

Environmental taxation practice and revenue performance in Ethiopia

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This is to certify that the thesis prepared by Lalu Melese, entitled: *Environmental taxation practices and revenue performance in Ethiopia* and submitted in partial fulfilment of the requirements for the degree of Master of Science in Accounting and Finance complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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DECLARATION

I, Lalu Melese declare that this thesis entitled **“Environmental taxation practice and revenue performance in Ethiopia”** is outcome of my own effort and study and that all sources of materials used for the study have been duly acknowledged. I have produced it independently except for the guidance and suggestion of the thesis Advisor.

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Abstract

The study focuses on investigating the environmental taxation practices and their revenue performance in Ethiopia. It adopts a mixed methods research approach to address the broad objective through answering research questions and specifically, it uses quantitative (surveys of structured review of documents), in-depth interview together with documentary analysis. The study statistically analyzes the data elicited from documents. It also supports the result from survey by the results from in-depth interviews and document studies. The results of this study reveal that there is no explicit environmental tax in Ethiopia but there exist environmental tax bases which categorise these taxes as environmental tax. The result also identifies that these tax has revenue contribution for the country also it identifies the percentage of these taxes to the total revenue as well as tax revenue is high. And that there are various activities in Ethiopia in which this taxes could be introduced. Moreover, the result identifies the tax can be used as a source of fund for environmentally beneficiary projects. As a whole, the study suggests that laws need further guiding principle and manuals; strict implementation of prior laws like environmental impact assessment is needed also a series of measures which could be taken by the government policy makers and regulators.

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Chapter one: Introduction

Now a day, with the growing number of the population and various types of activities and industries in the economy environmental damaging activities are also rising. Moreover environmental degradation is a hazard to the attainment of sustainable development. This Environmental ideas or concepts are not solely restricted to natural science. The different environmental problems and associated studies are inviting individuals from fields like engineering, economics and accounting (Bennett 2004). One such area, in the field of accounting is environmental tax. Environmental taxes are fees levied for the purposes of raising revenues and/or altering the behaviour of economic agents' vis-à-vis the environment (Bluffstone 2004).

In different countries there are studies regarding environmental taxes. Sterner and Köhlin (2003) provides an overview and a discussion of environmental Taxes in Europe. Parry (2011) focused on Mauritius (a pioneer in the use of green taxes) to illustrate how existing taxes, especially on fuels and vehicles, could be reformed to better address these externalities. Mugalula (2009) assessed Uganda's Environmental Taxation. All have shown why there should be a deviation from the normal tax basis or why these taxes should be introduced also the rationales for using such taxes in different countries.

However, study regarding environmental tax in Ethiopia is low; therefore this study contributes to the knowledge concerning the environmental taxes in Ethiopia by investigating different aspect and provides baseline data for further research. Therefore the major objective of the study is to investigate the environmental taxation practices and their revenue performance in Ethiopia.

The purpose of this chapter is to provide background information on the study. The remaining parts of the chapter are organised as follows: The first section presents

introduction of the thesis. While the second section sets out statement of the problem. The purpose statement is presented in the third section. This is followed by the research questions in the fourth section. The fifth, six and seventh sections present significance, scope of the study and structure of the thesis.

1.2 Statement of the problem

The environmental issues have become the topics of discussion for many professionals and politicians. This is because there is a growing concern among many, that with the current manner and rate of consumption of natural resource most will be exhausted. Some countries are consuming so much and generating too much waste due to this consumption behaviour and due to the industries that are manufacturing these consumer goods using polluting technologies and environmentally below standard processes. Moreover, some industries like mining have been causing great damage or harm than benefit especially in developing countries (Madeley 2008). This process will continue if it remains unchecked.

Accordingly, Ethiopia's forests are depleted and this releases considerable amounts of carbon dioxide (CO_2). Changes in climate and groundwater levels, as well as the resulting soil erosion and landslides, put even more pressure on local communities to clear further forested areas in order to gain new land for agriculture and grazing. If this continues, Ethiopia will have lost its remaining forests by 2020 (Hennigs 2011). In addition, in Ethiopia from flower exports the country profits, billions of Ethiopian Birr or millions of dollars. However, to run the flower farms and make them fully operational, various types of chemicals and pesticides are applied to cultivate land coverage of the farm area. And as Gedion (2011) indicated that these chemicals are hazardous, and are carcinogenic to human and pollute the environment.

Despite this forest and land degradation, there is also a growing concern about the behaviours of some of the industries or companies producing different products. Some are dumping

poisonous and non-degradable wastes directly into local rivers, causing great damage especially in the downstream localities. For example Gedion (2011) indicated that Wonji, Wonji Shoa, Metheara and Akakai are industrial towns of Ethiopia. In Wonji and Metehara sugar production factories are residing; whereas in Akaki Beseke small textile and metal industries are located. The river water of such town is heavily polluted by the hazardous wastes generated from the industries also there exists noise pollution (Gedion 2011).

Moreover, in Addis Ababa the present Dry Waste Management system relies entirely on the municipality which is expected to provide the full range of waste collection and disposal (Tadesse 2004). For example Beyene (1999) quoted while walking on the city from any corner all public spaces like road sides and open spaces attest eye-catching piles of garbage, flying 'festal' (which is increasingly used for packaging), rubbish, construction demolition and moved-earth from new construction sites littering the urban space indefinitely. Obnoxious odours emanating from decomposing solid wastes, semi-liquid and liquid wastes are sickening all citizens (Beyene 1999).

Such pollution problems in developing countries are of growing concern, particularly air and water pollution in rapidly growing urban areas. In addition there is inadequate public good infrastructure for treating and disposing of waste products. This lack is due in part to inadequate levels of tax revenue in developing countries (Bruce and Ellis 1993).

There is a great debate about 'pollution haven' principle which states that dirtier industries travel or shift their industries to countries where environmental regulations are non-existent or not strict. This might be difficult to examine, but one can find many situations where the same company operating in the west and in the global south or poor countries using different technology in terms of environmental standard (Ruffin 2012).

Without policies to address this type of pollution one country could not reach the intended development. As environment is for all it has to be protected to gain more out of it or to develop in to urban so this problems has to be addressed. Environmental tax which in many occasions overlooked can serve to protect the environmental degradation. Implementing environmental tax, apart from serving the above mentioned purposes, improve tax performance. However, in Ethiopia environmental tax did not get the required attention.

With respect to environmental taxation it is believed to avoid or change behaviours of taxpayers. But taxpayers need to be able to understand what the environmental tax seeks to achieve, how it is levied and what behaviour is needed to avoid paying it and so on. A shift in focus of the environmental movement from simply setting non-legally binding rules and regulations towards financing of environmentally beneficial projects is necessary. Therefore, those problems in Ethiopia call for extensive research on environmental taxation practices and the revenue performance in Ethiopia.

1.3 Purpose statement

In the context of the problems highlighted above, the broad objective of the study is to investigate the environmental taxation practices and their revenue performance in Ethiopia.

1.4 Research questions (RQ)

In order to achieve the above broad objective, the researcher developed five research questions:

RQ1. What environmentally related taxes are currently operating in Ethiopia?

RQ2. What is the revenue performance of environmental taxes in Ethiopia?

RQ3. What is the environmental taxation practice in Ethiopia?

RQ4. What areas of economic activities are there where environmental taxes could be introduced?

RQ5. How are funds generated to finance environmentally beneficial projects in Ethiopia from environmental taxes?

1.5 Research methods

In order to achieve the main research objective of the study, pragmatic fundamental research framework was used. That is a pragmatic worldview which freely chooses the approaches that best meet the needs and purpose of the research was adopted. Instead of focusing on a particular approach (one extreme) researchers emphasize the research problem and use all approaches available to understand the problem. For collecting and analysing data the researcher uses both qualitative and quantitative approaches, thus mixed method were used. This mixed methodology approach is to gather data that could not be obtained by adopting a single method. As a result, the quantitative data were gathered through Survey (Structured review of documents) also the qualitative data were gathered through documentary analysis and in-depth interview with 32 key informants from Environmental Protection Authority, Ethiopian Revenue and Custom Authority, Ministry of Water and Energy, Addis Ababa University and Ministry of Agriculture. Furthermore the method of data analysis used for qualitative study was description and the quantitative study used descriptive statistics.

