories of environmental taxes or environmentally-related taxes depend on the answers to the following questions:

- Is there an induced behavioral change?
- Is the tax on the polluting base resulting in an environmental effect in the form of internalization of externalities?
- Is the tax fulfilling any overall environmental goals such as reductions in GHG emissions?
- Is there a fiscal effect associated with the tax, i.e., a revenue-generating impact?

Perch (2000) likewise states that the follow criteria should determine the selection of environmental instruments:

- Whether there is a specified goal/objective/target of the instrument;
- Whether the implementation of the instrument directly or indirectly contributes to environmental management or is “environmentally effective;” and
- Whether data are available on the instrument and the associated environmental issue.

2.3. Theoretical Background of Environmental Taxes

Externalities exist as third party, spill-over effects of production and consumption that are not considered in market transactions. Negative externalities, commonly in the form of environmental pollution—expressed as a non-excludable, non-rival public “bad”—imply a divergence between private optimum and social optimum, leading to excessive production of goods and bads as well as excessive exploitation of natural resources (Kumar, 2006). The first treatments of the need for the internalization of externalities appear in the work of Pigou (1920), Baumol and Oates (1988), and Coase (1960).

The Pigouvian tax (Pigou, 1920) sought to rectify this problem by ensuring that the external marginal costs are internalized in the prices offered to tourists to maximize social benefits. Moreover, in Baumol and Oates (1971) cost-efficient taxes are also identified as a solution by ensuring that a pre-determined level of environmental quality is maintained. These two different taxes have, however, been difficult to implement because of the complexity of calculating the external marginal cost to impose on tourists in a Pigouvian tax and, for both types of taxes, politicians’ preference for regulation rather than taxation. In the midst of all of these constraints to environmental taxation in the tourism industry, the realities of the negative externalities and the need for public expenditure for restoration must be taken into consideration.

Environmental taxes are used to ensure that there is an optimum utilization of resources through the prevention of underpricing (control demand). They may also, as with the “Balearic Ecotax,” seek to provide funding for “improving the environment and level of basic infrastructure” (Palmer and Riera, 2003) of the destination environment. While there are differing rational arguments both for and against the implementation of an environmental tax, its effectiveness depends acceptance. The key to acceptance is, in turn, widespread knowledge of the benefits that would accrue from that tax’s implementation in spite of its costs.

The Pigouvian tax is essential for the achievement of optimum resource allocation. The value of the tax is based on the social marginal cost arising from economic activity to be charged solely on the pollution generator/producer and not to those affected. In the presence of externalities, output levels should be set where price equals social marginal cost of production, while in the absence of externalities price should just equal private marginal cost. Over the years there have been increasing critiques of the Pigouvian tax to the point that in some instances it is not deemed necessary for optimum resource allocation. This was highlighted by Coase (1960)

under the oligopolistic market structure, where the implementation of a Pigouvian taxes would result in the misallocation of resources due to the preemptive adjustments made by the few firms in the industry to correct the market problem. This tax, which seeks to assist with internalizing the costs of externalities, is also faced with difficulties in proper implementation as listed below:

- Estimation of social costs;
- Sourcing of adequate data to determine social costs;
- Use of trial and error to assist in accurately determining the Pigouvian tax to be charged; and
- The presence of multiplicity of local maxima (i.e., different options to achieve optimum resource allocation) due to the presence of strong externalities (Portes, 1970; Baumol, 1964) where, if the wrong one is chosen, could inferior equilibrium and opportunity losses to society could result.

The presence of these difficulties spurred the development of an alternative approach identified by Baumol (1972). This approach entails setting minimum standards of acceptability and maximum pollutant levels to formulate a tax that can achieve the quality standards initially indicated. The alternative approach provides fewer constraints on implementation for the following reasons:

- Less information is required to set the tax to be charged on polluters;
- High administrative costs and inefficiencies are avoided;
- The effects are long-lasting;
- As this approach is not dependent on law enforcement, it does not pose a financial burden on the state;
- Pollution and environmental damages are reduced at a minimum cost to society;
- The tax to be charged on polluters could be properly determined with the assistance of trial and error;
- There is room for modification.

2.4 Advantages and Disadvantages of Environmental Taxes

The numerous benefits of environmental taxes have caused them to receive increasing attention from OECD countries as key instruments to reduce environmental impacts by creating a constant price pressure for improvement. As Pigou (1920) explicitly states, “It is possible for the State to make the difference disappear for any activity (in which there is no contractual relationship), by promoting or limiting, by extraordinary means, investments in such activities.” He further emphasizes “The best known methods of promoting and restricting investments can take the form of incentive payments or taxes.” It has also been suggested that changes in relative prices (via the use of taxes, subsidies or market price movements) have had the strongest effects on influencing energy efficiency and energy use (Ekins, 2009).¹²

Environmental taxes directly on emissions allow firms to employ any method that may reduce emissions, whereas command and control typically targets a specific portion of production chains such as carbon content of fuel. It is important to note that taxes create dynamic efficiency, which is not seen in command and control policies; in other words, the incentive to reduce emissions exists at every level of emissions, as opposed to a mandated percentage reduction in emissions (OECD, 2011). Static efficiency is also created by well-designed taxation policies, since the lowest-cost abatement measures are utilized first, resulting in a minimal cost to society (Tietenberg, 1992). Taxation also creates long-term incentives for innovation by increasing the cost of pollution, and it encourages a larger variety of innovation methods for the same reasons that it facilitates dynamic efficiency (OECD, 2011).

One rationale for the use of environmental taxes is that an environmental tax addresses the problem of market failure by pricing in environmental costs. In other words, a properly designed environmental tax will increase the price of a good or activity to reflect the environmental impact it has on others. Therefore, the externality is internalized in the market price, according to the principle that the full environmental cost of a polluting activity should be reflected in the price, as asserted by Mintz and Olewiler (2008). Another reason for the use of environmental taxes is that it enables firms and consumers with the ability to identify the least-costly approach to reducing environmental damage. The government of a country can use environmental taxes to guide the economy toward certain environmental solutions in relation to

¹² Environmental taxes in OECD countries are also having impacts on the Caribbean tourism industry, such as the United Kingdom’s Air Passenger Duty.

others. Moreover, polluting activities that have a higher cost due to the environmental tax will be less attractive to economic agents, and market forces will lead actors to choose the least costly approach to reducing environmental damage.

Other benefits of environmental taxes include the following:

- They provide a continuous incentive to abate environmental damage even though consumers and businesses have already achieved high levels of abatement;
- Environmental taxes, which increase the cost to the polluter, provide an incentive for the development of new innovations and the adoption of existing ones;
- Environmental taxes increase the competitiveness of less-polluting alternatives, such as public transport in comparison to automobiles;
- Environmental taxes have the potential to correct market distortions by replacing existing distortionary taxes with corrective taxes that improve on the efficiency and equity of the taxation system as a whole (Mintz and Olewiler, 2008); and
- Taxes can induce investments in “cleaner” technology.

Fullerton, Leicester, and Smith (2008) indicate that efficiency is emphasized when environmental policy instruments such as environmental taxes and emissions trading are used. Conventional regulatory policies are based on emission standards and technology mandates, but when compared to economic instruments, environmental taxes can reduce the costs of achieving a given level of environmental protection. Command and control regulations can also be utilized if they are deemed necessary and more effective than taxes.

An advantage of environmental taxes is that they have the ability to minimize costs due to two reasons. The first reason is founded on the premise that other policy instruments do not have the ability to distinguish different polluters’ marginal cost of abatement, and as a result abatement may come about at a high cost. Economic instruments such as environmental taxes, on the other hand, provide incentives to polluters to abate in the least expensive manner, and abatement can therefore be undertaken at a lower cost than other instruments. The second reason is that economic instruments do not necessarily need the regulatory authority to gather detailed

information on individual sources of abatement costs, thus lowering the authority's administrative cost.

A second advantage, according to Fullerton, Leicester, and Smith (2008), relates to the “dynamic innovation incentive” of environmental taxes. Using regulatory policies, which are aimed at polluters to reduce emissions to a certain level, or utilizing a particular form of technology to limit pollution will succeed in bringing about a level of conformity but will not induce polluters to reduce emissions to a lower level. However, utilizing environmental taxes will on a constant basis provide polluters with an incentive to reduce emissions to an extent which is below the cost-effective level due to per unit cost on residual emissions. As a result there will be an incentive for polluters to develop technologies which have a marginal cost under the tax rate.

A third advantage of environmental taxes according to Fullerton, Leicester, and Smith (2008) is their “robustness to negotiated erosion.” Efficiency in using regulations to control pollution requires firm-by-firm negotiation of individual abatement or technology requirements. Moreover, command and control regulations require different levels of pollution abatement from different firms so as to minimize overall abatement cost. It should be noted, however, that the regulator will be dependent on the firm for the provision of the firm's abatement costs and will have to enter into discussions with the given firm. Therefore, the firm has control of a key element needed to set regulatory policies, and as a result the firm can use this control to its advantage in order to implement less stringent abatement targets. On the other hand, environmental taxes that are uniform achieve a cost-effective distribution of abatement which takes into consideration the diverse abatement costs of firms in a robust and non-negotiated way. Moreover, all firms will face the same environmental tax at the same rate, and the regulator will not be required to take into account the different circumstances of firms, whose bargaining power of firms will be minimized.

Another advantage identified by Fullerton, Leicester, and Smith (2008) is the revenue potential of environmental taxes where payments are made on each unit of residual emissions. The stability and predictability of this form of tax are of concern from a fiscal policy side due to the behavioral patterns of economic agents. However, the authors state that these problems are overstated, as an environmental tax based on inelastic-demanded commodities such as energy will be less affected by behavioral responses.

One of the disadvantages identified by the authors relates to geographically-varying damage. Damages can vary with source of emissions and, as a result, the application of a uniform environmental tax will result in inefficiency. To correct for this, there is the need for source-by-source regulation to attain more efficient outcomes. The authors indicate that environmental taxes can be applied to different sources of pollution at varying rates; however, the tax may be influenced by lobbying from regulated firms. Moreover, certain types of environmental taxes will have to be implemented at uniform rates even though damage differs across locations.

A second disadvantage of environmental taxes relates to their incompatibility with a firm's decision-making structure. In most firms decision-making is decentralized, which means that while there is a division of labor, not all of the firm's operations are taken into account at once. In order to respond to an environmental tax, the firm needs to assimilate the available information that pertains to technology and tax payment. Therefore, for the firm to carry out additional pollution abatement, there must be the balancing of marginal tax savings with the marginal costs of abatement. According to Fullerton, Leicester, and Smith (2008), firms may not assign a high priority to this type of interaction within the firm, and increasing it may require changes in the firm's decision-making structure so that decisions on pollution control technology and environmental taxes are made together. This process can be costly, and firms may not respond to minor environmental taxes. As a result, conventional regulatory measures will be more appropriate and effective under those circumstances.

A third disadvantage of environmental taxes noted by Fullerton, Leicester, and Smith (2008) relates to damage avoidance activities. In some situations, the implementation of an environmental tax and the resulting actions of the polluters can result in worse consequences for the environment than the status quo ante. The authors note that, while an environmental tax on toxic waste will provide an incentive for polluters to reduce waste, it can also lead to illegal dumping and burning of the waste. Toxic waste on a per unit basis can have greater social costs when dumped than taken to the proper disposal facilities.

Another disadvantage of environmental taxes is their distributional effects, particularly in relation to the environmental taxes levied on energy as a whole. Moreover, Fullerton, Leicester, and Smith (2008) indicate that low-income households spend a large share of their income on electricity, transportation and heating fuels, which makes environmental taxes regressive. The

authors further note that gains from environmental protection accrues to high-income households because of their high willingness to pay and a clean environment can become a luxury good. Therefore, environmental policies must take into account the inequality of distributional effects.

The impact of environmental taxes on international competitiveness is another disadvantage, as an environmental tax on industrial inputs will increase the cost of production. As a result, if domestic output competes internationally with other products which do not face a similar environmental tax, then domestic firms will be at a disadvantage.

Attention to environmental protection during economic decision-making has significantly grown over the years. Environmental policy has traditionally used government command and control legislation (CCL), but in recent years market-based mechanisms including environmental taxes have been found to be much more effective. These mechanisms seek to protect the environment through incentive taxes, cost-covering taxes and revenue-raising taxes (Ekins, 1999), which “remain the most the most efficient method for pursuing many environmental goals” (Bailey, 2002). These mechanisms provide greater choice for potential polluters, promote “cost-effective environmental protection” and provide opportunities to achieve “socially and ecologically optimum pollution levels.” These advantages notwithstanding, there remain four inherent concerns, illustrated in Table 2 below.

Table 2. Four Concerns of Market-Based Mechanisms (MBMs)

Concerns	Effects	Prospective Solutions
Inflationary effects from taxation	Adversely affect sectors’ economic performance and competitiveness	Provide rebates to control the effects on sectors’ performance and competitiveness
Potential regressive distributional effects	The poor of society may be adversely affected from higher prices due to increased costs from taxes charged	Provide tax-free thresholds to those stakeholders at risk
Constrained environmental efficacy	Institutional factors, factor costs priority in investment decision- making and the price-inelasticity of demand for business activities tend to constrain the effectiveness/adherence to MBMs (Jacobs, 1991; Goddard, 1995; Pearce and Barbier, 2000)	Ensure that mechanisms are geared towards the realities polluters face in conjunction with the aim of protecting the environment
Non-acceptance	In some instances, the best fit to the environmental policy mix is solely that of command and control mechanisms due to the nature of the sector	Each sector’s environmental policy mix should be uniquely suited for that sector (MBMs, CCL or a mixture of both).

Source: Authors’ compilation based on Bailey (2002).

It is very common for governments to utilize both options for environmental policy rather than depend solely on one and, as different governments use varying mixes of CCL and Economic instruments/MBMs, different economic and environmental outcomes result. Statistical assessment shows a weak relationship between economic instruments and business waste management in Britain and Germany due to the insufficient taxes charged, which are not at the “optimum rate of incentive taxes which occurs when the marginal cost of further increases in pollution equals the marginal private benefit gained” (Bailey, 2002) from economic activity.

2.5 Design of Environmental Taxes

Correctly designed environmental taxes are transparent in relation to their cost and coverage, i.e., these taxes are clear on the following:

1. What is taxed,
2. The exemption of polluters, and
3. The per unit cost polluters must pay.

Environmental taxes increase the cost of goods and activities with negative environmental impact, but they do so in a fairly direct and predictable manner. Moreover, these taxes facilitate the analysis of first order financial impact on firms and consumers.

For environmental taxes to be successful, great emphasis must be placed on designing them properly. The tax base should aimed at the pollutant or the activity which is causing damage to the environment and as a result, increase the cost of polluting and incentivize alternative abatement options such as end-of-pipe abatement (i.e., measures to neutralize emissions before they enter the environment). The tax should reduce output and production of environmentally damaging goods, enhance cleaner production processes and encourage the development and adoption of environmentally friendly products. An environmental tax should be levied on the polluting activity and not on proxies, which would limit abatement options. For example, in the case of carbon dioxide emissions from vehicles, an environmental tax on direct emission from vehicles would be costly to measure. A more appropriate design would be to tax the fuel used by the vehicle based on carbon content.

In addition, caution should be exercised when implementing taxes on intermediate goods because taxes on those goods may not be transparent and can contribute to misspecification of

the tax rate. This issue relates to taxes on fuels such as gasoline and diesel; carbon dioxide emissions from diesel will be greater than those of gasoline when combusted, which should be reflected in their respective tax rates. It should be noted that an environmental tax should be levied on the final product, income and consumption because taxes levied on intermediate goods can increase the economic cost by hampering the production process. Moreover, one of the aims of environmental taxes is to change to production processes that are less polluting and doing so without causing distortions in the production process.

Apart from the design of environmental taxes, the scope of the environmental tax is essential as well. Identifying the scope of the environmental tax will depend on the scope of the environmental damage which is being done. Moreover, the political jurisdiction will affect the scope of the environmental tax. Environmental damage from soil contamination, for example, is limited in scope and as a result an environmental tax will be at a municipal level. However, air pollution goes beyond national boundaries, which makes a global tax more appropriate; such a tax can be implemented in sub-national jurisdictions, but this may not be politically feasible.

When implemented, environmental taxes should be applied uniformly with only minimal exceptions. Environmental taxes can thereby provide the similar abatement incentives for every unit of production as well as promote low-cost source abatement, ensure environmental goals are achieved at the lowest possible social cost, and minimize tax evasion. The impact of the environmental tax on groups such as low-income households and trade-exposed businesses, however, needs to be considered, and lower tax rates or exemptions can be applied to these groups. As a result there will be differing incentives provided by the tax, which may increase the cost of attaining environmental targets since abatement will be in disequilibrium among polluters and will thus bring about a different form of inequity. For this reasons environmental taxes should be as broad as possible, with few or no exemptions, and differential impacts should be addressed apart from the tax to preserve its incentive effect of the tax.

The rate of the environmental tax should reflect society's valuation of environmental damages, ensuring that the prices paid by producers and consumers include the environmental costs of their actions and providing a financial incentive to account for those impacts in decision-making decisions. In addition, the environmental tax should include spill-over effects such as social impacts. The burning of fuels in vehicles, for example, contributes not only to climate change but also to respiratory problems. If the appropriate policy instruments are not available to

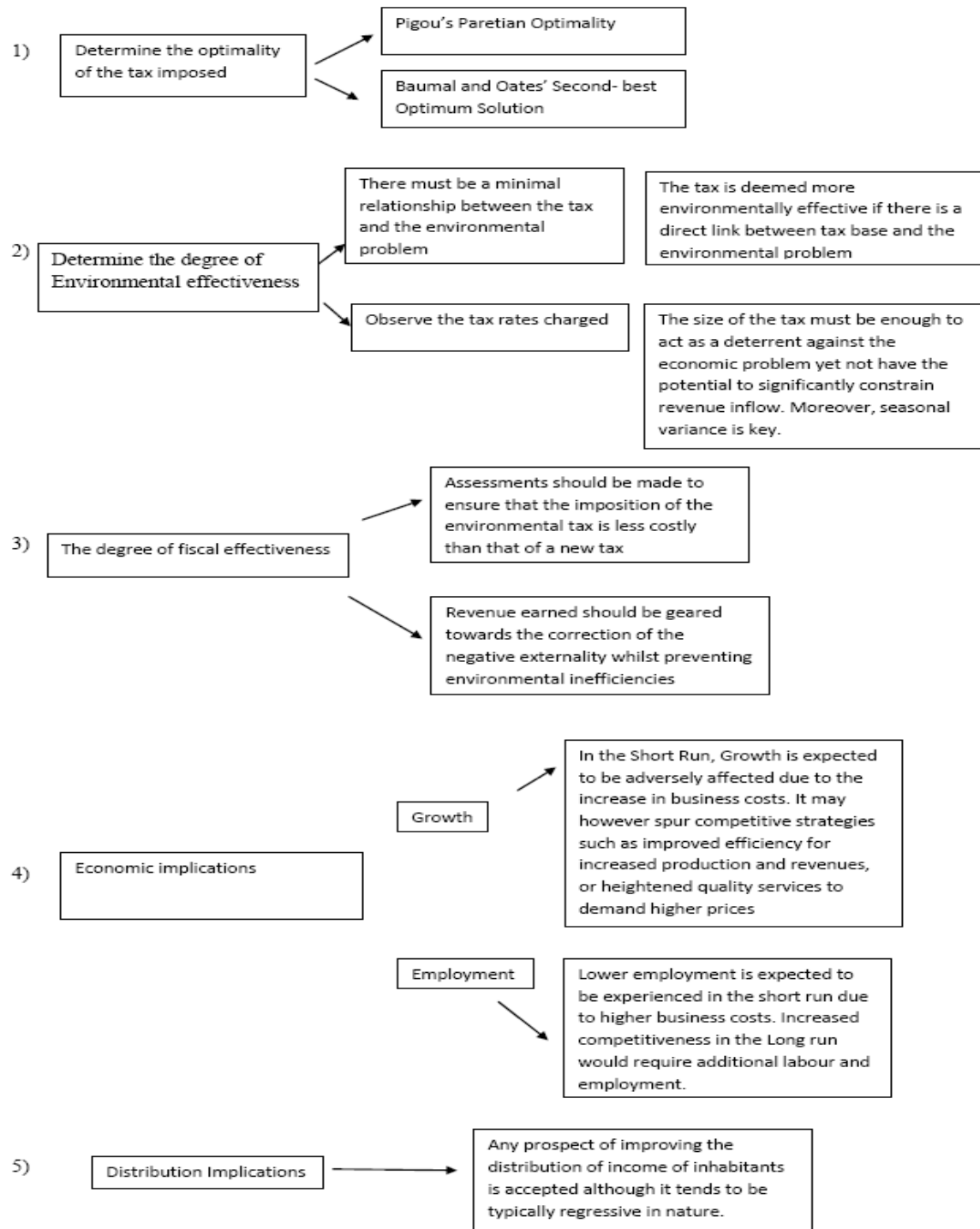
account for the different negative effects, then identifying the most appropriate rates for the available taxes will be complex because of the inadequacy of correcting externalities and the potential risks of introducing risks in production methods. Environmental taxes should additionally incorporate the ability to raise public revenue for spending purposes. In this regard it should be noted that environmentally related taxes tend to have a small impact on demand in the short run because of their inelastic nature. Furthermore, tax rates should not be set higher than the estimated value of the social externalities.

With these criteria in mind, environmental taxes must be credible and the rate predictable in order to bring about environmental improvements. Moreover, environmental taxes can impact on pollution abatement through both short-term and structural responses. Short-term responses may include the reduction of firms' output, and consumers may adopt behavioral patterns which are less polluting due to price changes brought about by the tax charges. Structural responses are more fundamental changes in conjunction with longer-term consequences on capital investment, the purchase of housing and consumer durables, and innovation programs. These changes will depend on the investors', households', and firms' expectations and long-term view of prices. Moreover, in order to encourage structural changes in innovation and abatement efforts environmental policy must be credible. The public must be convinced that the government has carried out the relevant research for the tax, communicated with the necessary stakeholders, and committed itself to implementing the tax. Environmental taxes should reflect real economic growth and inflation, citizens' changing preferences on environmental protection and the effect of innovation on the cost of pollution abatement. Finally, updated environmental taxes must be transparent so that their determinants and timing of the tax will be understood by the public.

2.6. Survey and Assessment of Environmental Taxes

A critical review of environmental taxes is illustrated in Figure 1 below.

Figure 1. Criteria for Assessing Environmental Taxes



Source: Authors' compilation.

A review of environmental taxes thus involves therefore two main activities: i) selection of environmental taxes and ii) assessment. Selection of environmental taxes depends on the definitional consideration. As stated earlier, an environmentally related tax does not always conform to the normative literature's criteria for a specified environmental tax. Selection criteria may therefore involve distinguishing between environmental taxes and environmentally-related taxes, the latter clearly outlined by the OECD Statistical Framework as "A tax whose tax base is a physical unit (or proxy of it) of something that has a proven, specific negative impact on the environment." Such taxes can therefore include environmental taxes and are therefore treated by the OECD as congruent with its definition of environmental taxes.

A survey of environmental taxes should begin with identification of the following environmental tax statistics (Eurostat, 2001), which are identified in Table 3 below.

Table 3. Required Environmental Tax Statistics

Environmental Tax Statistic	Details/Descriptions
Tax Rules	Name of Tax
	Administration of Tax
	Responsibility for Proper Payments
	Frequency of Payment
	Recipients of the Revenue
	Earmarking of (parts of) the Revenue
	General Tax bases included under the tax
	Specific tax bases
	Nominal tax rates
	Exemptions
	Refund Mechanisms
	Threshold or ceilings for tax payments
Tax revenue	Revenue collected on the tax, cross-classified by aggregate tax type, industry and tax base
Physical data on tax bases	Volume of emissions for emission taxes; traded volumes of different products for the product taxes (e.g., kg of SO ₂ , liters of diesel, numbers of cars sold).
Effective tax rates on tax bases	Taxes actually paid per unit of different products and activities, which should reflect exemptions, etc.; nominal tax rates; and differentiation of tax rates by industry or sector where applicable.
Market Prices of bases	Market price per unit traded of different products; classification should be the same as for physical data.

Source: Compiled from Eurostat (2001).

UNEP (2004) presents a template for assessing important factors affecting instrument choice. It is based on the recognition that the effectiveness of economic instruments are based on proper assessment of the problem; factional analysis of the stakeholders and their interests including government institutions; and an overview of public sector institutions' structure and strengths, which includes under legal institutions rule of law and enforcement of property rights under the category of legal institutions and the functioning of tax and financial reporting audit system under fiscal/economic institutions. Finally, environmental institutions are included.

This assessment approach is popular in the literature (UNEP, 2004; Perch, 2000; Acquatella Corrales, 2009), where instruments are assessed at the earlier stages of implementation level. Acquatella Corrales (2009) finds that, among 81 cases of instruments across 13 Latin American and Caribbean territories, 68 percent were considered to be implemented. Among these, Barbados had a total of eight instruments, five of them implemented, and in Jamaica, 1 of 2 identified instruments was implemented (Acquatella Corrales, 2009). Perch (2000) also assesses economic instruments in the Caribbean. He does first by presenting the main determinants of an instrument's success in the design and implementation stages, citing factors that have been highlighted in the literature such as Panayotou (1994), Huber, Ruitenbeek, and Serôa da Motta (1998), and the World Bank's "Five Years After Rio" (1997). Second, he evaluates an instrument's suitability based on similar primary and secondary considerations of design and implementation to indicate the instrument's goal, relevance to management, and availability of data.

Another approach, commonly used in the OECD, is to assess environmental taxes in terms of their economic and environmental outcomes. CGE modeling (Bergman and Henrekson, 2003) is used to elucidate relationships between economic policies and impacts as a way of corroborating theory.¹³ CGE modeling and environmental policy analysis have yielded environmental CGE models designed for climate policy analysis such as the GREEN model (cited by Bergman and Henrekson, 2003) and the Cambridge Multisectoral Dynamic Model in the United Kingdom (MDM-E3), the latter cited by Ekins et al. (2011).¹⁴ The conclusions of the MDM-E3 included the following:

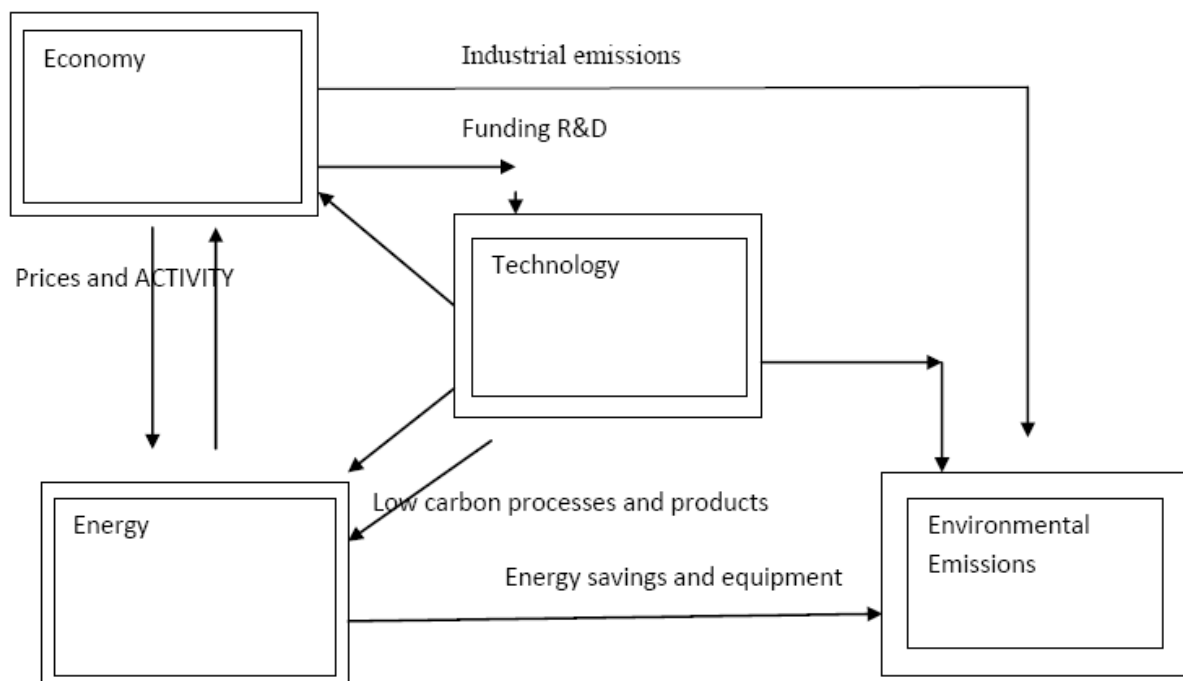
¹³ Bergman and Henrekson (2005: 21) state "a CGE model is an ideal bridge between economic theory and applied policy research."

¹⁴ This model encourages the interactions of several sectors of the macro-economy in such a way that policy decisions can be based on its results. It was designed to analyze and forecast changes in economic structure, energy

1. Spending only 10 percent of the extra tax revenues (ETRs) on green investments resulted in further decreases in carbon emissions. Countries would do well to take this approach.
2. ETR reduces greenhouse gas emissions, but at effectively no cost to the economy and with increased employment.
3. Using the tax revenue to implement eco-innovation can further reduce effects on the environment.

The use of that analysis however, requires that data gaps are nonexistent and all variables for the required inputs, identified in Figure 2 below, are available.

Figure 2. The Energy-Environment-Economy Interaction Considered in the MDM-E3 Model



Source: Ekins et al. (2011).

demand and the environmental emissions that result. The model combines a previously disaggregated model of the economy; in this case the paper focused on the UK economy. The sub-models looked at energy demand (both primary demand and demand after implementation), environmental emissions and electricity supply, all of which have implications for environmental degradation. The model thus permits extensive energy-environment-economy interaction.

Assessment of environmental taxes may therefore involve many diverse approaches. The early stages of design and implementation can be evaluated in order to determine the appropriateness of the instrument to the externality and its “fit” to the country’s political economy. At later stages, the tax can be assessed in terms of impact on revenues and environmental impacts, and perhaps other micro and macroeconomic variables such as employment, imports and exports. The extent of assessment will therefore depend on several factors including the presence of monitoring mechanisms for tracing the adoption of economic instruments in the legislative framework and for tracking the operationalization of such instruments, as well as data generation and collection for the empirical impacts of such instruments to determine whether they have met their designed objectives.

3. Economic Instruments in Case Study Countries

3.1. Methodology for Selection and Assessment of Taxes

This study’s criteria for selection of environmental taxes in the Caribbean context are guided by the OECD definition of environmental taxes as “A tax whose tax base is a physical unit (or proxy of it) of something that has a proven, specific negative impact on the environment.”¹⁵ This clarification is necessary given the emphasis in the general literature that such taxes may not necessarily be driven by a specific motive (albeit fiscal or environmental) but rather by the base on which the tax is imposed. In the Caribbean region, environmental taxes are part of policy packages that include other economic instruments such as deposit refund systems, user fees, tax incentives and exemptions and tipping fees (Paquin and Sbert, 2004). The suite of policy packages, illustrated in Table 5, demonstrates some degree of emphasis on environmental management (in principle if not in practice). While distinguished from environmental taxes in terms of whether payments are required or not, fees and charges are also included in this assessment. Given the region’s general lack of specific environmentally motivated taxes, fees and charges assume a major role in incentivizing behaviors to meet environmental objectives and particularly to internalize externalities through non-market based means. As such, the selection criteria identify the broad economic instruments utilized in the selected Caribbean countries; particular emphasis is placed on existing environmental taxes that satisfy the definitional criteria.

¹⁵ However, reference will also be made to taxes that are motivated by environmental objectives.

The study first considers the environmental profiles of each case study country, detailed in Appendix 2, followed by an inventory of economic instruments under three broad headings: Taxes, Charges/Fees/Licenses, and Other (Table 5 a-g). The rationale for the selection of environmental taxes is based on Table 5, where all identified instruments that fit the definitional criteria of environmental taxes or that have an environmental impact or motivation are selected from the list. The survey identifies environmental taxes' tax bases as presented in Table 1 and the tax statistics noted in Table 3.¹⁶

The assessment of existing environmental policies is twofold. First, consistent with the methodologies of Perch (2000) and Acquatella Corrales (2009), existing taxes are assessed qualitatively in terms of the design and implementation stages. Based on the environmental tax design criteria in the literature, an assessment of whether taxes meet the requirements of proper design answers the following questions:

- 1a) What is the tax base?
- 1b) Is the tax base a pollutant or directly linked to the polluting activity as the cause of environmental damage?
- 2) Is the tax levied on the final product, income, or consumption?
- 3) What is the scope of the tax, i.e., are there any geographical boundaries to which the tax is limited?
- 4) Is the tax applied uniformly across groups, i.e., are there exemptions for households, businesses, etc.?
- 5) Does the tax rate reflect the economic and social valuation of the externality?

The assessment of existing taxes in the Caribbean focuses on the status of each tax in terms of the following criteria, adopted from Acquatella Corrales (2009) and shown in Table 4.

Table 4. Criteria for Assessment of Implementation of Taxes

Not Implemented		Implemented			
Proposal	Officially Sanctioned	Implemented	Operating	Partially Operating	Not operating

¹⁶ Where data are available.

The second stage of assessment is necessitated by the region's paucity of data that would be required to undertake in-depth econometric analysis of the impact of environmental taxes on specified micro and macroeconomic variables. Given these circumstances, this report assesses the qualitative impacts of existing taxes on the overall operations of significant sectors of each case study's economy. For example, where tourism is significant, as in the case of Barbados, the assessment considers changes in knowledge, attitudes and practices of stakeholders of the tourist industry that have been incentivized by existing taxes. Where possible, data to support assessments are provided.

3.2. Environmental Profiles of Selected Case Studies

As previously noted, the Caribbean region is heavily dependent on natural resource endowments and the environment as sources of income. Figure A1 in the Appendix shows that Trinidad and Tobago, for example, derives an estimated 20-60 percent of income (GDP) from natural resource rents. While values may appear significantly lower for other countries such as Barbados, it should be noted that total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents they do include the tourism-related natural resources of Sun, Sea and Sand. Among the tourism economies in 2010, travel and tourism accounted for 46.1 percent of GDP for The Bahamas and Barbados, 33.6 percent for Belize and 24.4 percent for Jamaica (Business Barbados, 2011). Guyana's main economic activities are agriculture, mining and quarrying, and forestry, which in 2009 accounted for 31.7 percent of GDP (ECLAC, 2010). Primary sectors such as mining and agriculture have also dominated Suriname's GDP growth rates.

Table A2 (a-g) of Appendix 2 details the environmental issues that each country faces, categorized by Land, Air, and Water externalities. Among the highlighted environmental issues detailed in this table are climate change and global warming; sea level rise; threats to biodiversity, deforestation and declining fisheries, and depleting internal freshwater resources.

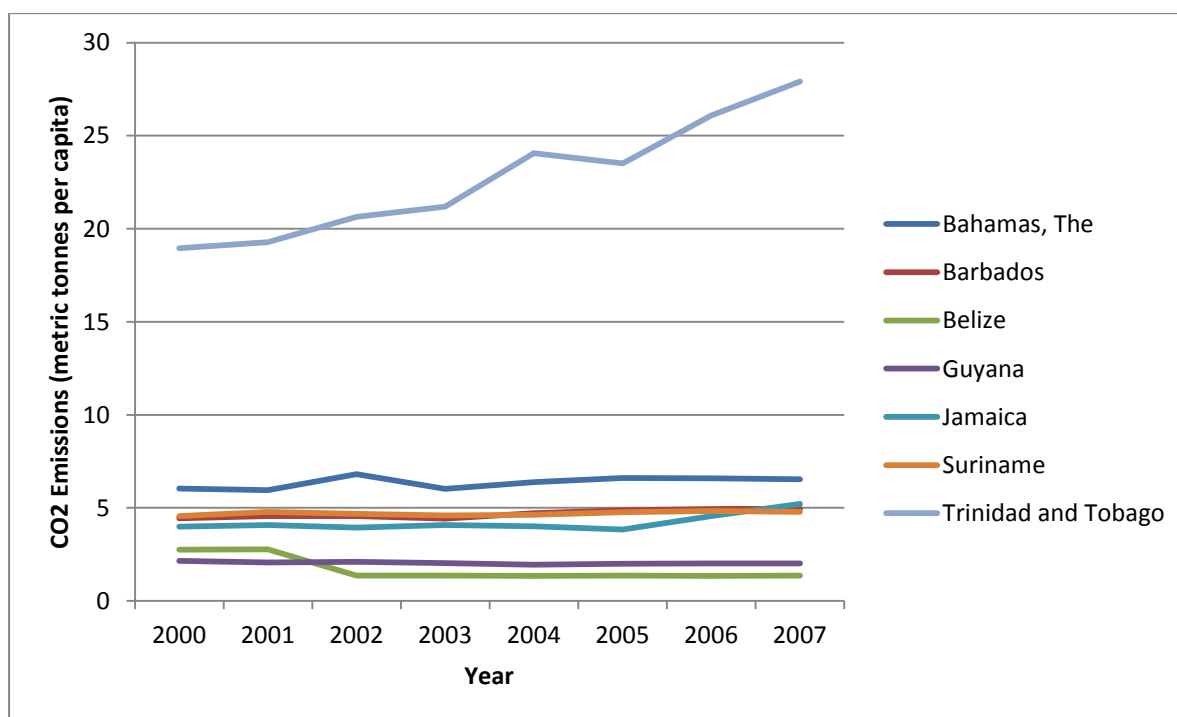
Among SIDS, The Bahamas, Suriname and Guyana have the largest shares of populations settled in low-elevation coastal zones,¹⁷ which are highly vulnerable to sea level rise, storm surges, and climate change-related hazards (UNDESA, 2010). While SIDS account for a small percentage of global emissions of carbon dioxide, the challenge to reduce emissions is

¹⁷ Low-elevation coastal zone is defined as the contiguous area along the coast that is less than 10 meters above sea level (UNDESA, 2010).

evidenced by the increase in SIDS' carbon dioxide emissions at an annual average rate of 2.3 per cent (UNDESA, 2010). Figure 4 illustrates the trends in carbon dioxide emissions per capita for the selected case study countries. Figure 5 presents the degree of air pollution in the selected case study countries, of which Trinidad and Tobago accounts for the greatest level of PM10 emissions (emissions of particulate matter that are less than 10 microns in diameter), and Belize the least. The trend, while fluctuating over the period, shows a gradual decline.