1.6 Significance of the study

This study is going to be worthwhile to carry on the various grounds. It facilitates the users of the output; to understand the role of environmental tax for the protection of the environment. Besides it is expected to make contribution to the government by indicating prior laws which require strict implementation, since the government is striving to ensure a sustainable response to economic development and climate change. In addition, the society will be benefited by having awareness about environmental related taxes provision towards the society's welfare. It will also help those who are engaged in tax administration activities for

introducing environmental tax in activities that were ignored. Furthermore it might be used as a reference for future research because the study documented environmental taxes of Ethiopia.

1.7 Scope and limitation of the study

The study was conducted on assessing the environmental tax practices and their revenue performance in Ethiopia. Extensive assessment of the country's experience that dealt with environment and tax was also completed.

The main problem the researcher faced in this study was information shortage due to little experience regarding this aspect in the country. Another limitation was that the researcher could not access quantitative figures on waste fees; the data is not available except for the past four months. In addition since the interview method was primarily used, the information may not be free from personal biasness of the respondents.

1.8 Organization of the paper

The thesis is organized in five chapters. The first chapter presents the introduction of the study. Second chapter presents review of literature, whereas, the third chapter outlines methodology of the study and chapter four presents the results and major findings, analysis and interpretation. Finally the last chapter shows the summary, conclusion and recommendation.

Chapter two: Literature Review

The purpose of this chapter is to review the literature in the area of environmental taxes. This review of the literature establishes the framework for the study and highlights the findings of the previous studies, which, in turn, help in clearly identifying the gap in the literature and formulating the research question for the study.

The review has two sections these are section 2.1 which presented introduction and a review of the relevant empirical studies on environmental taxes and section 2.2. presented the conclusions on the literature review and knowledge gaps.

2.1 Introduction and a Review of Empirical studies

The Organization for Economic cooperation and development (OECD), International Energy Agency (IEA) and the European Commission (2006) have agreed to define environmentally related taxes as any compulsory, unrequited payment to general government levied on tax-bases deemed to be of particular environmental relevance. The relevant tax-bases include energy products, motor vehicles, waste, measured or estimated emissions, natural resources, etc. Taxes are unrequited in the sense that benefits provided by government to taxpayers are not normally in proportion to their payments (OECD 2006).

The requited compulsory payments to the government that are levied more or less in proportion to services provided (e.g. the amount of wastes collected and treated) can be labelled as fees and charges. The term levy covers both taxes and fees/charges (OECD 2006). Bluffstone (2004) explained that there is a certain amount of confusion regarding the jargon of environmental fees and particularly the difference between environmental charges, royalties and taxes. Environmental charges and royalties are fees paid by economic agents to governments for publicly owned environmental goods or services they receive. Examples include forest stumpage fees, land rent, mineral royalties and water charges. Environmental

taxes, on the other hand, are fees levied for the purposes of raising revenues and/or altering the behaviour of economic agents' vis-à-vis the environment. Examples of environmental taxes include taxes on pollution emissions by factories, gasoline taxes and taxes on other environmentally damaging products and taxes on production inputs that damage the environment (Bluffstone 2004).

This section presents types of the environmental taxes in section 2.1.1; which is followed by advantage and disadvantage of environmental taxes presented under section 2.1.2 finally a review of empirical studies under section 2.1.3.

2.1.1 Types of Environmental taxes

According to European Environment Agency (2000) environmental taxes are classified as follow:

Based on their objectives, environmental taxes are divided into the following categories:

- **Cost-covering charges**, which are aimed at raising revenue from the users of the environment in order to cover the cost of monitoring or controlling activities. There are two types of cost-covering taxes:
 1. **User charges**, where the charge is paid for a specific environmental service provided to the charge payer,
 2. **Earmarked charges**, where the charge is used to cover related environmental purposes but not in the form of a specific service to the charge payer.
- **Incentive charges**, aimed at altering environmentally damaging behaviour.
- **Fiscal environmental taxes**, aimed at raising government income.
- **Ecological tax reform** is essentially an expansion of fiscal taxes, consisting of a shift away from income and social contributions and towards taxes on the consumption of resources and environmental pollution.

Environmental taxes classified according to their field of operation include:

- energy taxes;
- transport taxes (e.g. taxes on vehicles) and;
- taxes on pollution and non-energy natural resources (e.g. taxes on emissions, non-energy products, raw materials and waste).

Environmental taxes classified according to their point of application are usually levied on polluting activities. Examples include taxes on quantities of pollutants in wastewater (e.g. Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD)) and air pollution (sulphur dioxide (SO₂), oxides of nitrogen (NO_x)).

Classification of taxes according to the tax base is an extension of the classification by fields of application. For example, it distinguishes between such bases as petrol, diesel, coals, coke and other energy carriers (European Environment Agency 2000).

Also according to European communities (2001) the following London Group classification were suggested:

Table 2.1 Classification of environmental taxes

Type of tax	Accounting classification
Energy products Import or sales of vehicles Agricultural inputs (fertiliser, pesticides) Individual products (packaging materials, batteries, tyres, lubricant oils, CFCs, halons, etc.)	Taxes on products (*)
Measured or estimated emissions to air or water, waste water discharges, waste Annual vehicle taxes Noise	Other taxes on production when paid by enterprises Other current taxes on income, wealth etc. when paid by households

Source: London Group (2001).

Where: (*): taxes on products includes (1) VAT; (2) taxes and duties on imports excluding VAT; (import duties and taxes on imports excluding VAT and import duties; (3) taxes on products, except VAT and import taxes

Besides the European Communities (2001) agreed to group environmental taxes into four categories such as energy, transport, pollution and resources. The separate groups are described below.

Energy taxes: This group includes taxes on energy products used for both transport and stationary purposes. The most important energy products for transport purposes are petrol and diesel. Energy products for stationary use include fuel oils, natural gas, coal and electricity. The CO₂ –taxes are included under energy taxes rather than under pollution taxes. There are several reasons for this. First of all, it is often not possible to identify CO₂ - taxes separately in tax statistics, because they are integrated with energy taxes, e.g. via differentiation of mineral oil tax rates.

In addition, they are partly introduced as a substitute for other energy taxes and the revenue from these taxes is often large compared to the revenue from the pollution taxes. This means that including CO₂ -taxes with pollution taxes rather than energy taxes would distort international comparisons. If they are identifiable, CO₂ -taxes should be reported as a separate category next to energy taxes. SO₂-taxes may be subject to the same problem as CO₂-taxes but should be recorded under the category pollution.

Transport taxes: This group mainly includes taxes related to the ownership and use of motor vehicles. Taxes on other transport equipment (e.g. planes), and related transport services (e.g. duty on charter or scheduled flights) are also included here, when they conform to the general definition of environmental taxes. The transport taxes may be ‘one-off’ taxes related to

imports or sales of the equipment or recurrent taxes such as an annual road tax. Taxes on petrol, diesel and other transport fuels are included under energy taxes.

Pollution taxes: This group includes taxes on measured or estimated emission to air and water, management of solid waste and noise. An exception is the CO₂-taxes, which are included under energy taxes as discussed above. SO₂-taxes are included here.

Resource taxes: Under the OECD/EC definition, resource taxes typically include taxes on water abstraction, forest and some raw materials like gravel. Taxes on oil and gas extraction are excluded from the definition of environmental taxes.

The following table lists the main categories of environmentally relevant tax bases (table 2.1). This tax base was seen as the only objective basis for identifying environmental taxes for the purpose of international comparisons. Other possible criteria, such as: the name of the tax, the purpose stated by the tax legislator, or the earmarking of the revenue for environmental purposes have proved to be difficult to use in practice. Many taxes are introduced with several purposes in mind, e.g. both to influence behaviour by making a product more expensive to use and to generate revenue. Since the environmental impact of the tax comes mainly through its effect on relative prices, a tax on e.g. petrol introduced for fiscal reasons will have the same effect as one that is introduced with the stated purpose of reducing emissions (European Communities 2001).