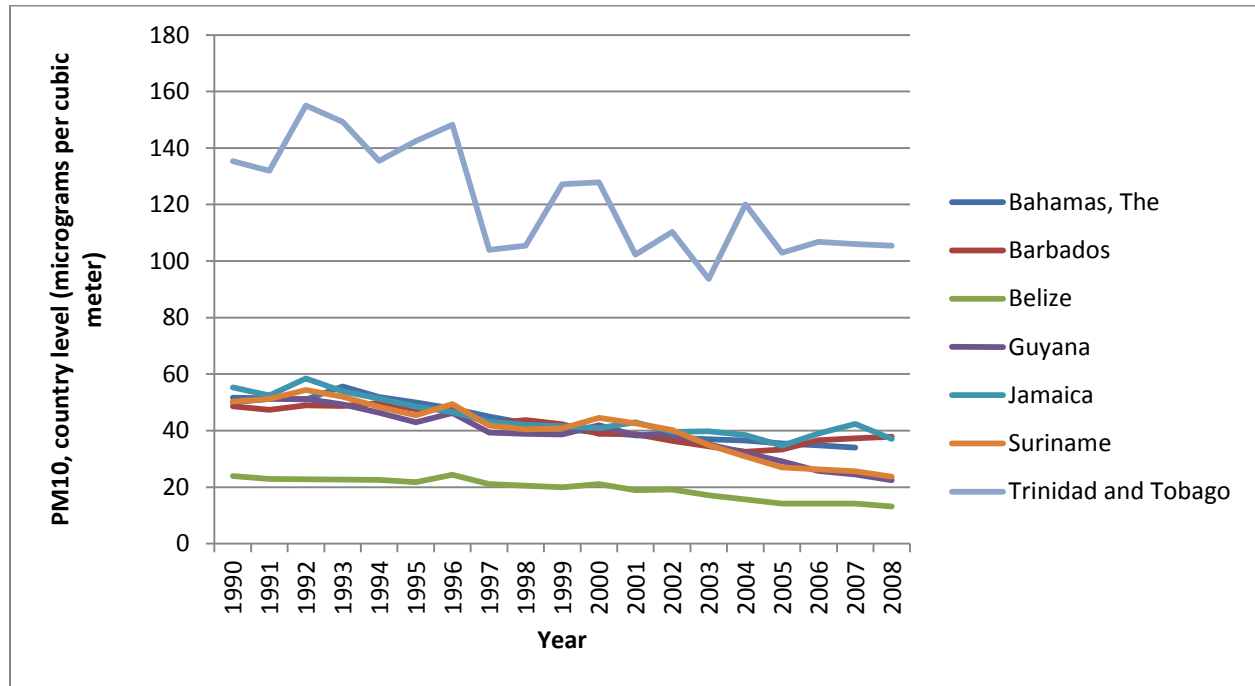
Countries' highlighted air quality conditions are largely impacted by the content of their energy consumption. For example, even though Barbados is a pioneer in renewable energy interventions, 87 percent of its energy demand is met by oil and related products, 6 percent by natural gas and only 7 percent by biomass (OLADE, 2007). At the other extreme, Trinidad and Tobago's energy demand is satisfied by 93 percent natural gas and 7 percent oil and related products (OLADE, 2007).

Figure 4. CO2 Emissions in Selected Case Study Countries (2000-2007)



Source: World Bank, World Development Indicators.

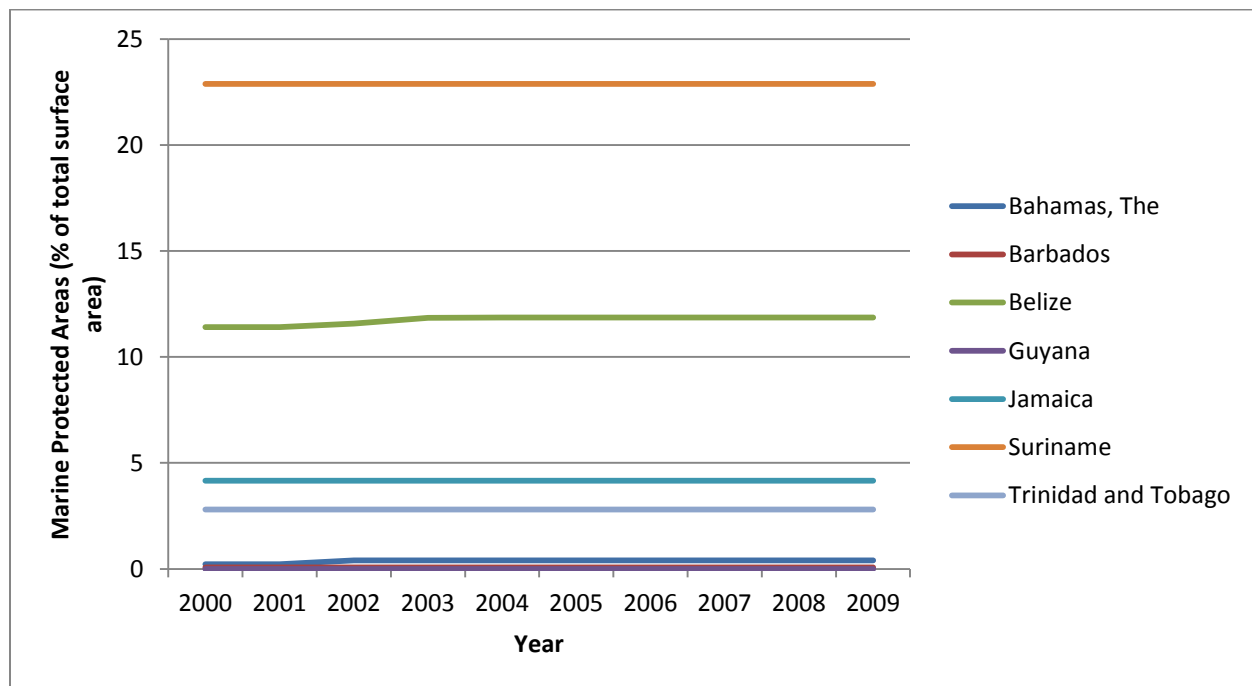
Figure 5. PM10 Emissions in Selected Case Study Countries (1990-2008)



Source: World Bank, World Development Indicators.

As suggested earlier, the tourism product of the Caribbean is essentially made up of Sun, Sea and Sand. UNDESA (2010) observes that management of both land and marine resources is of particular importance to SIDS given limited land resources, and increasing pressures on coastal areas: “Congestion and overcrowding are major concerns, especially in Caribbean ports, due to the resulting environmental pressures and the perception of overcrowding by both residents and tourists” (UNDESA, 2010: 18). Figure 6 illustrates that, of the selected case study countries, Suriname and Belize surpass the other countries in terms of marine protection. It should be noted, however, that the marine protected area of SIDS is estimated to be 40 percent of total surface area.

Figure 6. Marine Protected Areas in Selected Case Study Countries (2000-2009)



Source: World Bank, World Development Indicators.

Also notable is that both The Bahamas and Barbados have limited renewable internal freshwater resources, falling significantly below the critical values of the stress threshold and scarcity threshold utilized to calculate the water stress index.

In Suriname, the main environmental concerns associated with economic development are over-fishing, the degradation of the coastal zone (estuaries, mangrove forests, shoreline), uncontrolled deforestation, the impacts of the proposed hydroelectric dam in West Suriname, land degradation and harmful pollution from small-scale and large-scale mining operations, and inadequate resource management in the interior region. The already significant environmental impacts and public health risks associated with these threats are compounded by the lack of an adequate legislative, regulatory and institutional framework. The Foundation for Forest Management and Production Control within the Ministry of Natural Resources developed a series of regulations in 2000 to control the value of the logged products; it also provides loggers with guidance on their reforestation activities through statistics on logging and export.

3.3. Economic Instruments in Selected Case Studies

Based on a survey of economic instruments in the selected case study countries, Table 5 (a-g) lists those instruments that can be categorized under the headings of Taxes, User Fees/Charges/Licenses, and others (including rebates, deposit refund systems, etc.). The selection of the taxes identified for each country is guided by the definitional criteria of environmental taxes according to the OECD (2010) in terms of being based on an identifiable polluting tax base and within one of the following categories: Energy taxes, transport taxes, pollution taxes, and resource taxes. However, taxes in the selected case study countries that do not fit the OECD definition are also included, for example, in Trinidad and Tobago, the Green Fund Levy is essentially a tax on all businesses regardless of type of economic activity, imposed on gross income or receipts.

Table 5 (a-g). Inventory of Economic Instruments in Selected Case Study Countries

a.	Taxes	User Fees/ Charges/Licenses	Others
Bahamas	• Head Tax of US\$15 for cruise ship and airline passengers. • Departure Tax collected from all persons departing for a port outside the Bahamas. The rate of this tax is BS\$25, which includes a ticket tax. • Motor Vehicle Tax, where an annual fee is paid on the licensing of motor vehicles. • Import Duties, which is levied on the CIF (cost, insurance and freight) value of all goods imported, which ranges from 5% to 35%. For the importation of vehicles, customs duties apply at a rate of 35% or higher (see Appendix Table A3.).	• Landing fees - charges collected from private and commercial aircraft at “Government Owned Family Island Airports”	

b.	Taxes	User Fees/Charges/Licenses	Others
Barbados	• Used vehicles must be less than four years old, and an environmental tax is paid on arrival into the country. • Consumption tax is placed on conventional electric water heater. • All individuals are required to pay an annual “Road Tax” on vehicles which is based on the chargeable value of a car. • Departure Tax, which is geared towards fuels such as gasoline and diesel, incurred by passengers leaving the island. • There is an environmental levy which is used to defray the costs to dispose of refuse which is generated by imports into the country. The rate is 1% of the CIF (cost, insurance, and freight) Value of most goods. Vehicles for example have specific rates, where used vehicles have a rate of \$4,000 (Bds), and new vehicles, \$300 (Bds). There is a \$15.00 (Bds) environmental levy per refrigerator. • Excise Duties on specific goods such as rum and petroleum products which are produced and sold in Barbados. • Excise tax on gasoline at a rate of Bds\$0.5358 per liter. • Motor Vehicle Licenses where there is a tax which is applicable annually according to the weight on the vehicle. • Environmental Tariff on imported durable goods. • Differentiated Tariffs for collection of solid waste.	• Volume-based fees for solid waste collection.	• Income tax rebate for water conservation and solar energy equipment in the tourism sector. • Deposit-reimbursement system for mass consumption bottles. This initiative is based on a rebate of Barbados \$0.25 on returned glass bottles and Barbados \$0.10 - \$0.15 for plastic (PolyEthylene Teraphthalate) as outlined by the Refundable Containers Act. • Fiscal exoneration for solar water heaters. • Fiscal incentives for construction of rainwater holding tanks and imported equipment to save water at hotels. • Fiscal Incentive Act (1974) includes exemption on raw materials for solar water heater. • Income tax Amendment (1980) provides a deduction to the full cost of solar water heater installation. • Under the Tourism development Act (2002) there is the incentive of a tax credit of 20% on the capital cost of improving wastewater systems.

c.	Taxes	User Fees/Charges/Licenses	Others
Belize	• An environmental tax of 1% is paid on arrival of vehicles. • Departure tax and cruise head taxes • There are reef and mangrove-related taxes in Belize. • Taxes from marine recreation. • When crossing the border from Belize to Guatemala with a vehicle, persons have to pay an environmental tax of US\$3.50. • An amendment to the Environmental Tax Act (2001), by which a 1% tax on imports was imposed to support implementation of the Solid Waste Management Plan, assist collection and disposal operations, strengthen the institutional capacity of the Department of the Environment, and preserve and enhance the environment. • Business tax applied to gas stations on fuel and lubricants. • Sales tax on imported goods and services such as fuel at a rate of 12%. • Revenue Replacement (Tax) levied on fuels such as distillate fuels, jet fuel, kerosene, and liquid butane. • Travel Tax imposed persons departing from any international airport, at a rate of Blz \$20.00.	• Marine Protected Area (MPA) fees. • There is a 5% charge which is placed on all plastic containers as well as on the value of all goods packaged with such containers. • Motor Vehicle licenses and fees for to allow operation of both private and public operations. The rate ranges from Blz \$62.50 to Blz \$312.50.	

d.	Taxes	User Fees/Charges/Licenses	Others
Guyana	• Environmental tax of G\$10 on every returnable metal, plastic, glass or cardboard container of any alcoholic or non-alcoholic beverage imported into the country. • Withholding tax on individuals and corporation of interest earned on the gross sales to the Gold Board by individual gold miners at a rate of 2%. • Capital gains tax on the transfer of capital items such as vehicles at a rate of 20%. • Vehicle purchase tax paid on the accumulated retail value of vehicles purchased based on the engine capacity. • Travel voucher tax paid on any airline ticket departing from Guyana at a rate of 10%. • Departure tax paid by persons leaving Guyana at a rate of G \$2,500 per person. • Import duties applied to all goods imported into Guyana, based on the CIF value of the good. For example, motor vehicles have an import duty of 45%. • Export duties applied to items such as bauxite at a rate of G \$0.45 per ton. • Consumption Tax applied to oil imports based on the CIF value of the merchandise plus the value of the duty paid at a rate of 50%.		

e.	Taxes	User Fees/Charges/Licenses	Others
Jamaica	- General consumption tax on goods and services imported in Jamaica such as motor vehicles where the rate varies according to dealers and importers - Special consumption Tax imposed on importation or manufacture in Jamaica of stipulated goods such as petroleum products. - Stamp duties on travel tickets, a tax on international travel. - Travel tax applied to all persons traveling to a destination outside of Jamaica. - Gas tax at a rate of 10%. - Bauxite levy and royalty on bauxite production. - Environmental Levy is charged on all types of goods entering Jamaica at a rate of 0.5%.	- User fees for volume of water extracted. - Volume-based fees for solid waste collection. - Motor vehicle license fees based on the type and characteristics of the vehicle (see Appendix 3).	- Refund system when persons bring in glass containers for recycling or disposal. - Tax and tariff relief for pollution abatement investments.

f.	Taxes	User Fees/Charges/Licenses	Others
Suriname	- Profit tax on bauxite companies at a rate of 40% to 45%. - Annual license tax on motor vehicles - Tax on aluminum production based on the quantity of aluminum produced at a rate of US \$0.67 per ton. - Wood export tax based on the export value of all unprocessed and semi-processed wood.		Refund scheme for glass bottles.

g.	Taxes	User Fees/Charges/Licenses	Others
Trinidad and Tobago	- Supplemental petroleum tax imposed on the production of crude oil on a sliding scale. - Petroleum profit tax on oil and gas producers and on refineries based on net profits from operations at a rate of 50% of chargeable profits. - Royalties on crude oil at a rate of 10% to 12.5% and at a rate of 15% for natural gas. - Green Fund Levy (2001), established to financially assist in remediation, reforestation and conservation of the environment. The fund is capitalized by a tax of 0.1% on the gross sales or receipts of companies conducting business in Trinidad and Tobago. - Motor vehicles tax. - Hotel Accommodation Tax at 10% of chargeable income.	Petroleum companies: - License for marine operations: 0% to 45% before 1/1/88; and 0% to 36% after 1/1/88. - License for land operations: 0% to 38% before 1/1/88; and 0% to 21% after 1/1/88.	Refund scheme for glass bottles.

For some of the taxes identified above, Table 6 (a-f) details specific tax statistics (where data are available), outlining the tax base, nominal rates, and exemptions.

Tables 6 (a-f). Tax Statistics for Selected Case Study Countries (except Suriname)

Environmental Tax statistic	Details/Descriptions	a) Bahamas		
		Head Tax	Departure Tax (Includes Ticket Tax)	Motor Vehicle Tax
Tax Rules	Name of Tax	Head Tax	Departure Tax (Includes Ticket Tax)	Motor Vehicle Tax
	Administration of Tax	Ministry of Finance	Ministry of Finance	
	Responsibility for Proper Payments			
	Frequency of Payment	-	-	
	Recipients of the Revenue	Government	Government	Government
	Earmarking of (parts of) the Revenue	-	-	
	General Tax bases included under the tax	Transportation	Transportation	Transportation
	Specific tax bases	Air and Cruise Passengers	Air and Cruise Passengers	Licensing of motor vehicles
	Nominal tax rates	\$15.00 (US)	\$25.00	Fees range from \$75 to \$360 depending on the vehicle's size.
	Exemptions		Children under six years are exempted from paying the tax	
	Refund Mechanisms	If the cruise is cancelled the tax is refunded.		
	Threshold or ceilings for tax payments	\$20.00 (US)		

Source: Cruises Inc. (2010) and Saunders (2011).

Environmental Tax statistic	Details/Descriptions	b) Barbados		
Tax Rules	Name of Tax	Road Tax	Departure tax	Excise Tax on Gasoline
	Administration of Tax	Barbados Inland Revenue Department	Barbados Inland Revenue Department	Barbados Inland Revenue Department
	Responsibility for Proper Payments			
	Frequency of Payment	Annual	Upon leaving the island	
	Recipients of the Revenue	Government	Government	Government
	Earmarking of (parts of) the Revenue			
	General Tax bases included under the tax	Transportation	Transportation	Transportation
	Specific tax bases	Vehicles	Air Travel	Vehicles
	Nominal tax rates	Based on Chargeable values of car.	\$55.00 (Bds) (2007)	Bds\$0.5358 per liter
	Exemptions		Exempt for stays under 24 hours and children under 12 years.	
	Refund Mechanisms			
	Threshold or ceilings for tax payments			

Source: Authors' compilation based on data from the Barbados Inland Revenue Department, Businessbarbados.com, Schlegelmilk (2010), and Moore and Walkes (2009).

Environmental Tax statistic	Details/Descriptions	c) Belize		
		Tax on Imports (Solid Waste Management)	Environmental Tax (Import)	Environmental Tax (Crossing Border)
Tax Rules	Name of Tax			
	Administration of Tax			
	Responsibility for Proper Payments			
	Frequency of Payment			
	Recipients of Revenue	Government	Government	Government
	Earmarking of (parts of) the Revenue	Waste Management Program		
	General Tax bases included under the tax	Manufactured Products	Transportation	Transportation
	Specific tax bases	Plastics	Motor Vehicles	Motor Vehicles
	Nominal tax rates	1%	1%	US\$3.50
	Exemptions			Stays under 24 hours.
	Refund Mechanisms			
	Threshold or ceilings for tax payments			

Source: Authors' compilation based on data from UNEP (2005), Belize Customs and Excise Department, and Mayatrek (2011).

Environmental Tax statistic	Details/Descriptions	d) Jamaica					
Tax Rules	Name of Tax	GCT on Supply of Electricity to Residential Premises	GCT on Supply of Electricity to Commercial and Industrial Premises	GCT on the Tourism Sector	SCT on Fuel: Ad valorem to ex-refinery price	SCT on Fuel: Ad valorem to total value	SCT Specific tax: SCT/Liter
	Administration of Tax	Tax Administration Jamaica	Tax Administration Jamaica	Tax Administration Jamaica	Tax Administration Jamaica	Tax Administration Jamaica	Tax Administration Jamaica
	Responsibility for Proper Payments						
	Frequency of Payment						
	Recipients of the Revenue	Government	Government	Government	Government	Government	Government
	Earmarking of (parts of) the Revenue						
	General Tax bases included under the tax	Energy Products	Energy Products				
	Specific tax bases	Electricity consumption	Electricity consumption		Fuel (fuel manufactured in Jamaica)	Petroleum products imported into Jamaica	Fuel and petroleum products
	Nominal tax rates	10%	10%	10% (increased from 8.5%)	15% ¹⁸	15%	E10-87: JA\$16.1061
							E10-90: Ja\$16.4792
							ADO: Ja\$15.4145
							Kerosene: JA\$6.0186
	Exemptions	Below 200 Kilowatt hours is zero rated					
	Refund Mechanisms						
	Threshold or ceilings for tax payments	200 Kilowatt hours					

Source: Tax Administration Jamaica (2010).

¹⁸ As per April 2011, this rate has been lowered to 10 percent.

Environmental Tax statistic	Details/Descriptions	e) Guyana
Tax Rules	Name of Tax	Environmental Tax (Imports)
	Administration of Tax	Guyana Revenue Authority
	Responsibility for Proper Payments	Importers of products
	Frequency of Payment	
	Recipients of the Revenue	Government
	Earmarking of (parts of) the Revenue	
	General Tax bases included under the tax	Waste Management
	Specific tax bases	Non-returnable metal, plastic, glass or cardboard container of any alcoholic or non-alcoholic beverage.
	Nominal tax rates	\$10.00 (Guyanese)
	Exemptions	
	Refund Mechanisms	
	Threshold or ceilings for tax payments	

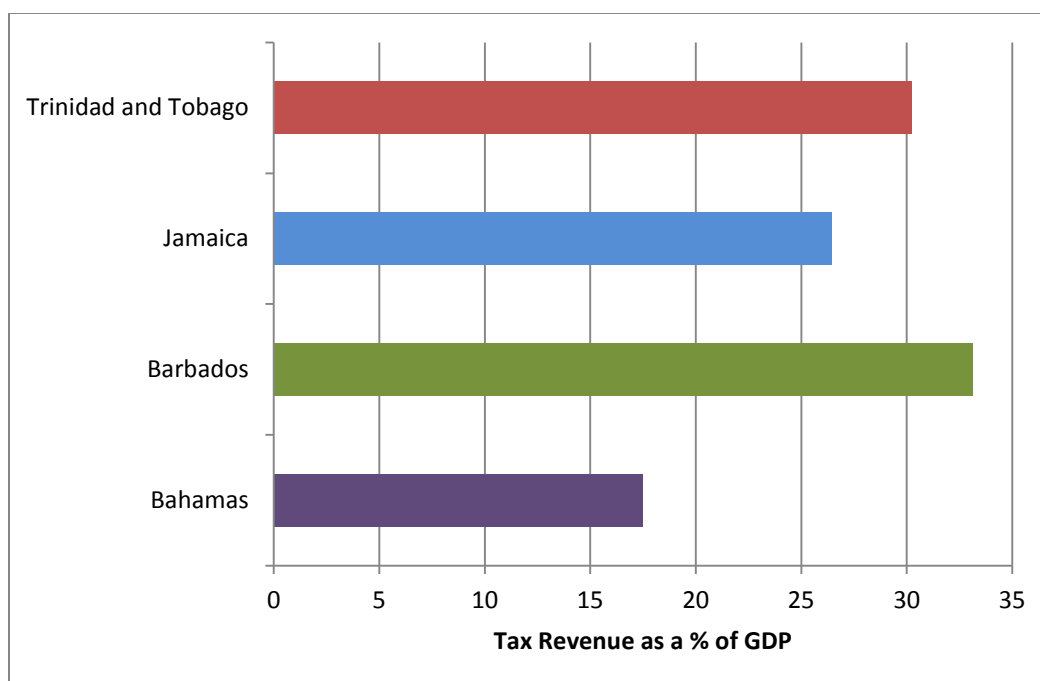
Source: Guyana Revenue Authority (2011).

Environmental Tax statistic	Details/Descriptions	f) Trinidad and Tobago	
The Tax Rules	Name of Tax	Green Fund levy	Petroleum profits tax
	Administration of Tax	Inland Revenue Division- Ministry of Finance	
	Responsibility for Proper Payments		
	Frequency of Payment	Assessed annually but paid at the end of calendar quarter	
	Recipients of the Revenue	Organizations and Community groups via the Green Fund	Government
	Earmarking of (parts of) the Revenue	Green Fund	
	General Tax bases included under the tax		Energy
	Specific tax bases	Gross Sales or receipts of a company carrying on business in T&T.	Chargeable Profits
	Nominal tax rates	0.1%	50%
	Exemptions		
	Refund Mechanisms	Where the levy has been paid in excess.	
	Threshold or ceilings for tax payments		

Source: Inland Revenue Division, Ministry of Finance and the Economy, Trinidad and Tobago (http://www.ird.gov.tt/load_page.asp?ID=7).

3.4. Assessment of Environmental Taxes in Selected Case Studies

In the Caribbean region, tax revenue accounts for as little as 17 percent of GDP in The Bahamas (which has no income tax) to as much as 33 percent in (Barbados).



The main sources of revenue (with the exception of The Bahamas) are from taxation of income, profits and capital gains (e.g., 62 percent of total revenue in Trinidad and Tobago in 2008,¹⁹ budgeted at 74 percent for 2012²⁰), taxes on goods and services (e.g., 41 percent of total revenue in Barbados in 2008) and international trade (7 percent of total revenue in Jamaica in 2008²¹). The exception is The Bahamas, where international trade accounts for 43.31 percent of total revenue.²²

On average, the findings show that environmental taxes, as defined by this study, account for a significant percentage of total tax revenue. The exception is Guyana, where data paucity may have led to a significantly underestimated value).

¹⁹ World Bank, World Development Indicators (WDI).

²⁰ Draft estimates of revenue for fiscal year 2012, Ministry of Finance, Trinidad and Tobago.

²¹ WDI.

²² WDI.

Table 7. Estimated Environmental Tax Revenue as a Percent of Total Tax Revenue

Country	Environmental Tax Revenue as % of Total tax Revenue
Bahamas	47.6%
Barbados	28.6 %
Belize	61%
Guyana	6%
Jamaica	25%
Suriname	35%
Trinidad and Tobago	42%

Source: Compiled from Statistical Annex (Appendix 4).

For a significant share of the taxes identified in this report, while guided by the OECD definitional criteria, it was found that many of the taxes were not environmental taxes, per se, as the tax base was mainly profits, sales or incomes. In addition, where taxes did meet the definitional criteria, it was difficult to determine whether the identified tax satisfied criterion (5) below.

- 1a) What is the tax base?
- 1b) Is the tax base a pollutant or directly linked to the polluting activity as the cause of environmental damage?
- 2) Is the tax levied on the final product, income, or consumption?
- 3) What is the scope of the tax, i.e., are there any geographical boundaries to which the tax is limited?
- 4) Is the tax applied uniformly across groups, i.e., are there exemptions for households, businesses, etc.?

5) Is the tax rate reflective of the economic and social valuation of the externality?

As identified earlier in the study, environmental taxes in the Caribbean region are part of policy packages that are designed for environmental management. The norm however, is for the use of more command and control type instruments to meet environmental objectives as opposed to market-based mechanisms. It is therefore more common to identify Fees and Charges that have direct environmental implications than it is to find taxes driven by an environmental motive. One of the more obvious taxes that exist which can be directly correlated to inducing or reducing externalities is the fuel tax.

3.5 An Assessment of Fuel Taxes in the Selected Case Study Countries

Assessment of fuel taxes tends to involve addressing several concerns: political, distributional, fiscal and environmental. Jamaica's gas tax, for example, has evoked a wave of public discontent resulting in the April 2011 reduction of that tax from 15 percent to 10 percent. The usual distributional concern of fuel taxes, identified by Blackman, Osakwe and Alpízar (2009) is that rising fuel taxes unfairly burden the poor. It has been suggested, however, that for developing countries, as in the case of Costa Rica, a 10 percent increase in fuel prices had modest if not highly regressive distributional effects (Blackman, Osakwe and Alpízar, 2009). The conclusion of which is that the distributional concerns of fuel taxes, need not necessarily take precedence over the other competing objectives. However, in the 2010/2011 budget for Barbados, it was cited that the *“removal of the environmental levy is assumed to mitigate the impact of the VAT increase on consumers. This proposal is expected to cut tax revenue by \$42 million on a yearly basis”* (Thomas, 2011). The Caribbean region's approach to fuel taxes is not uniform. For example, instead of fuel taxes, Trinidad and Tobago “boasts” of heavily subsidized fuels which have been an issue of concern as a major source of government expenditure.

Trinidad and Tobago is the largest producer of oil and natural gas in the Caribbean due to the country's natural endowment of hydrocarbons reserves. However, the petroleum products of Trinidad and Tobago are subsidized heavily. The subsidization of petroleum products was effected in 1974 when the then government implemented a policy by the passing of the Petroleum Production Levy and Subsidy Act. The subsidy operates in such a way, where the wholesaler of petroleum products, state-owned company National Petroleum (NP) of Trinidad and Tobago, receives the subsidy from the government of Trinidad and Tobago via the collection of a levy from oil production companies and then sells the petroleum products at a fixed rate to consumers; the subsidy pays for the difference in price. The Fuel Subsidy of Trinidad and Tobago for the period of 1996 to 2005 is estimated to be US\$655 million, or an annual average of US\$65 million (Iwaro and Mwashia, 2010: 708). Trinidad and Tobago's Fuel Subsidy as a percentage of Trinidad and Tobago's GDP, and the respective figures for Belize and Barbados, are given in the table below.

Table 8. Fuel Subsidies in Selected Case Study Countries

Year	Trinidad and Tobago Fuel Subsidy as a Percentage of GDP	Belize Fuel Subsidy as a Percentage of GDP	Barbados Fuel Subsidy as a Percentage of GDP ²³
2006	0.8	0.1	0.0
2007	0.8	0.4	1.0
2008	0.8	0.4	0.3

Source: World Bank (2009: 43).

The annual fuel subsidy for Trinidad and Tobago is given by Table 9.

Table 9. Annual Fuel Subsidy in Trinidad and Tobago

Year	Total/yr (US\$ Million)
2005	\$106.81
2008	\$288.06
2009	\$320
2010	\$443.81*

Sources: Iwaro and Mwasha (2010: 710) and Look Kin (2011).

*: The 2010 Trinidad and Tobago Fuel Subsidy figure is converted from TT\$2.83 billion to US\$ using the exchange rate of US\$1 = TT\$6.3766 at two decimal places.

An implication of Trinidad and Tobago's fuel subsidy is comparatively lower transport and electricity costs (Table 12). Without rigorous statistical analysis, one may conclude that there may be some correlation between this and the Carbon Dioxide emissions trends, and PM10 emissions trends in Figures 4 and 5 above.

Table 10. Transport Fuel Prices in Trinidad and Tobago

Fuel	Pump Price(per liter)	CNG % of Fuel Price	Market price @ WTI ²⁴ \$79/bbl (2010)	Unit Subsidy (per liter)
Premium	\$4.00	27%	\$4.73	\$0.73
Super	\$2.70	40%	\$4.53	\$1.83
Diesel	\$1.50	71%	\$4.21	\$2.71

Source: Look Kin (2011).

²³ The proposal for an increase in the excise tax on gasoline by 50 percent in Barbados' 2010/2011 Budget is estimated to generate Bds\$22.7 million in revenue (Thomas, 2011).

²⁴ WTI: West Texas Intermediate

In contrast to the above, the fuel surcharge of Barbados, Bahamas and Jamaica is identified in Table 11 below.

Table 11. Fuel Surcharges in Selected Case Study Countries

Country	Fuel Surcharge \$/Kwh (US\$)
Barbados	0.1596
Bahamas	0.15
Jamaica	0.01
Trinidad and Tobago	Not Applicable

Source: CARILEC (2010).

As a taxable base, fuel taxes, or subsidies as the case may be, has also impacted on the price of electricity. The table below list the average cost of electricity of the countries analyzed in this paper in terms of the price per kilowatt hour (\$kWh) in US dollars.

Table 12. Average Cost of Electricity in Selected Case Study Countries

Year	Bahamas (US\$kWh)	Barbados (US\$kWh)	Belize (US\$kWh)	Guyana (US\$kWh)	Jamaica (US\$kWh)	Suriname (US\$kWh)	Trinidad and Tobago (US\$kWh)
2003	\$0.176	\$0.17	\$0.18	\$0.25	\$0.137	NA	NA
2004	\$0.176	\$0.17	\$0.18	NA	\$0.137	NA	NA
2005	\$0.17	\$0.22	\$0.18	NA	\$0.204	NA	\$0.04
2006	\$0.23	\$0.229	\$0.21	NA	\$0.238	NA	\$0.05
2007	NA	\$0.243	\$0.22	NA	\$0.27	NA	\$0.05
2008	\$0.3	\$0.25	\$0.22	NA	NA	NA	\$0.05

NA: Not Available.

Source: CARILEC (2003-2008).

4. The Political Economy, Legal and Institutional Framework

4.1 Framework for Implementation

In the Caribbean region there is no shortage of supporting agendas for environmental management. Table 13 (a-g) identifies a plethora of legislations, regulations, and conventions that have been especially crafted to meet specific environmental protection and other management objectives.

Table 13 (a-g). Existing Framework in Selected Case Study Countries

a. BAHAMAS	Environmental Legislation/Conventions/Initiatives
	LAND RESOURCES: • Conservation and Preservation of the Physical Landscape of the Bahamas Act (1997). COASTAL ENVIRONMENT: • Coastal Protection Act (1968) • Roads Act (1968) • Abutments Act (1864) • Ports Authority Act (1966), Abutments (Out Island) Act (1883) • Agriculture and Fisheries Act (1963) • Land and Surveyors Act (1975) • Fisheries Resources (Jurisdiction and Conservation) Act (1977) • The Bahamas National Trust Act(1959) • Environmental Health Services Act (1987) MARINE: • Agriculture and fisheries Act (1963), • Fisheries Resources (Jurisdiction and Conservation) Act (1977) • Continental Shelf Act (1970) • Merchant Shipping Act (1976) • Water Skiing and Motor Boat Control Act (1970) LAND: • Acquisition of Land Act (1957) • Town Planning Act (1961), • The Bahamas National Trust • Environmental Health Service Act (1987) • Wild Birds Protection Act (1952) • Water and Sewerage Protection Act (1976) • Land Surveyors Act (1975) • Plant Protection Act (1916) • Wild Animals (Protection) Act (1968) • Conservation and Protection of the Physical Landscape of the Bahamas Act (1997) TOURISM: • Immigration Act • Hotel Encouragement Act.