According to the European Communities (2001) guidelines there are three main reasons why taxes on the extraction of oil and gases should be excluded: i) the revenue from these taxes is important in only a few EU/OECD countries; ii) the tax systems differ between countries; iii) tax revenue from oil and gas is highly volatile, reflecting fluctuations in the prices of oil and gas.

Table 2.2 Tax bases included in the environmental tax statistics framework

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 halons)
Measured or estimated effluents to water
Measured or estimated effluents of oxydizeable 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
Artificial fertilisers
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 fuel oil, heavy fuel oil
Natural gas
Coal
Coke
Biofuels
Other fuels for stationary use
Electricity - consumption, production
District heat - consumption, 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: European Communities (2001)

Where, NO_x stands for Nitrogen Oxides, SO₂ is sulphur Oxides, CFCs are Chlorofluorocarbons, BOD and COD are Biochemical Oxygen demand and Chemical Oxygen demand respectively, finally LPG is the Liquefied Petroleum Gas.

In some cases the tax base is the measured or estimated amount of emissions of a polluting substance, such as NO_x or SO₂. However, it is often difficult and expensive to measure

emissions directly, so many taxes are based on proxies for emissions, for example the use of petrol or fuel oil (European Communities 2001).

2.1.2 Advantage and disadvantage of environmental taxes

According to Fullerton et al (2007) Advantage of environmental taxes includes:

- **‘Static’ efficiency gains through reallocation of abatement:** Where the costs of pollution abatement vary across firms or individuals, environmental taxes have the potential to minimize costs, for one of two possible reasons. Other policy instruments cannot fully differentiate between polluters with different marginal costs of abatement, and thus may require some forms of abatement with high costs, but taxes provide each polluter with incentive to abate in all of the least-expensive ways, and thus can achieve a given level of abatement at lower total abatement cost. Second, taxes can side-step the need for the regulatory authority to acquire detailed information on individual sources’ abatement costs, and can thus lower the public sector’s costs of regulation (Fullerton et al 2007).
- **‘Static’ efficiency gains through performance incentives:** Taxes levied on emissions provide an incentive for care and attention in the operation of mandated technologies. Providing businesses with an incentive to cut emissions can be translated into providing individuals within the business with similar incentives, and some individuals may be in a position to take actions which greatly affect the emissions performance of a given technology (Fullerton et al 2007).
- **Dynamic Innovation incentive:** Regulatory policies, stipulating that polluters must use particular technologies, or maintain emissions below a specified limit, do not provide polluters with any encouragement to make reductions in pollution beyond what the regulations require (Fullerton et al 2007).

- **Robustness to negotiated erosion ('regulatory capture'):** An important consideration in choosing between different strategies for environmental regulation is the extent to which efficient implementation of the policy requires firm-by-firm negotiation of individual abatement or technology requirements. One key difference between regulatory policies which set differentiated firm-by-firm targets and the use of environmental taxes is that environmental taxes achieve a cost-effective distribution of abatement, taking account of the abatement costs of individual firms, while taking a robust, non-negotiated form (Fullerton et al 2007).
- **Cost-limiting properties:** As compared with policy instruments which operate by defining a quantitative limit on pollution, environmental taxes have the attraction that they insulate polluters from the risk that regulatory requirements might involve excessive abatement costs. The tax rate per unit of emissions places an upper limit on the unit abatement cost to be incurred. If abatement turns out to be more costly per unit than the tax per unit, firms will simply pollute and pay the tax, rather than paying for costly abatement (Fullerton et al 2007).

Likewise, and again from the perspective of environmental policy, environmental taxes have a number of identifiable drawbacks and limitations, which will in some cases be sufficiently important to rule out their use in particular applications.

- **Uncertain environmental impact:** The level of pollution abatement achieved by an environmental tax depends on individual polluters' responses to the abatement incentive that the tax creates. It is not possible to guarantee that an environmental tax will achieve a particular environmental impact; polluters' behavioral responses may be less, or more, than expected. It will be noted that this uncertain environmental effect is the counterpart of the cost-limiting property of environmental taxes noted above (Fullerton et al 2007).

- **Compatibility with firm decision-making structures:** For environmental taxes to lead to efficient polluter responses, it is necessary for firms to draw together information relating both to technology choice and to tax payments. Firms considering whether to undertake more pollution abatement need to balance the gains, at the margin, in reduced tax payments, against the marginal costs of abatement. This requires a type of interaction that may not otherwise be a high priority in the internal organization of the firm, and may require significant changes to the decision-making structure of the firm, so that tax and pollution-control technology decisions are taken together. Restructuring the firm so that such interactions can take place may be costly, and may well not be worth doing if the tax at stake is small. Firms may not, therefore, respond at all to ‘small’ environmental taxes, and conventional regulatory measures may be more effective and—taking decision-making costs into account—more cost-effective, too (Fullerton et al 2007).
- **Lack of experience:** In the past, the lack of experience with environmental taxes may have been a significant obstacle to their adoption in any particular practical context. Increasingly, the objection that environmental taxes are untried and untested is untrue (Fullerton et al 2007).
- **Administration and enforcement costs:** First, a pollution tax may require counting tons of emissions, whereas a design standard simply requires authorities to confirm the use of a particular kind of pollution control equipment. Second, a general principle of taxation is that a tax can readily be imposed upon any market transaction such as the sale of a final good or service, because the invoice can be verified by the other party to the transaction. Problems arise with an environmental tax because the producer enters no market transaction for deforestation, dumping, or emissions. Trees can be cut without any record that they ever existed. Illegal waste can be dumped at midnight. Emissions are self-

reported. Without expensive audits, they are relatively easy to hide. Third, however, excise taxes on inputs may be an inexpensive way of regulating polluting processes which use these inputs. The excise duties levied on mineral oils are a case in point; there are a small number of petrol companies, and their activities are tightly controlled and well documented (Fullerton et al 2007).

- **Geographical differences:** If pollution damage varies depending on the source of the emissions, policy based on a uniform pollution tax applying to different sources will be liable to result in inefficiency, and source-by-source regulation may be able to achieve a more efficient outcome (Fullerton et al 2007).
- **Damaging avoidance activities:** Sometimes the environmental consequences of an environmental tax may be adverse, if those subject to the tax respond in a way that is more damaging to the environment than unregulated emissions. For example, a tax on toxic waste may provide a powerful incentive to reduce as much waste as possible, but it may also induce illegal dumping or burning (Fullerton et al 2007).
- **Political Considerations:** In the current political climate, a new "tax" might or might not be politically feasible (Fullerton et al 2007).
- **Distributional effects:** Yet a high fraction of low-income household budgets are spent on electricity, heating fuel, and transportation. Thus environmental taxes are often regressive. To make matters worse, the gains from environmental protection may accrue to high-income households who have the most "willingness to pay" for that public protection. A clean environment may be a luxury good. Thus environmental policy reforms must be careful to use a package of changes that account for and offset these distributional effects (Fullerton et al 2007).

- **Effect on attitudes and perceptions:** Environmental taxes may have effects on individuals' attitudes and perceptions that may affect the environmental outcome either positively or negatively (Fullerton et al 2007).

2.1.3 A Review of Empirical studies

Different authors forwarded the reasons why a country should use environmental taxes. According to Leicester (2006) the primary rationale for the use of environmental taxes is the externalities argument. This says that in deciding how much, and in what way, to produce or consume, a polluter will not take into account the costs imposed on society at large from their private actions, meaning that, from a socially optimal point of view, too much pollution will be generated. Environmental taxes may be able to align the private incentives of the polluter with the socially desirable outcome. They will also conform to the so-called 'polluter pays principle' (PPP) whereby the costs of pollution control are paid by the polluter themselves and not by society at large (Leicester 2006)

But Bovenberg and van der Ploeg (1994), Bovenberg and Goulder (1996) or Goulder, Parry and Burtraw (1997) suggest that tax interaction effects increase the gross efficiency costs (i.e. costs net of environmental benefits) of environmental taxes compared to a first-best world leading to optimal second-best environmental tax rates below the Pigouvian rate. On the other hand, revenues from environmental taxes can be used to reduce the distortions of existing taxes (Terkla 1984, Oates 1995 cited in Böhringer and Rutherford 2002) hereby offsetting at least part of potentially negative tax interaction effects (Goulder 1995).