	FRESHWATER: • Sewerage Corporation Act (1976) • Building Code and the Environmental Health Services Act (1987) SOLID WASTE MANAGEMENT: • Environmental Health Services Act (1987) • Solid Waste Management Program NATURAL HAZARDS: • National Emergency Management Agency • Emergency Power Act (1974) NON-GOVERNMENTAL ORGANIZATION: • Bahamas National Trust, established by The Bahamas National Trust Act (1959) • Bahamas Reef Environment Educational Foundation • Andros Conservancy and Trust • The Nature Conservancy • Friends of the Environment • ReEarth. INTERNATIONAL CONVENTIONS: • Convention on Wetlands of International Importance (Ramsar Convention) • United Nation Convention to Combat Desertification, • Convention on Biological Diversity • United Nation Framework Convention on Climate Change • Caribbean Planning for Adaption to Climate Chang, • Basel Convention on the Control Of Trans-boundary Movement of Hazardous Waste and their Disposal • Montreal Protocol on Substances that Deplete the Ozone Layer • Stockholm Convention on Persistent Organic Pollutants
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b. BARBADOS	Environmental Legislation/Conventions/Initiatives
BARBADOS	LAND RESOURCES • Town Planning Act (1963) • Soil Conservation (Scotland District) Act (1959) • Agricultural Sector Plan (1993-2000) • Prevention of Floods Act (1952) MINERALS AND ENERGY RESOURCES • Town and Country Planning Act • Soil Conservation (Scotland District) Act (1959) • Petroleum Winning • Operations Act (1951) • National Petroleum Corporation Act (1981) • National Petroleum Corporation (Supply • of Natural Gas) Regulations (1982) • Mines Regulation Act • Quarries Act (1963)

	FRESH WATER RESOURCES • Underground Water Protection Policy (Revised 1972) • Revised Policy on Private Sewage and Waste • Water Disposal Systems • Barbados Water Authority (Water Services) Regulations • 1997 Policy Framework for Water Resources Development and Management COASTAL AND MARINE RESOURCES • Coastal Zone Management Act (1998) • Marine Pollution Control Act (1998) • Town and Country Planning Act • Fisheries Act (1993) • Barbados Territorial Waters Act (1979) • The Marine Boundaries and Jurisdiction Act (1979) • Fisheries Management Plan (1997) • National Biodiversity Strategy and Action Plan (1998) WASTE MANAGEMENT • Solid Waste Management Program • The Health Services Act • The Nuisance Regulation • The Rodent Control Regulation • Disposal of Offensive Matter Regulation • Underground Water Control Act • Returnable Containers Act (1987) • Environmental Levy Act (1996-1008) [levy on specific goods] • Marine Pollution Control Act (1999) • Sanitation Service Authority Act Act-Sanitation Service Authority (fees, Amendments) Regulations (1996) • Comprehensive Solid Waste Management Act ATMOSPHERE AND CLIMATE • Environmental Management Act • Environmental Management Plan CONVENTIONS • United Nations Framework Convention on Climate Change • Intergovernmental Panel on Climate Change (IPCC) • International Convention for the Prevention Pollution from Ships
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c. BELIZE	Environmental Legislation/Conventions/Initiatives
BELIZE	FORESTRY • Forests Act (1927) – [Forest Reserves Order, Forest (Protection of Trees) Regulations, Forest (Export Duty) Order, Forest Licenses (Delegation of Powers) Order, Forests (Protection of Mangroves) Regulations, Powers of Forest Officers proclamation and the Forest Roads Regulations] • Forest Rules (1971) • Private Forests (Conservation) Act • Forest Fire Protection Act (1962) • Wildlife Protection Act • National Parks System Act • National Biodiversity Strategy and Action Plan

	CORAL REEFS • Environmental Protection Act (Amended 2009) COASTAL ZONES • Environmental Protection Act • Forest Regulations under the Forest Act • Mangrove Protection Act (1990) • National Lands Act (1992) • National Plan of Action for Land-based sources of Pollution FISHING • Fisheries Regulations (size and weight limits and closed seasons for commercially exploited species) • Marine Reserves CLIMATE CHANGE • Belize Draft Policy for Adaptation to Climate Change WATER RESOURCE • Water Industry Act (2001) • The Village Councils Act • Belize City Council Act • Belmopan City Council Act • Town Councils Act • Public Health Act • Coastal Zone Management Act (1998) • Environmental Protection Act • Forests Act • National Parks System Act • Land Utilization Act • Environmental Impact Assessment Regulations • The Maritime Areas Act 1992 SOLID AND LIQUID WASTE MANAGEMENT • National Environmental Action Plan • National Solid Waste Management Plan • Environmental Protection Act (1992) • Littering Offences Regulations (1996) • Pollution Control Regulations • Derelict Vehicles Regulations (1999) • Solid Waste Management Authority Act (1991) • Effluent Limitations Regulations (1995) REGIONAL REEF INITIATIVES • Mesoamerican Barrier Reef System (MBRS) Project • Healthy Reefs for Healthy People Initiative NATIONAL RESPONSES • Marine Protected Areas
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	CONVENTIONS • United Nations Convention on Biological Diversity • United Nations Convention on Combating Desertification • United Nations Framework Convention on Climate Change • International Convention for the Prevention of Pollution for Ships • Convention on Wetlands of International Importance Especially as Waterfowl Habitat • Convention on the International Trade of Endangered Species of Wild Fauna and Flora
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d. GUYANA	Environmental Legislation/Conventions/Initiatives
	PASSENGER VEHICLE STANDARD AND FLEETS: • From the year 2004, the Environmental Protection Agency and the Bureau of Standards of Guyana were developing emission standards. CONVENTIONS AND TREATIES: • The Convention on International Trade in Endangered Species of Wild Fauna and Flora • The International Plant Convention • The Convention on Biological Diversity • The World Heritage Convention • The Convention on the Conservation of Migratory Species • The Kyoto Protocol • The Rio Declaration on Environment and Development • The Montreal Protocol • The United Nations Convention on the Law of the Sea • The United Nations Framework Convention on Climate Change • The Convention concerning the Protection of the World Cultural and Natural Heritage • The International Convention for the Prevention of Pollution • The Vienna Convention for the Protection of the Ozone Layer • The United Nations Convention to Combat Desertification • The International Tropical Timber Agreement (ITTA) • The Convention on Wetlands (Ramsar) • The Convention for the Production and Development of the Marine Environment in the Wider Caribbean Region and its Protocols (Oil Spill) • The Basel Convention on the Control of Trans-boundary Movement of Hazardous Wastes and their Disposal • The Special Protected Areas and Wildlife REGIONAL PROGRAMS: • Caribbean Planning for Adaptation to Climate Change • Caribbean Conservation Association (CCA, 1967) • Caribbean Environment Program (CaEP, 1981) • Specially Protected Areas & Wildlife Program (SPAW, 1990) • Latin American Network for Technical Co-operation in National Parks, Protected Areas & Wildlife • UNESCO's Man and the Biosphere Program (MAB, 1972) • The Food and Agriculture Organization • Tropical Forestry Action Plan (TFAP, 1985) • Treaty for Amazon Co-operation (TAC, 1978) • Member of the Guiana Shield Initiative • Cartagena Convention

	GUYANA’S NATIONAL DEVELOPMENT STRATEGY (NDS) The environmental policies of the NDS is aimed at the promotion of the sustainable use of natural resources and to preserve the health of the urban, coastal, and hinterland provinces. GUYANA NATIONAL BUREAU OF STANDARDS: The quality standards and regulations in places in Guyana: Environmental Protection (Water Quality) Regulations (2000); Environmental Protection (Noise Management) Regulation (2000); Environmental Protection (Air Quality) Regulations (2000); Pesticide and Toxic chemicals Act and Regulations; and Guyana National Initiative on Forest Certification. LEGISLATIONS PROTECTING THE ENVIRONMENT: • Environmental Protection Act (1996) LAND USE: • Lands and Surveys Commission Act (1999) • National Parks Commission Act (1977) • National Trust Act (1972) • Forests Act • State Lands Act of 1903 • Amerindian Act of 1953 • Local Government Act • National Parks Commission AGRICULTURE: • National Agricultural Research Institute of Guyana Act (1984) • Plant Protection Act (1942) • Animal Diseases Act (1936) • Pesticides and Toxic Chemicals Control Act (2002) • Guyana Rice Producers Association Act (1946) FISHERIES: • Fisheries Regulations (1959) • Fisheries (Pin Seine) Regulations (1962) • Fisheries (Aquatic Wild Life Control) Regulations (1996) • Maritime Boundaries Act (1977) WILDLIFE: • Importation of Bees Act (1935) • Wild Birds Protection Act (1919) • Species Protection Regulations (2000) • Aquatic Wildlife Control Regulations DRAINAGE AND IRRIGATION SYSTEMS: • Drainage and Irrigation Act (1941) WATER SUPPLY AND SEWERAGE: • Water and Sewerage Act (2002) • District Councils Act (1970) COASTAL MANAGEMENT AND FLOOD DEFENSE: • Sea Defense Act (1933) • Forests Act • Town and Country Planning Act (1948) • Municipal and District Councils Act
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	• Public Health Act • State Lands Act; Housing Act (1948) • Drainage and Irrigation Act • East Demerara Water Conservancy Act • Mining Act (1991) • Geology and Mines, Petroleum (Exploration and Production) Act • Water and Sewerage Act (2002) • Fisheries Act (1957) • Maritime Boundaries Act (1977) • Shorezone Management Program and the Integrated Coastal Zone Management Action Plan (2000) • Archipelagic Waters & Maritime Jurisdiction Act (1993) MINING: • Mining Act (1991) • Blasting Operations Act • Petroleum (Exploration and Production) Act • Bauxite Nationalization Act; Minerals Act • Mines Assistance Act • Guyana Geology and Mines Commission Act FORESTRY: • Forest Act • Timber Forest Export Act (1973) • Timber Marketing Act (1974) • Guyana's REDD initiative ENERGY: • National Energy Policy TRANSPORTATION: • Shipping Act (1998) • The Transport and Harbors Act (1932) • The River Navigation Act (1891) TOURISM : • Guyana Tourism Authority Act (2002) • National Tourism Policy Document (1998) PROTECTED AREAS: • National Parks Act (1930) • Iwokrama International Centre for Rain Forest Conservation and Development Act (1996) BIODIVERSITY: • National Strategy for the Conservation of Biological Diversity • National Biodiversity Action Plan produced in 1999 • National Environmental Education Strategy • National Mangrove Management Action Plan • Poverty Reduction Strategy Paper (2002) • Guyana Marine Turtle Conservation Strategy (2003)
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e- JAMAICA	Environmental Legislation/Conventions/Initiatives
JAMAICA	BEACHES • Beach Control Act • National Beach Policy CORAL REEFS • Draft Coral Reef Protection • Preservation Policy (1997) FISHERIES • The Fishing Industry Act FORESTRY • Forestry Policy (2001) WATERSHEDS • Watersheds Protection Act BIODIVERSITY AND BIOLOGICAL RESOURCES • Wild Life Protection Act (1945) • The Endangered Species Act (2000) INTERNATIONAL CONVENTIONS • Convention on Biological Diversity PARKS AND PROTECTED AREAS • Policy framework for the National System of Protected Areas titled, “Policy for Jamaica’s System of Protected Areas” • A new five-year management Plan was developed for Blue and John Crow Mountain National Park. • A National Park Trust • User Fees Regulations are currently being developed for all national parks. NATURAL RESOURCES • The Natural Resources Conservation Authority Act (1991) LAND • The Land Development and Utilization Act • The Town and Country Planning Act MARINE • The Maritime Areas Act (1996)

f. SURINAME	Environmental Legislation/Conventions/Initiatives
SURINAME	INDUSTRIAL POLLUTION • Hindrance Act (1972) MINING AND EXTRACTION ACTIVITIES • Mining Decree (1986) • State Decree on Mining Installations (1989) • Petroleum Act(1990) • Harbor Decree (1981) FOREST EXPLOITATION AND CONSERVATION • Forest Management Act (1992) LAND RIGHTS AND LAND USE • Tribal laws and regulations. • Land Policy Directives (2005) • Planning Act (1973) WILDLIFE PROTECTION AND NATURE CONSERVATION AREAS • Nature Conservation Act (1954) WASTE • Harbours Decree (1981) INTERNATIONAL AGREEMENTS • Convention on the International Trade of Endangered Species of Wild Fauna and Flora • United Nations Convention on Biological Diversity • Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere • United Nations Convention to Combat Desertification, • Wetlands Convention • United Nations Convention on the Law of the Seas (UNCLOS) • Convention on the High Seas • International Convention for the Prevention of Pollution from Ships • Convention on the Prevention of Marine Pollution by Dumping of Wastes (MARPOL) • International Convention for the Safety of Life at Sea (SOLAS) • International Convention for the Prevention of Pollution of the Sea by Oil • International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties • United Nations Framework Convention on Climate Change • Montreal Protocol on Substances that Deplete the Ozone Layer • Vienna Convention for the Protection of the Ozone Layer KEY MINISTRIES AND AGENCIES • National Council for the Environment • Environmental Division of the Ministry of Labor, Technological Development and Environment • National Institute for Environment and Development in Suriname • Inter-Ministerial Advisory Committee • Ministry of Natural Resources • Foundation for Forest Management and Production Control (2001)

	• Nature Conservation Division of the Suriname Forest Service • Foundation for Nature Conservation in Suriname • Ministry of Agriculture, Animal Husbandry and Fisheries • Ministry of Public Health • Ministry of Public Works • Ministry of Planning and Development Cooperation • Ministry of Regional Development ENVIRONMENTAL NGOS • Conservation International (CI) • World Wildlife Fund (WWF) • Amazon Conservation Team (ACT) • Suriname Conservation Foundation (SCF) • Foundation for a Clean Suriname INDIGENOUS GROUPS • Organization of Indigenous Village Leaders in Suriname • Organization of Indigenous Peoples in Suriname • Chairmen Advisory Committees to Maroon Granmans
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g. TRINIDAD AND TOBAGO	Environmental Legislation/Conventions/Initiatives
TRINIDAD AND TOBAGO	ENVIRONMENTAL LEGISLATIONS • Environmental Management Act 1995 (3/1995); as replaced by the Environmental Management Act 2000 (3/2000), as augmented • Conservation of Wild Life Act (Chap. 67:01) as amended by Conservation of Wildlife Regulations 1996, 1997 • Marine Areas (Preservation & Enhancement) Act (Chap. 37:02) as amended by Marine Areas (Restricted Area) Order 1996 ENVIRONMENTAL TREATIES AND CONVENTIONS • Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on Fishing and Conservation of the Living Resources of the High Seas • International Plant Protection Convention • Geneva Convention on the Continental Shelf • Vienna Convention on Civil Liability for Nuclear Damage • Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water • United Nations Convention on the Law of the Sea – Montego Bay. • Convention for the Protection and Development of the Marine Environment of the Wider Caribbean and its Protocol Concerning Co-operation in the Combating Oil Spills in the Wider Caribbean Region • International Tropical Timber Agreement • Montreal Protocol on Substances that Deplete the Ozone Layer • Vienna Convention Protection of the Ozone Layer • Protocol Concerning Pollution from Land Based Sources and Activities to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region • Convention on Wetlands of International Importance Especially as Waterfowl Habitat

	• Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal • United Nations Framework Convention on Climate Change and its Protocol • United Nations Convention on Biological Diversity and its Cartagena Protocol on Biosafety • Geneva Convention on the High Seas • Convention on the Territorial Sea and the Contiguous Zone • Lomé IV Convention (Control of Hazardous Wastes) • Stockholm Convention on Persistent Organic Pollutants LIABILITY RULES • Trinidad and Tobago has established a voluntary policy of full compensation for environmental damages, but has not legislated mandatory liability. ACTS AND REGULATIONS • Petroleum Act (1969) • The Petroleum Regulations (1970) • The Petroleum Tax Act (1974) • Mineral Act (2000) • Petroleum Production Levy and Subsidy Act (1974) • Unemployment Levy Act (1970) • Income Tax (In Aid of Industry) Act (1950) • Green Fund (Amendment) Regulations (2011)
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4.2 Challenges to Success

According to UNEP (2003: 3):

“The effectiveness of economic instruments for environmental management depends on the efficiency of the way the markets function and the presence of a solid institutional platform with capacity to implement environmental management objectives at the national, state and municipal level.”

In addition, it is stated:

“Ultimately, the success of this type of environmental management instruments in the countries will be intrinsically linked to the degree of institutional development attained, and to the capacity of the public apparatus to render operable policy objectives—such as environmental policy—in the long term.”

While economic instruments have had varying degrees of success in meeting their objectives, many of these in the Caribbean operate outside of the market arena in the forms of regulations- fees, charges etc. In addition, where deliberate policies have been implemented as in the case of Trinidad and Tobago’s Green Fund, success is not as common.

Minister: Make more use of Green Fund \$\$

Minister of Housing and the Environmentsays only \$12 million has been used from the \$2.3 billion Green Fund during the last decade. He also described the period from 2000 to present as “a missing decade of environmental activities.”

Source: <http://www.guardian.co.tt/node/15401> Published: Sat, 2011-06-04

As of January, 2011 three organizations had been successful in accessing grants from the Green Fund in Trinidad and Tobago. In addition, for Trinidad and Tobago, the National Environmental Policy (2005) *proposed* some economic instruments and incentives to minimize damage to the environment:

- A deposit/refund taxes for beverage containers, tyres, batteries, fluorescent bulbs, appliances, used oil and automobiles.
- A tax on energy consumption.
- A fuel tax on diesel.

These policies (with the exception of the deposit refund system for beverage containers) have yet to be implemented.

5. Policy Recommendations and Conclusions

5.1 Conclusions

This paper has provided an important inventory of what environmental management policy instruments are in place in the Caribbean BMCs of the IADB. Notwithstanding the foregoing we acknowledge that in the Caribbean region, environmental taxes and environmentally related taxes are difficult to disaggregate. Taxes in the Caribbean that have intended to meet environmental objectives have not been well developed (when compared to the experience of the OECD countries), in that there is significant overlap between taxes on income that have

environmental implications and taxes on polluting tax bases. Values for the contribution of environmental taxes to total tax revenue are therefore “conflated” with income and profit taxations. The implication is that there is difficulty in assessing the impact of specific environmental taxes.

While there is some degree of legislative frameworks for environmental management in the form of various signed Conventions and Agreements, there continue to be gaps between policy documentation and effective crafting of policy for implementation of same. The use of alternative instruments suggests that the region has yet to move away from command and control policies to exploit the potential of market-based mechanisms. Even with the use of the command of control policies evidence suggests these are outdated and poorly executed so that the desired environmental outcomes (in terms of internalizing specific externalities) are not particularly successful.

Environmental taxes could provide Caribbean governments with additional fiscal revenues and at the same time foster much-needed environmental amenity improvements. There is also the possibility for a further environmental dividend if some of the revenues collected are reinvested in the maintenance of environmental or natural resource services as in the case of the Green Fund, but there is the requirement for greater incentives to ensure that these funds meet their directed objectives. It is possible that environmental taxes may also provide dynamic efficiency incentives for those economic sectors that are reliant on the environmental services which the tax is designed to protect, such as the Tourism Sector.

Taxes may also lead to price increases (such as fuel taxes) that could have regressive consequences for the society but as the literature suggests as in the case of the fuel tax, this concern can be abated and instead, the impact of fuel subsidies considered in terms of associated trends in externalities. Assessing each of these concerns and estimating the net benefits of the environmental tax is important in determining the effectiveness of such taxes, but will also require that the tax rules and other statistics be monitored and implemented for such an assessment to be executed.