Taxes of this nature are often called 'Pigouvian' taxes after the work of (Pigou 1920), who first looked at means to correct for negative externalities in this way. It should be noted that, in general, an optimal level of pollution will be above zero. Reducing emissions has a cost and, from an efficiency perspective, emissions should only be reduced to the point where the

cost of reducing emissions by one more unit is equal to the benefit to society of so doing (Leicester 2006).

There are at least two reasons developing and transition countries might want to use environmental taxes. First, taxes on environmentally harmful behaviour have the potential to raise revenues for governments. Taxing harmful behaviour like pollution rather than "good" activities like labour is, of course, appealing. The other main reason for using environmental taxes is to internalize negative externalities associated with economic activities and to raise revenues for environmental protection. The transition countries of Central and Eastern Europe have particularly used environmental taxes to generate funds for environmental investments. Poland's National Fund for Environmental Protection and Water Management, for example, financed about \$400 million in environmental expenditures in 1997 (OECD 1999a) (Bruce and Ellis 1993).

Fullerton et.al (2008) provides an overview of key economic issues in the use of taxation as environmental policy. The authors have some preliminary observations of a general nature about this field of tax policy, and about the approach they have adopted: Firstly, the focus of the paper is primarily on the economic aspects of environmental taxes. In addition to economic considerations, however, both politics and public opinion will play a crucial role in determining the scale of action needed, and the range of acceptable measures. Secondly, technology is developing rapidly, and is a key issue in determining the types of environmental taxes that are practicable. Thirdly, environmental policy choices depend on some key value judgements as well as objective data. Finally, while the primary focus of the paper is on national tax policy, they cannot neglect a key international dimension to some major areas of environmental policy-making (Fullerton et.al 2008).

On the basis of this observation the authors found that Environmental taxes could make a significant contribution to tax revenues in two particular areas: energy taxes and road transport congestion charges. In both cases, the available tax base is broad, high tax rates may be justified by the environmental externalities, and demand is inelastic (so revenues are not greatly eroded by behavioural responses, particularly in the short-term). The potential revenues from these taxes hold out the possibility of tax reform packages that include tax reductions and reforms elsewhere in the fiscal system. The political constituency in support of environmental tax measures could create an opportunity for tax reforms that might not otherwise be politically viable (Fullerton et.al 2008).

Johnstone and Alavalapati (1998) reported the distributional effects of environmental tax reform. And this report reviews some of the distributional implications of environmental tax reform in the residential energy, road transport and agriculture sectors. While some of the most important distributional issues are related to the direct financial burden of the tax, this study also reviews some of the other distributional implications. In particular, it looks at the indirect effects on goods and services through input-output linkages, the potentially mitigating effects through different forms of revenue recycling, the distribution of indirect economic effects such as employment opportunities, as well as the distribution of social and environmental effects such as personal health and exposure to pollutants (Johnstone and Alavalapati 1998).

On the basis of the evidence reviewed it is concluded that distributional concerns, while important in many cases, should not prevent or delay the introduction of environmental taxes. Rather, they should serve as guiding principles in the design of environmental tax reform not only for their own sake, but also because efficiency objectives and equity objectives can be complementary in a well-designed package of environmental tax reform (Johnstone and Alavalapati 1998).

Böhringer and Rutherford (2002), they investigate four potentially important arguments for the deviations from uniform taxation: pre-existing tax distortions, domestic equity concerns, global environmental effectiveness, and strategic trade policy. Their primary objective was to ascertain whether the degree of tax differentiation observed in many countries can be rationalized on economic grounds. They have developed a modelling framework for isolating alternative motives for tax differentiation and quantifying their implications on the optimal structure of an environmental tax based on a comprehensive data set of global trade and energy use. But they did not incorporate public choice arguments for tax differentiation in the current analysis. They plan to address these issues in future research using the current model framework to the extent possible with available data (Böhringer and Rutherford 2002).

Ashworth et al., (2006) analyse the elements that affect the decision to introduce an environmental tax. The empirical analysis is based on a panel of data for all 308 Flemish municipalities for the period 1991–1999. They find that first adoptions of a green tax are much less likely to occur during election years but are more likely if ones' peers/neighbours (defined both geographically and ideologically) already have the taxes. In addition, whilst left-wing governments are more likely to set new taxes and coalitions are more likely to set the tax than single-party governments, the greater the fragmentation of the municipal government, the lower is the likelihood that a new tax will be set (Ashworth et al., 2006).

Fullerton et.al (2008) suggested that the scope for environmental taxes within each of their main environmental policy applications, involve three common themes:

- Empirical evidence is necessary for grounding environmental tax policy on the size of the marginal externalities involved, in order to indicate the level of environmental taxes that might be justified and the potential benefits of policy action.
- Multi-part instrument combinations can frequently and usefully be employed when available tax instruments do not accurately target the relevant externalities.

- Environmental taxes may form only part of a portfolio of policy measures. Political and practical constraints may prevent setting environmental taxes at the first-best level, so other measures can then help stimulate the development or use of abatement technologies. The case for such packages may be enhanced by recognising various market failures in the development or dissemination of new abatement technologies. Thus, well-targeted measures to stimulate research and development or diffusion may enhance efficiency (Fullerton et.al 2008).

Sterner and Köhlin (2003) provides an overview and a discussion of environmental taxes in Europe. They concluded that Environmental taxes should however be separated into two categories. In the first taxes related to energy and transportation and motivated at least partly by global concerns such as climate change. In this category they indicated that they have considerable revenues already and in principle an even larger potential if taxation were to be used as the primary way of achieving global goals for climate. The other category of environmental taxes is somewhat less visible both to ministries of finance and thus to the political world and to the researcher. They generate fairly insignificant revenue. On the other hand, one of the reasons for the low revenue is precisely the tax base erosion, which from a fiscal point of view may be unsatisfactory but from an environmental viewpoint is very desirable. The diversity of these taxes is considerable, they are applied to various chemical pollutants and their administration ranges from pure taxes to product charges, local user fees, and noncompliance fees. Furthermore, they suggested that they include elements of refunding and other aspects that make them hard to compare. On the whole, however, there is considerable evidence that they are sometimes efficient instruments for environmental improvement (Sterner and Köhlin 2003).

The OECD (2006) report database operated in cooperation between OECD and the European Environment Agency (EEA) has entered 375 environmentally related taxes in OECD member

countries, plus some 250 environmentally related fees and charges in those countries. Of the taxes, the largest number is levied on energy products (150), on motor vehicles (125), and various forms of waste (50). There is a wide range of environmentally related taxes currently levied in the OECD-countries, among others: water pollution tax, batteries tax, logging tax, tyres tax, beverage container tax, toxic waste levy, tax on plastic bags, aircraft noise tax, tax on groundwater extraction, tax on pesticides, and artificial fertilisers, landfill tax, ozone depletion tax etc (OECD 2006).

The UK has a complex mix of environmental taxes and price signals, particularly for energy. For example, there are now four carbons 'tax points' in the electricity supply chain and there are a multitude of different effective tax rates on carbon emissions that vary between different users of energy and between different fuels (House of Commons 2011).

Norway has a long experience with environmental taxation. Taxes have been introduced to reduce environmentally harmful emissions to air and water, and to reduce the amount of waste generated. Taxation had of course an environmental impact long before taxes were established as an instrument in environmental policy. Already in 1931 Norway introduced a petrol tax. The first tax that had an explicit environmental purpose was levied on sulphur in mineral oil in 1971. However, a wide-spread use of environmental taxes was not seen until the late 1980s and early 1990s. Since the early 1990s tax instruments have played an important role in providing incentives for cleaner production and consumption patterns, even though regulation has remained the main policy instrument to abate environmental damage (Sollund 2007).

Environmentally related taxes are, of course, also levied in other parts of the world; in China a tax on wooden chopsticks was increased in the year 2006, in order to protect forests.

According to a news report Chinese consumers use and dispose of 45 billion pairs of wooden chopsticks annually, requiring logging of 25 million trees (Sollund 2007).

Environmental taxes used anywhere in the world are part of a set of environmental policy tools known as economic or incentive - based instruments. Economic instruments attempt to alter behavior through the use of incentives rather than dictates in the hope that environmental outcomes will be achieved at lower cost. Environmental taxes use fees as the incentive instrument (Bluffstone 2004).

In OECD countries, for example, environmental taxes are estimated to have made up an average of 7.2% of government revenues in 1998 and represented 2.7% of GDP on average (OECD 2001). Similar statistics for developing and transition countries do not exist, but probably the weight of environmental taxes is much less (Bruce and Ellis 1993).

Tax revenues raised by countries from environmentally related taxes represent on average about 2-2.5% of GDP (Gross Domestic Product) in OECD countries, but this figure varies significantly among countries, from more than 3% in Scandinavian countries, the United Kingdom, Turkey and the Netherlands, to less than 1% in the United States. Also the share of environmental tax as per cent of total tax revenue varies significantly, being in the order of 6-7% on average in the OECD countries. This figure is, of course not only resulting from the tax mixes but is also influenced by the level of traditional taxes like income tax and VAT in each country (OECD 2006).

In addition in Norway, 4.2 per cent of central government tax revenue is due to environmental and energy taxes, equivalent to 1.6 per cent of GDP (estimates based on the 2006 budget) (Sollund 2007). In 2010, the UK Government received £41.4 billion from environmental taxes. This was £1.9 billion more than in 2009 and more than double the amount received in 1993. In 2010, environmental taxes accounted for 8.0 per cent of total

taxes and social contributions, down from 8.1 per cent in 2009. Receipts from environmental taxes were equivalent to 2.8 per cent of Gross Domestic Product in 2010, unchanged from 2009 and down from 3.4 per cent in 2000. Environmental tax receipts increased in 2010, compared with 2009, as:

- energy taxes increased by £1.3 billion to £32.2 billion,
- road vehicles taxes increased by £0.1 billion to £5.7 billion,
- Other environmental taxes – air passenger duty, landfill tax, and aggregates levy – increased by £0.5 billion to £3.5 billion (office for National statistics 2011).

However, according to (Bruce and Ellis 1993) Efficiency gains from curbing pollution in developing countries may be large. Some polluting activities are subsidized, so curtailing them brings both fiscal and environmental benefits. Taxing polluting inputs and outputs is a particularly attractive policy, in developing countries, which often lack experience in administering and enforcing other types of environmental regulation. Corrective taxes make use of existing administrative structures and increase tax revenues, which can be spent on public goods to improve environmental quality (including treatment facilities for water and sewage, waste disposal, and sanitation) or can be used to reduce other taxes (which are often highly distortionary in countries with a narrow tax base) (Bruce and Ellis 1993).

According to Perkins *et al* (2001) implementing environmental tax systems is likely to be administratively more difficult than standard excise, value added and income taxes. Lower income countries also typically have more difficulty with tax administration than higher income countries. Whereas total taxes were 28% of GDP in high-income countries, in low income countries taxes were only 9.9% of GDP. Almost half of all taxes came from taxes on international trade (25.2%) and various fees, such as licensing charges (23%) and income tax generates only 18% of all tax revenues. By comparison, in high-income countries there are no

international trade taxes and most tax revenues come from sales taxes (28%) and income taxes (28%) (Bruce and Ellis 1993).

Bluffstone (2002) investigated Environmental Taxes in Developing and Transition Economies. This paper concerns itself with the use of environmental taxes in countries with developing and transition economies. The question addressed in this paper is how the particular conditions found in developing and transition countries relate to the use of environmental taxes. The author suggests that general concern overlaying the use of all the instruments discussed is tax administration. Tax administration in developing and transition countries is often weak. If environmental taxes are included in environmental policy portfolios, the development of supporting institutions must be considered a key prerequisite (Bluffstone 2002).

Parry (2011) focused on Mauritius (a pioneer in the use of green taxes) to illustrate how existing taxes, especially on fuels and vehicles, could be reformed to better address these externalities. They particularly discuss, an explicit carbon tax; a variety of options for reforming vehicle taxes to meet environmental, equity, and revenue objectives; and a progressive transition to usage-based vehicle taxes to address congestion. They recommended that they argue for enacting an explicit tax on carbon dioxide (CO₂) emissions, for using a (revenue-neutral) —“feebate” to cost-effectively increase fuel economy, and for combining it with an excise tax on vehicle sales prices to meet revenue and equity objectives. They also recommend converting the road tax into a tax on annual kilometres driven to initiate a progressive transition to a GPS-based pricing system where tolls vary across region and time of day according to congestion severity. They suggested that although the study focused on Mauritius, the discussion potentially serves as a template for other countries (Parry 2011).

Mugalula (2009) assessed Uganda's Environmental Taxation. In this paper the authors' quintessence of the article is to essentially examine closely the extent to which Uganda is using her tax system to positively affect environmental protection. The author suggested that: to garner support for more funding to the environment sector to facilitate environment management activities including law enforcement and public awareness, information and training programmes; also recommended that there is a need to create and strengthen partnerships at community, local, national, regional and international levels and also to step up efforts in ensuring compliance with environmental law; and there should be an environmental fund where all the taxes collected from environmentally harmful activities are placed; again they suggested that there should be a shift in the tax burden from taxation of labour to taxation of carbon and energy (Mugalula 2009).

2.2 Conclusions and knowledge gaps

This chapter gives an idea about what environmental taxes are. There are various types of environmental taxes; these taxes have to be imposed because one can internalise externalities and raise government revenue from harmful behaviour. European Communities (2001) agreed to group environmental taxes into four categories such as energy, transport, pollution and resources. Fullerton *et.al*, (2007) have also shown the advantage and disadvantage of environmental taxes.

The rationales for using environmental taxes are investigated by many authors, Leicester (2006) conform to the so-called 'polluter pays principle' (PPP) whereby the costs of pollution control are paid by the polluter themselves and not by society at large. Again according to (Bruce and Ellis 1993) there are at least two reasons why developing Countries use these taxes.

Besides, Fullerton et.al (2008) provides an overview of key economic issues in the use of taxation as environmental policy. On the basis of this observation the authors found that Environmental taxes could make a significant contribution to tax revenues in two particular areas: energy taxes and road transport congestion charges. Johnstone and Alavalapati (1998) reported the distributional effects of environmental tax reform. They concluded that distributional concerns, while important in many cases, should not prevent or delay the introduction of environmental taxes. Böhringer and Rutherford (2002), they investigate four potentially important arguments for the deviations from uniform taxation. Ashworth et al., (2006) analyzes the elements that affect the decision to introduce an environmental tax.

In addition, reviews of past studies on environmental taxes of different countries indicate an interesting finding. Sterner and Köhlin (2003) provides an overview and a discussion of environmental Taxes in Europe. Bluffstone (2002) investigated Environmental Taxes in Developing and Transition Economies. Parry (2011) focused on Mauritius (a pioneer in the use of green taxes) to illustrate how existing taxes, especially on fuels and vehicles, could be reformed to better address these externalities. Mugalula (2009) assessed Uganda's Environmental Taxation. They have shown why there should be a deviation from the normal tax basis or why this taxes should be introduced also the rationales for using such taxes.

However, in Ethiopia studies regarding this aspect seem low; therefore this study will contribute to the knowledge concerning the environmental taxes in Ethiopia by investigating different aspects. This gap lead to the main research questions of the thesis which tries to investigate the environmental taxation practices and their revenue performance in Ethiopia. The following chapter provides details of the research method in respect of the identified research problem.

Chapter three: Research Design

The preceding chapter indicated that the literature on environmental taxes issues from the perspective of Ethiopia is limited. It appears that there is little research conducted in investigating such taxes whether they are applicable or not; or whether they contribute to the revenue of the country or not. So the purpose of this chapter was to present the research methodology. The research problems along with the philosophy of research methodology guide the choice of the appropriate research method. Depending on the nature of the research problems and the research perspective, the research method was based on the philosophy of quantitative or qualitative or a combination of these two approaches.

Hence this chapter is arranged as follows. Section 3.1 presents the broad research objective along with the research questions. Section 3.2 presents the research approaches. Then, the research methods adopted in this study in section 3.3. Finally, conclusion and the relationship between research questions and sources of data are presented in section 3.4.