If the tax leads to regressive outcomes, then parallel policies that could mitigate these perverse distributional outcomes would also need to be assessed, so that evidence based policies can be recommended for Caribbean policymakers. New taxes can also be politically unpalatable for policymakers.

5.2 Policy Implications and Recommendations

Sustainable development of Caribbean SIDS is heavily dependent on successful management of the environmental resources on which these economies rely.

To successfully assess the impact of environmental taxes in the Caribbean there needs to be a concerted data collection effort in this area so that policy is explicitly linked to outcomes which are located in an empirical context. In this regard it is recommended that efforts be made to “green” national accounts for the Caribbean countries so that much needed data on environmental causes and effect can become an integral part of development planning in these countries.

Taxes in the Caribbean region are a significant source of government revenues. There is, however, overlap between taxes on profits and income, and what can be interpreted as environmental taxes. While the analysis of this paper suggests that environmental taxes contribute a significant share to total taxation revenue, it should be noted that the values, as estimates only, suggest that a significant share of total tax revenue can be earned through environmental taxation.

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Appendices

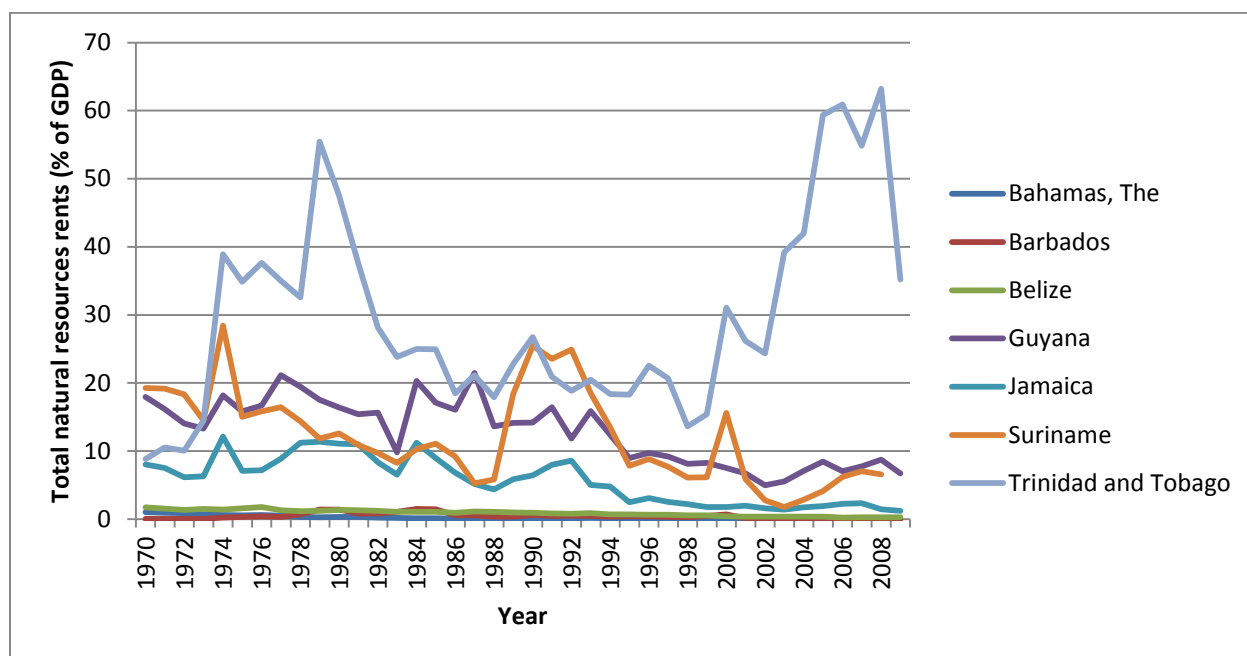
Appendix 1

Table A1. GCT and the Tourist Sector, 2002

Item	Amount (\$J Mil.)
1. Tourism Revenue	25,157
2. Less Commissions	4,221
3. Less Gratuities	1,316
4. Less Transportation	350
5. Net Tourism Revenue (1)-(2)-(3)-(4)	19,270
6. Output tax (0.111 * Net Tourism Revenue)	2,144
7. Less Input Tax Credits ²⁵	897
8. Less Special Tourism Credits	1,027
9. GCT Payable (6)-(7)-(8)	220
Exhibit: Number of Firms	398
¹ Input Tax credit attributable to tourism is calculated pro rata to the share (92.7%) of tourism revenue in total supplies reported by tourist firms	

Source: Edmiston and Bird (2006: 29).

Figure A1. Natural Resource Dependence in the Caribbean (1970-2009)



Source: World Bank, World Development Indicators, various years.

Appendix 2

Table A2 (a-g): Environmental Profiles for Selected Case Study Countries

COUNTRY (a)	EXTERNALITIES			SOURCE/LINKS
	LAND	AIR	WATER	
BAHAMAS	WETLANDS/MANGROVES Building hotels and marinas negatively impacts on the mangrove ecosystem. Mangroves are used as dump sites. BEACHES Human activities have caused beach erosion due to: • Constructing groynes • Clearing beaches and dunes • Sand mining • Clearing of vegetation LAND RESOURCES Reduction of the coppice tree population due to: • Shifting cultivation • Charcoal making • Woodcarving The clearing of pine and coppice has led to the proliferation of invasive plant species. SOLID WASTE Majority of the wastes generated are disposed of in dumps with little protection. Indiscriminate dumping along the roadsides and on abandon lands.	EMISSIONS Main sources of CO₂ are transportation and electricity generation. Dust from the Sahara negatively impacts the coral reefs as well as through precipitation. GLOBAL WARMING Rise in temperature will increase the intensity and frequency of hurricanes and storms. Bahamas is susceptible to sea-level rise Coral reefs are in danger from increased sea temperature.	SEA-GRASS BEDS Sea-grass beds are affected by: Natural Threats such as: • Wind-driven waves • Storms and sea level rise and Anthropogenic Threats such as: • Sedimentation surface run-off Raw sewage disposal • Grounding of vessels • The use of inappropriate fishing gears • Coastal development. CORAL REEFS Coral reefs has decline in waters of more populated and developed islands. Anthropogenic impacts on the coral reefs: • Inadequate liquid waste treatment. • Land based sources. Coral disease such as the white band disease. FISHING: Knowledge of the status of reef fish stocks is not known. Overexploitation of fish stocks. Problems which exists • Non-adherence of bag limits. • Sport fishing limits.	GEO Bahamas. 2005. “<i>State of the Environment</i>” United Nations Environment Program United Nations Environment Program. “Latin America and the Caribbean Passenger Vehicle Standard and Fleets.” August 2011. United Nations Environment Program. 2002. “Caribbean Environmental Law Development and Application.” United Nations Environment Program

	Disposal sites are located near: • Residential communities • Well fields with high groundwater tables • Airports and wetland HAZARDOUS WASTE Lack of improper disposal of hazardous waste facilities Indiscriminate disposal of hazardous waste at landfills MEDICAL WASTE Lack of capacity to deal with medical waste generated. Ends up in landfills.		• Improper techniques in recreational fishing. • Illegal catching of fish by poachers from neighboring countries. SEWER COLLECTION SYSTEMS: Only one-fifth of the residences are serviced by sewer collection systems. Liquid wastes are disposed of directly into the sea. Septic tanks do not conform to building codes. FRESH WATER: Factors affecting rainfall of the Bahamas: • Size of the islands. • Proximity to the mainland of the United States of America. • Frequency of tropical storms.	
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COUNTRY (b)	EXTERNALITIES			SOURCE
	LAND	AIR	WATER	
BARBADOS	LAND RESOURCES Land slippage and soil Human activities which leads to flooding MINERALS AND ENERGY RESOURCES Intense “haze” over quarries, and dust deposits on buildings and vegetation in the vicinity of quarry sites. Illegal mining. Salt laden onshore winds affect agricultural lands. Ground water contamination from hydrocarbons. Human consumption impacts on air quality. BIOLOGICAL DIVERSITY The major threats to biodiversity are physical development. Driving vehicles and grazing on beaches causes’ damage to beach vegetation. Chemical fertilizers and pesticides negatively impacts on terrestrial flora and fauna and surface freshwater catchments. Coral reef damage from boat moorings, and bleaching and	ATMOSPHERE AND CLIMATE Increases in vehicular traffic, industrial activity and the incidence of Sahara. The primary sources of odors: • Mangrove Landfill • Garbage collection trucks • Sites of unauthorized disposal of animal and other organic waste in drainage suck-wells • Gullies and roadsides • Vehicular exhaust • Industrial stacks and aircraft. • Smoke. Silicate processing and flour and feed blending plants. Climate change impacts on agriculture and on groundwater recharge and public water supply.	FRESH WATER RESOURCES Water quality at risk from: • Agricultural activity, • Petro-chemical industry, • Industrial facilities and hazardous wastes, • Urban development and domestic waste disposal, • Solid and liquid waste disposal. Leachate from both official and unofficial landfill sites threatens groundwater supply. COASTAL AND MARINE RESOURCES Encroachment of buildings into the active beach zone. Degradation of wetlands. Degradation of reefs and coastal water quality. Loss of beach access. Littoral vegetation communities now have low species diversity. Loss of economically viable agricultural/arable Wastewater discharges from agriculture	United Nations Environmental Program. “Economic Instruments and Fiscal Policy.” Fourteenth Meeting of the Forum of Ministers of the Environment of Latin America and the Caribbean. November 2003. United Nations Environment Program. “Latin America and the Caribbean Passenger Vehicle Standard and Fleets.” August 2011. United Nations Environment Program http://www.unep.org/dec/onlineManual/Enforcement/InstitutionalFrameworks/EconomicInstruments/Resource/tabid/1013/Default.aspx United Nations Development Program. 2010. “Latin America and the Caribbean: Environment Outlook.” GEO LAC 3 Barbados. Ministry of Physical Development and Environment. 2001. “State of the Environment Report 2000: GEO Barbados.” Ministry of Physical Development and Environment. Stavins Robert N. 2001. “Experience with Market-Based

	sediment smothering in several areas. Marine ecosystem is under threat primarily from land based sources of pollution. WASTE MANAGEMENT Large quantities of packaging generated through foreign imports and local producers and retailers. Inadequate storage and covering of waste which includes hazardous materials. Vector control problems.		Algal growth caused by eutrophication, and increased levels of suspended particulate matter Wetland systems threatened by proposed development. WASTE MANAGEMENT Leachate infiltration into the groundwater aquifer from illegal dump sites in gullies. Contamination of coastal waters and deterioration of coral reefs.	Environmental Policy Instruments.” Resources for the Future.
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COUNTRY (c)	EXTERNALITIES			SOURCE
	LAND	AIR	WATER	
BELIZE	HIGH DEFORESTATION RATE: Agriculture and aquaculture have escalated at the expense of the forests. Deforestation rate is twice that of Central America. Illegal immigrants into Belize contributed to the high deforestation rate. Outdated policies aid in deforestation. SOLID AND LIQUID WASTE MANAGEMENT ISSUES Solid waste generated per capita basis is low. Inability to properly dispose of the wastes. Overflowing of landfills Landfills are not sealed to prevent leaching of pollutants into ground water. Inadequacy to deal with liquid waste and liquid waste management. Large number of cruise tourists exacerbates issues of liquid waste. Lack of proper solid and liquid waste infrastructure.	CLIMATE CHANGE Total GHG emissions for Belize: 1994 – 2,827 Gg 1997– 8,149 Gg 2000 – 13,238 Gg Most vulnerable infrastructure: • Industrial plants and products. Equipment for producing and distributing energy. • Roads, ports and other transportation facilities. • Residential and commercial properties. • Coastal embankments. Most susceptible to extreme events: • Agro-industry. • Production of hydroelectricity, biomass, and other forms of renewable resources. • Energy use. • Construction. • Some transportation activities. • Infrastructure located in coastal zones.	RAPID COASTAL DEVELOPMENT Rapid and uncontrolled coastal development threatens the coastal zones. Coastal lands are purchased to build condos and resorts at the expense of mangroves and littoral forest. The aquaculture industry poses a direct threat to coastal ecosystems. CLIMATE CHANGE Sea level rise can negatively impact coastal populations. Sea level rise and sea temperature also negatively impact the Barrier Reef Coral bleaching in the reef system. CORAL REEFS Natural phenomena which are exacerbated by human-induced global climate change affect the coral reefs. Over fishing is a significant pressure on coral reefs. Unsustainable coastal development is a major threat to the coral reef. The coral reefs are also affected by: • Sedimentation from various land use practices. • Contamination from nutrients and pollutants. • Aquaculture industry.	United Nations Environment Programme. “Latin America and the Caribbean Passenger Vehicle Standard and Fleets.” August 2011. Cooper, Emily, Laurretta Burke, and Nadia Bood. 2009. “Coastal Capital: Belize. The Economic Contribution of Belize’s Coral Reefs and Mangroves.” World Resources Institute. Young, Colin A. 2011. “Belize’s Ecosystems: Threats and Challenges to Conservation in Belize.” Tropical Conservation Science. GEO Belize. 2010. “Belize Environment Outlook.” Ministry of Natural Resource and the Environment. United Nations Environment Program. 2002. “Caribbean Environmental Law Development and Application.” United Nations Environment Programme.

	FORESTRY Deforestation due to: • Population growth. • Urban and agricultural expansion. • Illegal extraction of forest resources. Immigration from neighboring countries results in: • Increase demand for land for housing and farming. • Introduction of unsustainable agricultural practices. Extraction can reduce populations of certain timber and non-timber species. Deforestation is a result of land conversion for agriculture. Land conversion leads to a loss of forest cover and also biodiversity. Selective logging has contributed to declining populations of commercial hardwood species SOLID WASTE MANAGEMENT A major threat to water is contamination from solid and liquid wastes. The lack of a systematic solid waste system results in open dumping of garbage. Belize's clean water sources are threatened by improper solid		COASTS AND COASTAL ECOSYSTEMS The major threats affecting coastal ecosystems are: • Unsustainable development associated with population expansion. • Tourism and the aquaculture industry. • Unsustainable land-based or non-coastal practices. Factors which influence the high level of destruction and degradation of coastal ecosystems: • The large number of people living or wanting to live near the coast. • Activities occurring all the way inland. Mariculture business is a threat to the coasts. Activities from aquaculture that can impact coastal systems and their waterways are: • Discharge of effluents from ponds. • The disposal of parts of the shrimp, such as the heads, which are not exported. Pollution and sedimentation that travel down to the coast through rivers within Belize and in neighbor countries are the primary threats. Belize City and the Southern parts of the country will continue to be the most vulnerable to storm damages. Coastal degradation will also affect those with businesses and home near the coast. LOSS OF WATER QUALITY AND QUANTITY Belize's water resources may ultimately be determined less by increased demand for water and more by loss of water quality.	
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	waste disposal. Waste contributes to the increase of atmospheric concentrations of GHGs.		The major direct pressures on the country's water resources: • Contamination and pollution from the use of agrochemicals and fertilizers. • Discharge of liquid effluents. Other pressures on Belize's environment: • Deforestation. • Increased waste and illegal dumping of waste. • Natural disasters including floods and drought. Loss of aquatic life due to contamination and saltwater intrusion. LIQUID WASTE MANAGEMENT Liquid wastes and sewage poses a threat to the country's water resources. In Belize City, disposal of sewage into open canals is still practiced. The waters in and around islands and other coastal areas are particularly vulnerable to: • Effluents from septic tank systems. • Improper liquid waste and sewage disposal. Fish, coral reefs and people including tourists are susceptible to the impacts of contamination. Improper waste disposal is not only a public health issue but a threat to the sustainable development of the country.	
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COUNTRY (d)	EXTERNALITIES			SOURCE
	LAND	AIR	WATER	
GUYANA	MINING: Mining contributes to: • Contaminate and discoloration of water. • Loss of domestic water quality for communities in downstream areas. • Loss of biodiversity and biological resources. • Damage to the landscape. AGRICULTURE Pesticides cause a reduction in bird populations. Contaminated fresh water fishes consumed by humans entered the food chain. FORESTRY Damages associated with the harvesting of timber: • Soil disturbance. • Canalization of water, • Inappropriate log harvesting techniques • Loss of biodiversity and biological resources from human intervention. WILDLIFE: The emergence of easier transport has the potential to exacerbate the problem of illegal trafficking of wildlife. SOLID WASTE COLLECTION AND DISPOSAL Issues such as: • Location of garbage disposal sites. • Dense population which put stress on the existing infrastructure. • Volume of waste generated.	CLIMATE CHANGE: Sea level rise will cause: • Intrusion of salt water in artesian wells • Increase in salinity of fresh water • Increase in the costs of these treats. Constraints to deal with sea level rise: • Low levels of awareness. • Limited institutional capacity. • Lack of efficient and new technology. • Inadequate budgetary allocation to public agencies. • Lack of monitoring systems.	FISHERIES Illegal activities by foreign unlicensed fishing vessels. Overharvesting of resources Illegal or poor fishing Threats to ecosystems from illegal dumping of ship waste. COASTAL WATERS AND INLAND FRESH WATER These water sources are polluted by: • Unregulated and irresponsible use of pesticides and toxic chemicals. • Impact of urban sprawl from the run off of poorly treated sewage and septic systems; • Illegal destruction of coastal mangroves. • Irresponsible mining and logging practice. • Human settlement and activities on waterways. Threat to land use management and soil degradation from: • Aquaculture. • Unregulated use of nitrogen fertilizers and the effect of greenhouse gas emissions. • Introduction of exotic fish species. WATER RESOURCES Scarcity or degradation of water resources emanates from: • Unplanned settlement. • Industrial and mining issues. • Agriculture	Atkins. 2005. "Guyana Country Environmental Profile." "Trade Policy in CARICOM: Overview of the Main Trade Policy Measures." United Nations Economic Commission for Latin America and the Caribbean." December 1999.