3.1 Broad research objective and research questions

As presented in chapter 1, the broad objective of the thesis was to investigate the environmental taxation practices and their revenue performance in Ethiopia. Thus, to achieve this broad objective, five research questions were developed. Therefore the research questions that this study tried to answer were:

RQ.1.What environmentally related taxes are currently operating in Ethiopia?

RQ2.What is the revenue performance of environmental taxes in Ethiopia?

RQ3.What is the environmental taxation practice in Ethiopia?

RQ.4.What areas of economic activities are there where environmental taxes could be introduced?

RQ.5. How are funds generated to finance environmentally beneficial projects in Ethiopia from environmental taxes?

3.2 Research approaches

The inquiry paradigm used in this research was influenced by how the researcher views and seeks to understand the world. Thus, pragmatic fundamental research framework was adopted. The researcher uses both qualitative and quantitative assumptions (normally adopted mixed method). Thus, this section includes the philosophy of mixed methods approaches.

Mixed approach research seeks a pragmatic knowledge claim that arises out of actions, situations, and consequences rather than antecedent conditions (as in post-positivism). Mixed methods research is an approach to inquiry that combines or associates both qualitative and quantitative forms (Creswell & Plano Clark 2007). As a result it can answer a broader and more complete range of research questions because the researcher is not confined to a single research approach. Apart from this, using mixed approaches can capitalise on the strengths of each approach and offset their different weaknesses (Spratt, Walker and Robinson 2004). On the other hand, its disadvantage is the research may take extra time and resources because of the need to collect and analyze both quantitative and qualitative data. Also it can be difficult for a single researcher to carry out both qualitative and quantitative research, especially if two or more approaches are expected to be done concurrently.

In general, to address the general objective and to fill the gap, adequate data from both quantitative (survey of structured review of documents) and qualitative (face-to-face in-depth interview together with documentary analysis) sources were used, and converge data collected from both sources at the same time to get a comprehensive analysis of the research problem and interpret the overall result. Therefore, based on the above research approach theories to achieve the broad objective of the research (i.e. to investigate the environmental

taxation practices and their revenue performance in Ethiopia) the researcher uses structured review of documentary analysis in the quantitative survey research and in-depth face to face interview data gathering instruments. Subsequently, the researcher uses concurrent mixed approach during the study.

3.3. Research Methods

In this research, mixed research approach was used because it enables the researcher to cope up with reliable information, on the current situation of Ethiopia's environmental tax practices and the revenue performance. The quantitative research method uses survey design (structured review of documents) because of the appropriateness of the method to the problem under study, accuracy and generalizability of the findings. Besides qualitative methods particularly documentary analysis and in-depth interview to assess the environmental practices of Ethiopia were also used. The in-depth interview helps to uncover the participant's views but otherwise respects how the participant frames and structures the responses. Therefore, the quantitative aspect of the research method in the first section which is followed by qualitative aspect of the research method in the second section and the discussion of data analysis method in the third section is presented as follow.

3.3.1. Quantitative aspect of the research method

In order to know the contribution of environmental taxes of Ethiopia to the revenues of the country the quantitative analysis were made. Thus, to address the research problem survey (structured review of documents) was used.

Survey Design (structured review of documents)

Survey research is the appropriate mode of inquiry for making inferences about a large group of people based on data drawn from a relatively small number of individuals in that group. Fowler (1984) cited in Creswell (2009), explained that the strengths of survey methods is in

their wider use including the value of statistical sampling, consistent measurement, and the ability to obtain information not systematically available elsewhere or in the form needed for analysis (Creswell 2009). Surveys have weaknesses, however. They are of little value for examining complex social relationships or intricate patterns of interaction. Also, even though surveys are convenient, they are generally a relatively expensive method of data collection (Marshall and Rossman 2011).

Therefore, to gather enough information and for its merit of economy survey (structured review of documents) were employed in this research. Because it identify, evaluate and interpret all documents relevant to a particular research questions, or topic area, or phenomenon of interest. It also increases the likelihood of detecting real effects. Then sampling designs (that discusses how sample frame, sample size and sampling procedure are determined and used) and survey instrument design is discussed as follows:

Accordingly to address the research problem using a structured review of documents the researcher uses official records of tax revenue in Ethiopia. Tax revenue documents in the country could be found from the ministry of Finance and economic development also from Ethiopian Revenue and Customs Authority. Trends of environmental tax revenue for the past seventeen years were illustrated by the collected seventeen years time series data from 1993/94 up-to 2009/10 on each type of environmental taxes in the country.

3.3.2. Qualitative aspect of the research method

The purpose of qualitative approach in this proposed study was to gather the information that could not be obtained through the quantitative approach. Again it was to supplement the data obtained from the quantitative approach and show the perspective of participant's. Thus in-depth interview were used to gather the appropriate information.

The in-depth interview is a qualitative technique designed to elicit a vivid picture of the participant's perspective on the research topic. In depth interview is an effective qualitative method for getting people to talk about their personal feelings, opinions, and experiences. It is also an opportunity to gain insight into how people interpret and order the world (Milena 2008). A qualitative research interview seeks to cover both a factual and a meaning level, though it is usually more difficult to interview on a meaning level (Kvale 1996). Interviews are particularly useful for getting the story behind a participant's experiences.

Therefore it is better to use these in-depth interviews because they are investigative in nature and it offers a complete picture. Also the purpose of this interview is to yield data quickly, in a wider variety and for immediate follow-up and clarification. Consequently, the researcher conducted in-depth interviews because of its flexibility, high response rate and also allowing new questions to be brought up during the interview.

For qualitative aspects of data collection sample interviewees were determined based on their experience and relation to the issue under consideration thus key informant interview was used. In addition, the researcher tried to review the environmental practices and a summary of the main environmental laws/regulations in place or under consideration. The participants of the interview were employees of: Ethiopian Revenue and Customs Authority, Ministry of Agriculture, Minister of Water and energy and Environmental Protection Authority in addition teachers and students in Environmental programs.

Accordingly, the plan was to select five samples purposively from each office. As a result a total of thirty five interviewees' that is five from each office, again five instructors and five students were planned to be selected. But these samples were not the final sample size; since the size depend on key informants. Also these samples were chosen based on the participants experience and exposure to the issue and also when it is believed that their views reflect the

majority. In relation with instrument, face to face interview was used because of its flexibility, high response rate and also allowing new questions to be brought up during the interview. Thus, the qualitative and the quantitative data were gathered concurrently, where collection of both type data occur at the same time to converges or merges quantitative and qualitative data, this is in order to provide a comprehensive analysis of the research problem.

3.3.3. Data Analysis Methods

The specific methods applied in the study were survey (structured review of documents) and in-depth interview together with documentary analysis. Analysis occurs both within the quantitative (descriptive and inferential numeric analysis) and the qualitative (description and thematic text or image analysis) approach and often between the two approaches (Creswell 2009, p.956).

Thus the qualitative data was analysed using description because description involves a detailed rendering of information about people, places, or events in a setting. This analysis is useful in designing detailed descriptions for case studies, ethnographies, and narrative research projects (Creswell 2009). In addition, quantitative data was analysed using descriptive statistics because they provide simple summaries about the sample and the measures. Also the rationale for using this descriptive statistics was to describe the basic features of the data in a study.

Since the data were gathered concurrently the analysis was done on a concurrent embedded strategy of mixed methods. According to Creswell (2009) this concurrent embedded strategy can be identified by its use of one data collection phase, during which both quantitative and qualitative data are collected simultaneously. The data may reside side by side as two different pictures that provide an overall composite assessment of the problem. This would be the case when the researcher uses this approach to assess different research questions or different levels in an organization (Creswell 2009).

3.4 Conclusions and the relationship between research questions and sources of data

This chapter has presented the research questions and the methods appropriate to address them. Table 3.1 sets out how research questions were addressed by the appropriate item in the survey and in depth interviews.

Table 3. 1 The relationship between research questions and sources of data

Research Questions	Documentary analysis	Interview Questions
1. What environmentally related taxes are currently operating in Ethiopia?	Ethiopian tax laws and regulations	1,2,3,
2. How is the revenue performance of environmental taxes in Ethiopia?	Environmental tax and total taxation of Ethiopia from 1993/94 to 2009/10	3,5,6,7, 8
3. How is the environmental taxation practice in Ethiopia?	Environmental tax revenue from 1993/94 to 2009/10	2,3,4,9,15,16,17,
4. What areas of economic activities are there where environmental taxes could be introduced?		10,11,12,,13,14,15,16,17
5. Are funds generated to finance environmentally beneficial projects in Ethiopia from environmental taxes? How?		18,19

To sum up, based on the main research problem stated in the earlier chapter, five research questions have been forwarded. With respect to methodology, the principles of qualitative, quantitative, and mixed methods research approaches were shown. Based on the underlying principles of research methods the mixed method approach were chosen as appropriate to this research. More specifically, to address the research questions, survey (structured review of document); in-depth interviews and documentary analysis were shown to be the appropriate methods of inquiry for this research.

Chapter four: Results and analysis

This chapter deals with the results and analysis of the findings obtained from different data sources. It includes data obtained through in-depth interview with key informant that involves respondents' opinion towards environmental taxes and also data obtained from survey (structured review of documents) of issues related with tax revenue data. Results from face-to-face in-depth interview, survey (structured review of documents) and documentary analysis are incorporated under the first section and in the second section results from these sources were analyzed and interpreted and the third section is comprised of conclusions.

4.1 Results

The purpose of this study is to investigate the environmental taxation practices and their revenue performance in Ethiopia. As main source of information, the participants on the interview of this study were six employees from Ethiopian Revenue and Custom Authority; three employees from Ministry of Agriculture; seven employees from Minister of Water and Energy (four interviewees from Environment Impact Assessment Social Development Office (EIASDO), two participants from Water Supply and Sanitation Management, and one from Water Fund); five employees from Environmental Protection Authority (EPA) as well as teachers and students in Environmental planning program and Law department of Addis Ababa University (four instructors and seven PhD candidates).

4.1.1 In-depth interview results

To address research questions the study used survey (structured review of documents) and in-depth interview (key informant interview) together with documentary analysis. The outcomes of in-depth interview were conducted with sample interviewees, 32 respondents were interviewed because they were the one who have exposure to the issue under study. The subsequent discussion presents the results of in-depth interview.

The first question raised was what strategies and policies are currently employed to protect the environment?

Participants from EPA noted that “the basic and iconic strategy currently used to protect the environment in Ethiopia is Climate Resilient Green Economy Strategy (CRGE). Also there are Environmental policy, environmental regulation, proclamations and directives.” Whereas the participants from Natural Resource Management (NRM) give details that “The natural resources are protected by genetic conservation, wildlife habitat, and control of forest fire. Thus the policies are conservation based on awareness creation and transfer of ownership; which is advisory (on how to conserve/ preserve). Then there is systematic utilization to replace the forests and protect soil from water erosion; as well as deforestation.” They believe that “this strategy guides or helps to maintain the natural resource by creating public ownership of these resources which may direct to more sustainable protection.”

As well the interviewees from EIASDO inform that “The policies and standards are issued by the EPA. Our task is executing, monitoring and evaluating them. Thus we have limited power.” However, the participants from Water supply and sanitation management indicated that “There is Ethiopian resource management proclamation, according to this proclamation to emit wastes, proponents have to ask permission. Before they are admitted to do so they must complete different things like treating the wastes and making sure that it do not harm living things. And the minister office has to control these tasks. The problem is that this proclamation has not been put into action. However currently we are on the way to work this even with Kebeles. Until now the EPA tried to accomplish this.”

Moreover, opinion of instructors and students on the issue was that “there are strategies or policies but the problem is they are not placed into action.” Others also said “To execute policy we need laws; policy and law are parallel; and each principle could be used to issue laws. On the basis of environmental conservation there are sectoral approaches for natural

resource like water, wildlife, air, forest, health and so on thus the approach is multi-sectoral. By any standard Ethiopia have done a lot of things.”

The next concern was what alternatives are there to finance the funds for environmentally beneficiary projects the participants mentioned the following:

- Loan from an international organization,
- Climate financing
- Official development assistance (ODA) and relief
- Government budget, subsidies, grants, incentive and award

Further they indicate that “The source has to be from government, companies that produce the burden, also from the organization that gave the permission for the company to be established. Even, if the land is given to the community and they start rehabilitating the environment, they could become one source of fund.”

Afterwards they were asked, do you think environmental tax could be used to finance environmentally beneficiary projects? How? Regarding this question the entire participant answered yes except one they further explained the following:

Table 4.1 Environmental tax as source of finance

Response	How? Why?	Frequency	Percentage
Yes	- o by levying higher taxes to projects with more emissions, - o by following the principle of polluter pays or bearing the cost of production, - o through minimizing the amount of tax levied on tools which are imported to perform environmental protection activities,	31	96.87

	- o by using the tax revenue to incentivise clean technology this can be done by giving rewards or certificate for those who perform well, also by simply announcing their name, - o by spending the money in rehabilitation, - o with the introduction of clean development mechanism (CDM) and other mechanisms.		
No	Environmental tax has to assist clean up costs but the law is not working.	1	3.13%
	Total	32	100%

Then the other question raised was how do you think inadequate levels of tax revenue have impact on environmental protection? Concerning these areas most of the participants from EPA indicate that “To support activities that protect the environment government needs resource one way of getting the resource is through tax so inadequate taxation affect the performance.” They have also said that “it could lead to lack of environmental protection activities in different ways for instance: it would leave the polluter to persist to the unusual way of making business if the tax amount is ignorable.”

Besides interviewees from Natural resource management also said “No enough revenue, no natural resource conservation. For check dam construction, soil conservation and for any rehabilitation we need money; tax is the source thus has a direct impact.” As well, interviewees from Ministry of water reflected about it as follow “If there is adequate tax revenue, it may encourage protection of resources including water. The reverse is true.” Again some teachers and students indicated that “Apart from low revenue performance to

finance environmentally related projects, lack of awareness could play a big role with respect to environmental management.”

What part of the society should pay environmental related taxes and in which economic activities environmental taxes could be introduced in Ethiopia? Was the other issue raised, respondents from EPA mentioned “Polluters, industries, transport organizations, Households (using significant amount of energy), owners of vehicles, aviation, ship, entities with significant amount of waste should pay environmental taxes.” while participants from NRM stated “Farmers (peasants), investors, agricultural activities, industries, transportation, traders, plastic product manufacturers (fetal), garage, car industries, textile and other industries.” Also Ministry of water and energy participants point out “Company, industry, investors, floricultures, institutions like health (for laboratory chemicals), university, hotels, garage thus all has to pay.”

In addition instructors and students revealed “All segment of the society, because everyone impacts the environment but the rate might be different. Or those that generate income at the expense of the society, investors, agricultural activity, laundry and those who engage in livestock production.” At last participants from ERCA bring up “Industries, agricultural activities, car owners, transport associations, projects affecting environment and factories have to pay these taxes.”

Interviewees were also asked, how do they think Environmental tax will change behaviours of industries that manufacture consumer goods using polluting technologies and environmentally below standard processes?

EPA interviewees clarified that: “It encourages industries to take the responsibility of their action hence they will pollute less. And this may force the industries to use green ways to process things. Therefore it drives them to divert their technologies to a n environmental

friendly ways.” They have also indicated that the introduction of environmental tax “will raise the cost of production using polluting technologies forcing them to look for available options. Also because they think they are paying sums due to those low standard technologies, they consider it as unreasonable addition to their total costs.” As a result “It helps in understanding and incorporation of externalities.”

Again participants from Natural resource management indicated: “If industries especially manufacture of wooden products are taxed they would give value to the natural resource. This leads to quality production process or their attention would be on environmentally friendly products. As a result, they will focus on the minimization of environmental pollution.”

In addition respondents from Ministry of water and energy pointed out: “First awareness leads to behaviour change if there is this awareness they will try to minimize their waste. Therefore law on environmental tax like proclamation and directive and high amount of tax should be there. In view of the fact that tax payment will decrease their earning they might pollute less and may even start recycling their wastes.”