	• Housing structures are functioning without connections to the sewerage system. • No effective record keeping and statistical data on solid waste generated. • Poor infrastructure and services for collecting, transporting, treating and disposing of solid waste. ENVIRONMENTAL HEALTH: The human activities which negatively impact on the environment • Economic production • Altering the physical environment • Individual functioning LAND USE CHANGE: Conflict between land users and residential commercial, recreational and industrial interest. Traffic congestion caused by vending		• Uncontrolled demand. Coastal line is two meters below the sea level, there is the possibility of salinization of water resources. Inadequate maintenance and deterioration of the drainage and irrigation systems On the coastal belt of Guyana there is the treat of contamination and pollution of ground water supplies.	
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COUNTRY (e)	EXTERNALITIES			SOURCE
	LAND	AIR	WATER	
JAMAICA	FOREST ECOSYSTEMS Deforestation has led to the deterioration watersheds, and the drying up streams and rivers. Jamaica's forest is under serious pressure from: • Production of yam sticks. • Charcoal. • Resort and residential development. Timber extraction. • Grazing. • Cropping. Improper road construction and logging operations. Lack of soil and water conservation measure has led to: • High rates of soil erosion. • Loss of nutrients. • Reduction of water retention capacity in watersheds. Forests of Jamaica are threatened by industrial, agricultural and urban development. Bauxite mining is the single largest cause of deforestation in Jamaica. Large scale removal of trees from:	CLIMATE CHANGE Sea Level Rise due to climate change. Declines in agriculture yields. Severe repercussions on the tourist industry: • Erosion and flooding. • Loss of beach. • Loss of amenity value • Coral reef damage. • Infrastructural damage.	COASTAL ZONES Fish catches are being reduced by overexploitation Coastal mangroves being destroyed. Lack of awareness, resources and expertise, on ocean and coastal management. BEACHES Natural and Man-made factors are the cause of beach erosion Illegal sand mining is a longstanding problem. Recreational coastal and marine water quality is influenced by: • Discharge of sewage • Industrial effluent • Non-point source discharges from agricultural activities • Urban runoff and modifications of natural systems • Urbanization and the growth of informal settlements. Wastes in near shore waters comes from: • Water sports. • Boating. • Yachting. • Fishing. • Commercial shipping. Solid waste washed up or dumped on bathing beaches is a constant problem.	United Nations Environment Programme. "Latin America and the Caribbean Passenger Vehicle Standard and Fleets." August 2011. United Nations Environmental Programme. "Economic Instruments and Fiscal Policy." Fourteenth Meeting of the Forum of Ministers of the Environment of Latin America and the Caribbean. November 2003. United Nations Development Program. 2010. "Latin America and the Caribbean: Environment Outlook." GEO LAC 3 World Resources Institute. "Coastal Capital Literature Review: Economic Evaluation of Coastal and Marine Resources in Jamaica." June 2011. Jamaica. Vision 2030 Jamaica. 2009. "Natural Resources and Environmental Management and Hazard Risk Reduction and

• Watershed areas. • Illegal mining. • Unapproved and informal quarrying of sand and limestone. • Housing programs and squatter settlements. BIODIVERSITY AND BIOLOGICAL RESOURCES Reduction and loss of biodiversity due to: • Deforestation • Wetland destruction • Coral reef degradation Intense competition for land from: • Population growth. • Agricultural, Industrial and Commercial expansion. Awareness on the importance of biodiversity is limited. Biodiversity issues are not infused into national and sectoral policies. Poverty and over-consumption by certain sectors of the society. PARKS AND PROTECTED AREAS. Understanding of benefits from conservation and protection is insufficient. Inadequate financing to apply conservation and protection		Squatting is a major problem at fishing beaches. WETLANDS Coastal wetlands are threatened by: • Infrastructure development. • Conversion from natural habitat to other uses. Conversion mangroves for commercial uses. Draining land for agriculture has caused wetland destruction. Wetlands are destroyed by fires. Pollutants impacting on wetlands are: • Garbage. • Industrial waste • Sewage. • Oil spills Problems of non-point source pollution. CORAL REEFS The coral reefs have been subjected to: • Coral bleaching • Coral diseases. • Storm and hurricane damage. • Excessive nutrients from sewage pollution. • Siltation and poor watershed management practices. • Over-fishing and indiscriminate fishing practices. • Inappropriate recreational practices • Coastal pollution. FISHERIES Inshore fishery is considered to be severely overexploited. Loss of habitat for fish due to coastal degradation and pollution.	Climate Change: Sector Plan 2009-2030". Vision 2030 Jamaica. Jamaica. The National Environment and Planning Agency. 2009. "Annual Report: Financial Year 2008-2009". NEPA. United Nations Environment Program. 2002. "Caribbean Environmental Law Development and Application". United Nations Environment Program Stavins Robert N. 2001. "Experience with Market-Based Environmental Policy Instruments". Resources for the Future.
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	management in protected areas. FRESHWATER ECOSYSTEMS Seawater/saltwater intrusion of coastal aquifers caused by: • Over-pumping of the aquifer. • Pumping below sea level. • Poor well design. Groundwater is affected by improper sewage disposal and wastewater treatment. The quality of water rivers is threatened Caustic soda contamination “red mud” of ground and surface water Contamination of groundwater by: • Unlined waste disposal sites • Leaking underground petroleum storage tanks. There is organic and bacteriological contamination of groundwater from soak-away pits. Poor land use and inappropriate construction practices.		Use of destructive fishing gear. Lack of awareness by fishermen on fisheries management issues. Lack of adequate enforcement Poaching by foreign fishing vessels. Fishers not respecting closed seasons and other fisheries regulations WATERSHEDS Watersheds of Jamaica is impact on due to: • Reduced tree and vegetative cover and productivity of land. • Heavy siltation waterways. • Increased surface runoff. • Diminished vegetation cover. • Compacted soils Problem of reduced storage and availability of water. Severe flooding results in losses in life, agricultural crops, property and damage to roads. Marine and coastal contamination and degradation adversely affects tourism. Loss of habitat for important flora for fauna. Unsuitable farming practices is the single most important cause of the degradation of watersheds	
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COUNTRY (f)	EXTERNALITIES			SOURCE
	LAND	AIR	WATER	
SURINAME	COASTAL PLAINS AND SAVANNA BELT Increasing degradation of coastal lands Integrated watershed management is urgently needed in rice sector areas. Environmental impacts of extractive industries are poorly managed. There is a sharp decline in waterfowl, ibis and wood storks due to hunting pressure. Coastal wildlife populations are threatened by pollution of marine waters and coastal wetlands. Coastal lands are increasingly being converted to agricultural and urban areas. SURINAME INTERIOR Conflicting demands from industrial and traditional uses of environmental resources in region. Management of natural resource extraction is inadequate and with limited local consultation. Pollution of freshwater bodies through mining activities and inadequate waste/effluent disposal. Absence of a waste disposal system. The largest share of Indigenous and Maroon food comes from shifting or “slash and burn” agriculture.		MARINE AND COASTAL ZONE Depletion of fish and shrimp populations due to over-fishing. Fisheries management hampered by lack of: • Resources. • Enforceable control mechanisms. • Data. Loss of natural protection along coast line due to erosion and degradation of mangroves. Licensed fishing holders do not abide by the regulations set forth in their licenses. Illegal boats, mostly from Guyana and Venezuela, fish without licenses. High sediment content of the coastal waters facilitates the transportation of micro-organisms. Water pollution from in the coastal zones comes from: • Sewage systems. • Garbage from coastal communities. • Motor-oil from boats. • Ballast water from large vessels. Residues of agricultural chemicals in water systems have been toxic to fish and birds.	United Nations Environment Programme. “Latin America and the Caribbean Passenger Vehicle Standard and Fleets.” August 2011. Inter-American Development Bank. 2005. “Country Environmental Assessment.”. Inter-American Development Bank

	Large- and small-scale mining operations have negative impacts on land and water resources. Sedimentation is brought about when tailings of mining operations are discharged into rivers and creeks. Small-scale miners may release mercury into the air and aquatic ecosystem annually. Small-scale gold mining contributes to soil and landscape degradation PARAMARIBO URBAN AREA Ineffectively coordinated land use planning leading to sprawl and temporary flooding. Air pollution from vehicles and small industry. Inadequate systems for managing waste water, storm water and solid waste. Construction activities are expanding and converting green zones into concrete areas. The growing number of motorized vehicles contributes to damaging non-point source of air pollution. Road rehabilitation over the years has lead to: • Excessive erosion. • Drainage problems. • Dangerous height differences between roads and sidewalks. • Roads without sidewalks. Solid waste is not properly managed and illegal dumping along roads.			
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COUNTRY (g)	EXTERNALITIES			SOURCE
	LAND	AIR	WATER	
TRINIDAD AND TOBAGO	LAND AREA There is a slightly greater than average chance that environmental impacts are likely to occur. RATE OF LOSS OF NATURAL COVER T&T is highly vulnerable to loss of naturally vegetated areas. FRAGMENTATION OF LAND & HABITATS There is a high incidence of habitat fragmentation in T&T. TERRESTRIAL RESERVES The environment of Trinidad and Tobago has a relatively low vulnerability and a high intactness of the terrestrial environment as a result of the terrestrial reserves. INTENSIVE FARMING Water courses in Trinidad are slightly vulnerable to nutrient eutrophication from animal wastes. FERTILIZERS The vulnerability of the environment of Trinidad to damage caused by the excessive use of fertilizers is high. PESTICIDES The environment of Trinidad and Tobago is very vulnerable to damage from pesticides. SPILLS Trinidad is highly vulnerable to pollution arising from spills of oil and hazardous substances. MINING The environment of Trinidad is highly vulnerable to land degradation.	VEHICLES The environment of Trinidad is very vulnerable to damage from pollution from vehicles. Tobago is less vulnerable to this phenomenon.	SEA SURFACE TEMPERATURE T&T has a more than average vulnerability to environmental stress resulting from rising sea surface temperatures. MARINE RESERVES The ecological components of T&T are not sufficiently protected and are highly vulnerable. ECOLOGICAL OVER FISHING Trinidad and Tobago is moderately vulnerable to over-fishing. FISHING EFFORT Most of the available fish stocks in Trinidad and Tobago are already being fished and some are at risk of over-exploitation. RENEWABLE WATER Trinidad and Tobago have a very high demand on the water resources WASTE PRODUCTION T&T is moderately vulnerable to pollution of waterways, coastal regions and groundwater. WASTE TREATMENT The waterways, groundwater and coastal regions in Trinidad, are at moderate risk to pollution from the improper disposal of wastes. COASTAL POPULATIONS The coastal areas and associated ecosystems of T&T are very vulnerable to pollution.	United Nations Environment Programme. "Latin America and the Caribbean Passenger Vehicle Standard and Fleets." August 2011. Income Tax Act of Trinidad and Tobago. (BIR Version 04/2009) "Trade Policy in CARICOM: Overview of the Main Trade Policy Measures." United Nations Economic Commission for Latin America and the Caribbean. December 1999. Agard John, and Marissa Growrie. 2001 and 2002. "State of the Environment Report: Environmental Vulnerability Index (EVI) – Provisional Indices and Profiles for Trinidad and Tobago." Environmental Management Authority and University of the West Indies. United Nations Environment Programme. 2002. "Caribbean Environmental Law Development and Application." United Nations Environment Program National Environmental Policy (2005) of Trinidad and Tobago. Stavins, Robert N. 2001. "Experience with Market-Based Environmental Policy Instruments." Resources for the Future.

Appendix 3.

Table A.3.0. Motor Vehicles Taxes in Bahamas

Vehicle Price	Custom Duty Rate
\$10,000 or less	35%
\$10,000 to \$20,000	50%
\$20,000 to \$25,000	65%
\$25,000 and over	75%

Source: Dupuch Realty, available at <http://www.dupuchrealty.com/bahamas/vehicles.php>.

Table A.3.1. Motor Vehicle Fees in Jamaica

Vehicle Type	Annual Fee (Jam\$)
Motor Cars (T axis)	\$5,125
Motor Cars (not exceeding 1199 cc)	\$5,125
Motor Cars not deriving motive power from an internal combustion engine worked by Cylinders.	\$5,125
Motor Cars (exceeding 1199 cc but not exceeding 2999 cc)	\$7,000
Motor Cars (exceeding 2999 cc but not exceeding 3999 cc)	\$16,000
Motor Cars (exceeding 3999 cc)	\$24,250
Motor Cycles not exceeding 125 cc	\$2,050
Motor Cycles exceeding 125 cc but not exceeding 500 cc	\$3,100
Motor Cycles exceeding 500 cc	\$4,750
Trucks and Tractors not exceeding 50 cwt./2540.115 kg	\$7,000
Trucks and Tractors exceeding 50 cwt./2540.115 kg but not exceeding 120cwt/6109.09 kg	\$12,000
Trucks and Tractors exceeding 120cwt/6109.09 kg	\$12000 plus \$100 per cwt. over 120 or 4,500 plus \$100 per 50.91 kgs. over 6109 kgs.
Trailers	\$\$112.50 per cwt./ 50.91 kgs)

Source: Authors' compilation based on data from Tax Administration Jamaica.

Table A.3.2. Main Taxes Applicable to Trinidad and Tobago's Energy Sector

Tax	RATES
Royalty	Crude Oil: 10% - 12.5% Natural Gas: TT\$0.015/mscf – 15%
Supplemental Petroleum Tax	As prescribed in Schedule (Applicable only to Crude Oil Income)
Petroleum Profit Tax	50% of Net Taxable Income 35% of Net Taxable Income (Deep water)
Unemployment Levy	5% of Net Taxable Income
Petroleum Production Levy	Up to 4% of gross income from crude
Petroleum Impost	Rate specified in Order provide under the Petroleum Act
Green Fund Levy	0.1% of gross sales or receipts
Withholding Tax	Rate as specified in Schedule under the Income Tax Act

Source: Trinidad and Tobago, Ministry of Energy and Energy Affairs;
http://www.energy.gov.tt/business_and_investing.php?mid=159 (Accessed 01/12/11)

Appendix 4: Statistical Tables

Bahamas (Percentage of Total Revenue) (1990 – 2010)						
Year	Licenses (% of Total Tax Revenue)	Import Duty (% of Total Tax Revenue)	Departure Tax (% of Total Tax Revenue)	Motor Vehicle Tax (% of Total Tax Revenue)	Hotel Occupancy Tax (% of Total Tax Revenue)	Total Percentage of Tax Revenue
1990	7.20	64.62	5.99	NA	NA	77.81
1991	9.13	59.90	7.54	NA	NA	76.58
1992	7.78	55.18	10.45	NA	NA	73.41
1993	6.81	54.06	10.82	NA	1.10	72.79
1994	7.69	53.54	9.12	NA	0.98	71.33
1995	7.67	52.71	8.54	NA	1.43	70.36
1996	7.47	52.89	8.20	NA	1.35	69.91
1997	6.92	52.38	8.07	1.98	1.47	68.84
1998	10.04	49.79	7.95	2.03	1.54	69.32
1999	8.43	52.59	7.36	1.88	2.56	70.94
2000	8.55	50.35	7.42	1.93	2.85	69.16
2001	9.39	49.81	8.20	2.18	2.68	70.08
2002	9.57	54.23	7.82	1.99	2.52	74.13
2003	9.07	53.71	7.93	1.74	2.67	73.38
2004	NA	44.61	7.50	1.92	2.68	56.72
2005	NA	44.58	6.98	1.84	2.40	55.80
2006	NA	42.13	6.38	1.69	2.15	52.35
2007	NA	41.80	5.87	1.83	2.59	52.09
2008	NA	33.58	6.20	2.00	2.32	44.10
2009	NA	31.42	6.35	1.85	2.26	41.88
2010	NA	35.38	6.80	2.42	3.33	47.93

Guyana (GUY\$M) (1990 – 2010)										
Year	Withholding Tax	Capital Gains	Excise Duty	Purchase Tax on Cars	Import Duty	Export Duty	Travel Tax	Consumption Tax	Environmental Tax	Total Tax Revenue
1990	61.9	36	83.8	32.1	559.3	94	79.2	897.4	NA	4109
1991	457	57	93	95	1,168.0	180	239	3,271.00	NA	9682
1992	831	57	146	165	1,620.0	153	284	4,470.00	NA	16547
1993	897	164	168	254	2,689.0	152	425	6,148.00	NA	20542
1994	729	66	49	294	2,848.0	181	429	7,747.00	NA	22294
1995	1,066.00	109	NA	335	3,408.0	130	575	9,624.00	82.2	27652
1996	1,103.00	188	NA	463	3,747.0	197	697	11,087.00	76.2	31881
1997	NA	NA	9.6	442.3	3,700.6	10.2	673.7	11,225.60	132.8	31220
1998	NA	NA	10.8	433	3,724.2	4.5	751.3	11,001.30	139.8	30749.4
1999	NA	NA	8.3	392.2	3,703.8	7.8	877.7	11,698.70	132.7	36823
2000	NA	NA	4.4	474.5	3,943.0	7.3	1,083.5	14,956.60	134.3	37750.8
2001	NA	NA	790.5	477.7	3,665.4	12.4	1,096.1	13,141.70	353.5	37518
2002	NA	NA	139.6	470.8	3,456.6	7.9	1,169.1	14,630.70	326.1	40736.2
2003	1,365.20	138.3	22.5	444.2	3,318.6	11.7	1,100.6	15,324.80	344.1	41424.8
2004	NA	NA	22.6	718.3	3,684.6	13.1	1,145.9	19,497.80	273.4	48172.4
2005	NA	NA	271.1	737.9	3,634.8	6.9	1,163.9	21,395.00	472.80	52980.8
2006	NA	NA	109.2	828.1	4,114.7	7.3	1,082.4	23,375.80	421.7	58446.7
2007	NA	NA	256.1	158.9	6,004.5	8.7	1,111.8	1,426.10	513.6	77292.5
2008	NA	NA	267.40	7.5	6,602.4	8.60	1,143.6	NA	605.90	79134.0
2009	NA	NA	191.9	NA	6,804.5	8.2	1,255.0	13.50	674.1	89085.4
2010	NA	NA	186.2	NA	8,268.1	6.7	1,423.2	NA	775.1	100889.5
NA: Not Available										

Sources: dos Santos and Bain (2004) and Bank of Guyana (2005, 2011).

Guyana (Percentage of Total Revenue) (1990 – 2010)										
Year	Withholding Tax (% of Total Tax Revenue)	Capital Gains (% of Total Tax Revenue)	Excise Duty (% of Total Tax Revenue)	Purchase Tax on Cars (% of Total Tax Revenue)	Import Duty (% of Total Tax Revenue)	Export Duty (% of Total Tax Revenue)	Travel Tax (% of Total Tax Revenue)	Consumption Tax (% of Total Tax Revenue)	Environmental Tax (% of Total Tax Revenue)	Total Percentage of Tax Revenue
1990	1.51	0.88	2.04	0.78	13.61	2.29	1.93	21.84	NA	44.87
1991	4.72	0.59	0.96	0.98	12.06	1.86	2.47	33.78	NA	57.43
1992	5.02	0.34	0.88	1.00	9.79	0.92	1.72	27.01	NA	46.69
1993	4.37	0.80	0.82	1.24	13.09	0.74	2.07	29.93	NA	53.05
1994	3.27	0.30	0.22	1.32	12.77	0.81	1.92	34.75	NA	55.36
1995	3.86	0.39	NA	1.21	12.32	0.47	2.08	34.80	0.30	55.44
1996	3.46	0.59	NA	1.45	11.75	0.62	2.19	34.78	0.24	55.07
1997	NA	NA	0.03	1.42	11.85	0.03	2.16	35.96	0.43	51.87
1998	NA	NA	0.04	1.41	12.11	0.01	2.44	35.78	0.45	52.24
1999	NA	NA	0.02	1.07	10.06	0.02	2.38	31.77	0.36	45.68
2000	NA	NA	0.01	1.26	10.44	0.02	2.87	39.62	0.36	54.58
2001	NA	NA	2.11	1.27	9.77	0.03	2.92	35.03	0.94	52.07
2002	NA	NA	0.34	1.16	8.49	0.02	2.87	35.92	0.80	49.59
2003	3.30	0.33	0.05	1.07	8.01	0.03	2.66	36.99	0.83	53.28
2004	NA	NA	0.05	1.49	7.65	0.03	2.38	40.48	0.57	52.64
2005	NA	NA	0.51	1.39	6.86	0.01	2.20	40.38	0.89	52.25
2006	NA	NA	0.19	1.42	7.04	0.01	1.85	40.00	0.72	51.22
2007	NA	NA	0.33	0.21	7.77	0.01	1.44	1.85	0.66	12.26
2008	NA	NA	0.34	0.01	8.34	0.01	1.45	NA	0.77	10.91
2009	NA	NA	0.22	NA	7.64	0.01	1.41	0.02	0.76	10.04
2010	NA	NA	0.18	NA	8.20	0.01	1.41	NA	0.77	10.57

Barbados (BDS \$M) (1990 – 2010)					
Year	Levies	Consumption Tax	Excise Tax	Import Duties	Total Tax Revenue
1990	85.987	214.291	4.973	125.66	916
1991	91.335	197.291	4.911	117.787	891.7
1992	85.409	228.51	4.674	87.106	923.1
1993	85.289	233.391	4.446	74.063	916.4
1994	54.975	261.962	4.583	75.401	933.2
1995	12.169	280.466	4.334	84.518	979.1
1996	13.41	308.97	3.331	93.143	1081.5
1997	15.858	255.719	22.383	91.431	1131.1
1998	16.475	2.449	166.374	127.845	1381.1
1999	17.042	-0.032	189.237	138.919	1464.3
2000	13.994	0.448	461.383	132.669	1523.2
2001	18.094	0.71	160.157	131.528	1596.2
2002	17.536	-0.012	141.772	162.524	1611.9
2003	4.674	NA	114.203	170.609	1620.3
2004	NA	NA	152.987	201.047	1775.4
2005	NA	NA	149.369	191.653	1820.2
2006	NA	NA	172.193	188.554	2042.2
2007	14.191	NA	137.232	186.922	2066.5
2008	24.533	NA	186.162	216.327	2340.7
2009	21.809	NA	149.792	183.287	2273.8
2010	24.304	NA	151.323	187.755	2190

Source: Central Bank of Barbados (2011).

Barbados (Percentage of Total Revenue) (1990 – 2010)					
Year	Levies (% of Total Tax Revenue)	Consumption Tax (% of Total Tax Revenue)	Excise Tax (% of Total Tax Revenue)	Import Duties (% of Total Tax Revenue)	Total Percentage of Tax Revenue
1990	9.39	23.39	0.54	13.72	47.04
1991	10.24	22.13	0.55	13.21	46.13
1992	9.25	24.75	0.51	9.44	43.95
1993	9.31	25.47	0.49	8.08	43.34
1994	5.89	28.07	0.49	8.08	42.53
1995	1.24	28.65	0.44	8.63	38.96
1996	1.24	28.57	0.31	8.61	38.73
1997	1.40	22.61	1.98	8.08	34.07
1998	1.19	0.18	12.05	9.26	22.67
1999	1.16	0.00	12.92	9.49	23.57
2000	0.92	0.03	30.29	8.71	39.95
2001	1.13	0.04	10.03	8.24	19.45
2002	1.09	0.00	8.80	10.08	19.97
2003	0.29	NA	7.05	10.53	17.87
2004	NA	NA	8.62	11.32	19.94
2005	NA	NA	8.21	10.53	18.74
2006	NA	NA	8.43	9.23	17.66
2007	0.69	NA	6.64	9.05	16.37
2008	1.05	NA	7.95	9.24	18.24
2009	0.96	NA	6.59	8.06	15.61
2010	1.11	NA	6.91	8.57	16.59

Jamaica (Jam \$M) (1990 – 2009)											
Year	Bauxite and Alumina (Tax on Income Profits and Capital Gains)	Special Consumption Tax	Special Consumption Tax (Production and Consumption)	Special Consumption Tax (Imports)	Motor Vehicle License	Sales Tax, Used Cars	Custom Duty	Travel Tax	Consumption Duty	Bauxite Levy	Total Tax Revenue
1990	317.3	1198.3	N.A.	N.A.	47.3	3.8	807.1	86.2	293.1	606.5	8484.7
1991	199	1479	N.A.	N.A.	66	5	1530	167	239	1246	12686
1992	165	1936	N.A.	N.A.	65	3	2632	341	6	1623	20673
1993	450	1947	N.A.	N.A.	340	3	3927	427	NA	1726	33373
1994	302	2008	N.A.	N.A.	462	NA	4380	543	NA	2374	40778
1995	858	2016	N.A.	N.A.	481	NA	5962	713	NA	2795	53059
1996	54	1515	N.A.	N.A.	418	NA	5978	913	NA	2798	57989
1997	178	2194	N.A.	N.A.	237	NA	6677	951	NA	2872	62100
1998	419	3335	N.A.	N.A.	748	NA	7089	1496	1835	2787	69760
1999	26	3238	N.A.	N.A.	728	NA	7395	1776	5338	5405	81372
2000	430	5344	N.A.	N.A.	750	NA	8498	1999	4127	2753	89826
2001	NA	5174	N.A.	N.A.	851.9	NA	8978.7	2027	5295	NA	90568.2
2002	NA	6101.57	N.A.	N.A.	920.3	NA	9979.6	1492	4455.3	NA	102632.1
2003	NA	5234.81	N.A.	N.A.	1096.5	NA	12267	959.6	7157.8	NA	130114.5
2004	119.1	N.A.	4434.6	7376.3	941.3	NA	13357	970.5	N.A.	2479.4	147905
2005	365.7	N.A.	3535.6	8802.8	935	NA	14998.8	1914.2	N.A.	2951.6	156774.7
2006	975.6	N.A.	3018.9	8803.8	1043.8	NA	16166.4	2041.3	N.A.	3515.6	181443.2
2007	1626.2	N.A.	4495.9	8792.9	1011.7	NA	18639.5	2143.6	N.A.	5118.7	211298.4
2008	28.6	N.A.	4286	20141.9	1537.8	NA	19759.4	1896.3	N.A.	2509.3	250006.2
2009	866.3	N.A.	9167.8	28944.4	1774.5	NA	18229	3512.2	N.A.	273.4	276339.8

Sources: Central Bank of Jamaica, various years, and dos Santos and Bain (2004).

Jamaica (Percentage of Total Revenue) (1990 – 2009)											
Year	Bauxite and Alumina (% of Total Tax Revenue)	Special Consumption Tax (% of Total Tax Revenue)	Special Consumption Tax (Production and Consumption) (% of Total Tax Revenue)	Special Consumption Tax (Imports) (% of Total Tax Revenue)	Motor Vehicle Licenses (% of Total Tax Revenue)	Sales Tax, Used Cars (% of Total Tax Revenue)	Custom Duty (% of Total Tax Revenue)	Travel Tax (% of Total Tax Revenue)	Consumption Duty (% of Total Tax Revenue)	Bauxite Levy (% of Total Tax Revenue)	Total Percentage of Tax Revenue
1990	3.74	14.12	NA	NA	0.56	0.04	9.51	1.02	3.45	7.15	39.60
1991	1.57	11.66	NA	NA	0.52	0.04	12.06	1.32	1.88	9.82	38.87
1992	0.80	9.36	NA	NA	0.31	0.01	12.73	1.65	0.03	7.85	32.75
1993	1.35	5.83	NA	NA	1.02	0.01	11.77	1.28	NA	5.17	26.43
1994	0.74	4.92	NA	NA	1.13	NA	10.74	1.33	NA	5.82	24.69
1995	1.62	3.80	NA	NA	0.91	NA	11.24	1.34	NA	5.27	24.17
1996	0.09	2.61	NA	NA	0.72	NA	10.31	1.57	NA	4.83	20.13
1997	0.29	3.53	NA	NA	0.38	NA	10.75	1.53	NA	4.62	21.11
1998	0.60	4.78	NA	NA	1.07	NA	10.16	2.14	2.63	4.00	25.39
1999	0.03	3.98	NA	NA	0.89	NA	9.09	2.18	6.56	6.64	29.38
2000	0.48	5.95	NA	NA	0.83	NA	9.46	2.23	4.59	3.06	26.61
2001	NA	5.71	NA	NA	0.94	NA	9.91	2.24	5.85	NA	24.65
2002	NA	5.95	NA	NA	0.90	NA	9.72	1.45	4.34	NA	22.36
2003	NA	4.02	NA	NA	0.84	NA	9.43	0.74	5.50	NA	20.53
2004	0.08	NA	3.00	4.99	0.64	NA	9.03	0.66	NA	1.68	20.07
2005	0.23	NA	2.26	5.61	0.60	NA	9.57	1.22	NA	1.88	21.37
2006	0.54	NA	1.66	4.85	0.58	NA	8.91	1.13	NA	1.94	19.60
2007	0.77	NA	2.13	4.16	0.48	NA	8.82	1.01	NA	2.42	19.80
2008	0.01	NA	1.71	8.06	0.62	NA	7.90	0.76	NA	1.00	20.06
2009	0.31	NA	3.32	10.47	0.64	NA	6.60	1.27	NA	0.10	22.71

Belize (BLZ \$M) (1990 – 2010)					
Year	VAT/Sales/ GST	Excise duties	Revenue Replacement Duty	Import duties	Total Tax Revenue
1990	NA	15.5	17.9	50.0	185.0
1991	NA	15.0	24.0	51.2	194.0
1992	NA	16.0	27.7	50.7	219.5
1993	NA	23.8	32.7	50.7	233.1
1994	NA	16.6	36.2	51.8	245.6
1995	NA	23.2	37.6	55.5	246.9
1996	76.2	18.6	29.7	48.4	248.1
1997	76.1	16.9	36.2	52.4	252.0
1998	74.0	18.6	39.2	51.3	265.0
1999	67.3	6.7	39.8	58.8	266.2
2000	80.5	8.0	38.8	63.6	271.6
2001	85.9	8.5	58.9	64.9	304.8
2002	91.3	9.0	75.0	74.0	336.4
2003	97.5	8.5	79.1	71.1	354.9
2004	116.4	9.7	74.6	74.1	387.0
2005	130.7	19.4	56.7	79.6	433.8
2006	158.3	22.1	61.4	85.2	486.1
2007	174.8	22.4	49.4	91.9	507.6
2008	176.4	24.6	18.1	105.3	508.5
2009	158.2	22.5	8.5	129.8	514.3
2010	195.0	22.4	7.4	123.9	546.2

Sources: Central Bank of Belize, various years, and dos Santos and Bain (2004).

Notes: VAT (introduced FY 96/97), Sales Tax (introduced April 99), General Sales Tax (introduced July 06)

Belize (Percentage of Total Revenue) (1990 – 2010)					
Year	VAT/Sales/GST (% of Total Tax Revenue)	Excise duties (% of Total Tax Revenue)	Revenue Replacement Duty (% of Total Tax Revenue)	Import duties (% of Total Tax Revenue)	Total Percentage of Tax Revenue
1990	NA	8.38	9.69	27.05	45.12
1991	NA	7.72	12.37	26.38	46.47
1992	NA	7.27	12.62	23.11	42.99
1993	NA	10.23	14.01	21.77	46.01
1994	NA	6.74	14.76	21.10	42.59
1995	NA	9.41	15.22	22.49	47.12
1996	30.72	7.50	11.95	19.51	69.69
1997	30.19	6.72	14.36	20.80	72.08
1998	27.92	7.02	14.79	19.37	69.11
1999	25.28	2.53	14.95	22.07	64.84
2000	29.62	2.96	14.28	23.43	70.30
2001	28.17	2.79	19.33	21.30	71.58
2002	27.13	2.68	22.30	22.00	74.11
2003	27.48	2.40	22.30	20.04	72.22
2004	30.07	2.51	19.28	19.15	71.01
2005	30.14	4.48	13.07	18.36	66.04
2006	32.56	4.54	12.62	17.54	67.26
2007	34.44	4.40	9.74	18.11	66.68
2008	34.69	4.84	3.56	20.71	63.81
2009	30.77	4.38	1.65	25.25	62.04
2010	35.70	4.10	1.36	22.69	63.85

Suriname (SUR \$M) (1992 – 2003)						
Year	Motor Vehicle Tax	Motor Fuel Tax	Sales Tax	Customs Duty	Wood Export Tax	Total Tax Revenue
1992	31	73	NA	216	NA	797
1993	35	64	NA	176	NA	1000
1994	37	337	NA	3,030	NA	10034
1995	6	5,138	NA	12,582	-1	50,310
1996	391	6,817	NA	20,881	-125	75,109
1997	600	3,800	NA	18,900	100	74,400
1998	700	12,400	3,600	21,600	NA	97,300
1999	300	10,600	10,600	34,000	100	129,200
2000	300	2,400	14,400	55,500	200	242,500
2001	NA	44,200	22,700	91,100	600	556,300
2002	NA	55,900	25,400	107,200	300	546,300
2003	10	77,240	154,840	118,720	270	738,150

Source: dos Santos and Bain (2004).

Suriname (Percentage of Total Revenue) (1992 – 2003)						
Year	Motor Vehicle Tax (% of Total Tax Revenue)	Motor Fuel Tax (% of Total Tax Revenue)	Sales Tax (% of Total Tax Revenue)	Customs Duty (% of Total Tax Revenue)	Wood Export Tax (% of Total Tax Revenue)	Total Percentage of Tax Revenue
1992	3.89	9.16	NA	27.10	NA	40.15
1993	3.50	6.40	NA	17.60	NA	27.50
1994	0.37	3.36	NA	30.20	NA	33.92
1995	0.01	10.21	NA	25.01	0.00	35.23
1996	0.52	9.08	NA	27.80	-0.17	37.23
1997	0.81	5.11	NA	25.40	0.13	31.45
1998	0.72	12.74	3.70	22.20	NA	39.36
1999	0.23	8.20	8.20	26.32	0.08	43.03
2000	0.12	0.99	5.94	22.89	0.08	30.02
2001	NA	7.95	4.08	16.38	0.11	28.51
2002	NA	10.23	4.65	19.62	0.05	34.56
2003	0.00	10.46	20.98	16.08	0.04	47.56

Trinidad and Tobago (T&T \$M) (1998 – 2010)								
Year	Corporation ax (Oil Sector)	Withholding Tax (Oil Sector)	Royalties (Oil Sector)	Oil Impost (Oil Sector)	Unemployment Levy (Oil Sector)	Excise Duties (Oil Sector)	Motor Vehicles	Total Tax Revenue*
1998	173.2	24.1	449.8	5.1	13.5	484.1	302	8922.8
1999	904.7	20.4	446.5	32.4	83.1	480.7	287.5	8752.2
2000	2,442	22.6	574.8	17.6	151.2	480.7	238.4	11054.5
2001	2791.8	153.1	751.3	22.7	186.1	493.8	215.7	13043.4
2002	1644.1	95.3	599.6	29.5	102.5	524.9	212.2	12165.4
2003	4079.4	172.4	1011.1	33.9	290.5	562.8	211.6	15701.3
2004	5428.3	200.7	1094.5	36.8	294.2	587.2	173.2	19377.4
2005	10805.6	429.2	1228.5	42.7	820.4	634.8	217	27839.7
2006	17614.8	614.3	1679.3	65.9	1311.3	130.4	248.8	36830.3
2007	16206.2	928.7	1681	63.9	1111	88.4	338.5	34209.1
2008	25922.8	665.4	1823.4	65.6	1970	65.5	369.5	49271.7
2009	11880.9	859.1	1741.7	80.5	801.2	93.9	327.4	31421.4
2010	14731.7	660.5	1887	81.7	914.1	100	323.9	35760.2

Sources: Central Bank of Trinidad and Tobago (2001), (2005), (2008), and (2011) and Trinidad and Tobago: Ministry of Finance and the Economy (2009–2012).

*: Total Current Revenue - Non-Tax Revenue

Trinidad and Tobago (Percentage of Total Revenue) (1998 – 2010)								
Year	Corporation Tax (Oil Sector)(% of Total Tax Revenue)	Withholding Tax (Oil Sector) (% of Total Tax Revenue)	Royalties (Oil Sector) (% of Total Tax Revenue)	Oil Impost (Oil Sector) (% of Total Tax Revenue)	Unemployment Levy (Oil Sector) (% of Total Tax Revenue)	Excise Duties (Oil Sector) (% of Total Tax Revenue)	Motor Vehicles (% of Total Tax Revenue)	Total Percentage of Tax Revenue
1998	1.94	0.27	5.04	0.06	0.15	5.43	3.38	16.27
1999	10.34	0.23	5.10	0.37	0.95	5.49	3.28	25.77
2000	22.09	0.20	5.20	0.16	1.37	4.35	2.16	35.53
2001	21.40	1.17	5.76	0.17	1.43	3.79	1.65	35.38
2002	13.51	0.78	4.93	0.24	0.84	4.31	1.74	26.37
2003	25.98	1.10	6.44	0.22	1.85	3.58	1.35	40.52
2004	28.01	1.04	5.65	0.19	1.52	3.03	0.89	40.33
2005	38.81	1.54	4.41	0.15	2.95	2.28	0.78	50.93
2006	47.83	1.67	4.56	0.18	3.56	0.35	0.68	58.82
2007	47.37	2.71	4.91	0.19	3.25	0.26	0.99	59.68
2008	52.61	1.35	3.70	0.13	4.00	0.13	0.75	62.68
2009	37.81	2.73	5.54	0.26	2.55	0.30	1.04	50.24
2010	41.20	1.85	5.28	0.23	2.56	0.28	0.91	52.29