Furthermore some instructors and students said: “Yes, if they are taxed too much they will stop imposing wastes. Also if the waste and the tax go proportional they might not afford it so they will try to minimize it. However if companies manage to pay for these taxes they possibly will damp it and say we will pay. Hence companies should be required to manage and treat the burden and if they do so we have to tax those who do not treat accordingly to encourage others.” While others said “No, but this PPP is also related with punishment action thus we must tax on their pollution level in addition there has to be a punishment if the pollution level is high. For example if the plastic bag tax is high, no one will buy it.”

Also most participants from ERCA said that: “Since most environmental related taxes are imposed on industries which are not environmental friendly it might change their behaviour; because it discourages an activity with a negative externality.” On the other hand others said “measuring emission and ensuring compliance may become cumbersome in Ethiopia in addition to that imposing these taxes may retard the pace of industrialization.”

The next question was how do you think environmental tax could be used in order to protect water pollution? Here participants said “In Ethiopia there is no polluter pays principle (PPP) but if we implement such taxes, for example:

- ✓ it may minimize the emission around Akaki,
- ✓ it will also encourage water shade management and carbon trading,
- ✓ it may encourage using waste basket, because such things are due to lack of awareness and policy, and
- ✓ it may encourage institutions to treat waste. For example: Harar beer could be mentioned as a good example in waste treatment like for irrigation.

Thus since there is a competition between companies who produce and sale same type of product, the environmental tax has to be in a way that discriminate two similar companies by taxing high for those who pollute more and low for those who pollute less. Following the proclamation in giving permission according to a standard (i.e., emission effluent standard), control treatment of effluent's waste and then give them the permission but if they do not treat according to the standard they have to be punished or taxed.”

The other question raised was how can these tax lead to energy and resource savings? Interviewees answered that these taxes may:

- encourage the use of green technologies, this would supplement fuel, coal... energies with renewable energies like biogas, solar....,

- encourage recycling wastes, then waste will be decreased, as a result resource will be managed,
- lead a company that emit high carbon to pay high tax and energy efficient ones pay low, hence it will lead to well-managed resource,
- ask to pay more for using scarce resource as a consequence taxed parties will use the scarce resource appropriately,
- use the revenue to rehabilitate the scarce resource, to replace the forest that has been deforested then this may maintain the resources at their state, and
- encourage to use recyclable material instead of raw material by imposing more tax on those who use fresh natural resource. Example Tanner industry used chromium (which is poisonous) if this is taxed they may recycle it. Another example is paper- instead of cutting new trees (if it is more economical) used ones will be recycled. For that reason, the resource will be conserved as well as energy will be saved.

During the interview ERCA employees were asked to mention environmental related taxes implemented in Ethiopia they said “knowledge regarding this aspect is low, and in line with this there is no law in Ethiopia concerning environmental tax.” In addition all indicated that “there is no environmental tax.” As well they were asked, how do you think the contribution of the environmental tax would be for Ethiopia’s total tax revenue? A number of respondents believe that “environmental taxes will have a contribution on the total tax revenue, because increasing the tax base increase total tax revenue. As a result, the amount of money collected from these separate tax may increase the total amount of tax revenue.”

At that moment interviewees were asked, how do they think these environmental taxes could contribute for the protection of the environment? Respondents mentioned that “environmental taxes will protect the environment because these taxes are imposed on activities that harm the

environment and also on activities that utilize natural resource thus imposing this tax may result in building environmental friendly economy, redistribution of wealth, rehabilitation of damaged environments, also for the sustainable growth and development.”

In addition the other issue raised were how do you see the country's fees on waste treatment? Interviewees implied that “country's fees on waste treatment is only one – fee attached to water bill which is currently used for solid waste management by Addis Ababa City Administration and this really needs a great deal of transformation and a lot still had to be done to upgrade it.”

Following that participants were asked how they see the contribution of taxes on bottled water for the conservation of water they said “to some extent such taxes are useful, to control the ground water from depletion. This could be done by requiring them to construct watershed management, to balance what they recharge and discharge, by natural percolation. These types of laws are good for taxing those who do not prepare controlling mechanisms. If they are taxed, the government or the EPA would be able to do these like building the watershed on their behalf.”

Besides interviewees were asked how they think taxes or fees on measured or estimated effluents to water will contribute for the protection of water. They said “Fees may lead to remedy and it should be to a large extent enough to make them not to do it a gain, hence polluters may think to establish treatment technology.”

Likewise, participants were asked how they see land use fee's contribution for the protection of land degradation. They think that “If the land use fee is used for the purpose of protection of land degradation particularly for, eroded land/water erosion protection, biological fertilizer usage, for afforestation, and for the purchase of organic and inorganic fertilizer it will contribute for the protection of land degradation.”

After that, participants were asked, who are the main stakeholders that could have significant contribution towards the design and development of environmental tax in Ethiopia? They put forward the following:

EPA participants said “ the following could be the main stakeholders: civil societies, NGO’s (that work on environmental protection activity), federal and regional environmental offices, tax authorities, EPA, the court (in enforcing the legislation), economic associations (for general economic implications), experts and research institutes, and private sector.” Others added “environmental experts, environmental engineer, ecologists, environmental economists, urban and regional planners, sociologist (because they will tell if the tax payers can handle the tax or not), forester, government organizations (EPA) and politicians. Along with community that is because they can influence by buying or not buying environmental harmful products, government (by regulating the tax or creating awareness) and investors (on their production because the produced goods are consumed thus they may produce environmental friendly goods).”

Furthermore some put the potential stakeholders in such a way “ first parliament and parliamentarian because they issue and enter into force laws, second sectoral government organizations because they can initiate proclamation, third professional associations, fourth NGO’s example Forum for Environment, Lem Ethiopia, Melka also those who have concern for the environment, finally the Community Based Organizations (example Entoto Den Tibeka).”

4.1.2 Documentary analysis results

The environmental policy of Ethiopia was established in 1997 (EPA 1997^a). This could be mentioned as milestone in Ethiopia. Under this policies the ‘CSE (Conservation strategy of Ethiopia) volume I’ is all about the environmental resource basis in Ethiopia, which talks

about what Ethiopia has or what is the available resource in the country (EPA 1997). Then according to proclamation 295/2002, the EPA was established (FDRE 2002^a). under article 6/4 of this proclamation it says “establish a system for environmental impact assessment of public and private projects, as well as social and economic development policies, strategies, laws, and programmes;” again Article 6/7 says “in consultation with the competent agencies, set environmental standards and ensure compliance with those standards.”

Besides under the constitution of Federal Democratic Republic of Ethiopia there are environmental policy constitution provisions like Article 43/3 “All international agreements and relations concluded, established or conducted by the State shall protect and ensure Ethiopia's right to sustainable development.” Article 44/1 “All persons have the right to a clean and healthy environment.” Also there is Article 92/2 “The design and implementation of programmes and projects of development shall not damage or destroy the environment” (FDRE 1995). All these things on the constitution show that development and environment should go hand in hand.

Accordingly there is the Environmental Impact Assessment Proclamation (Proclamation No. 299/2002), which states that prior to authorization and implementation of major development activities, the proponents shall undertake an environmental impact assessment and submit the environmental impact study report to the competent authority (FDRE 2002^b). As well the other proclamation is the Ethiopian Water Resources Management Proclamation (Proclamation No. 197/ 2000), which states that the water resources of the country are protected and utilized for the highest social and economic benefits of the people of Ethiopia, to follow up and supervise that they are duly conserved, ensure that harmful effects of water are prevented, and that the management of water resources is carried out properly (FDRE 2000).

In addition in the Proclamation No. 197/2000, article 8/1/d require submission of plans and proposals from any person who apply for a permit to undertake any kind of water works and approve, reject, or amend such plans and proposals; and article 13/ 2 says any application for a permit to release or discharge any waste, which endanger human life, animals, plants and any living things, into water resources shall not be, accepted. However, the supervising body may accept the application requiring the applicant to release or discharge after having treated the pollutant. Finally under article 22/1 Charges shall be paid by the permit holders, for the discharge or release of waste into water resources (FDRE 2000).

Above all there is The Environmental Pollution Control Proclamation (Proclamation No.300/2002) which states that in the event of social and economic development endeavours which inflict environmental harm, it is appropriate to eliminate, or where impossible, to mitigate pollution as an undesirable consequences of social and economic development activities. For that reason article 17 says: The court, before which a person is prosecuted for an offence under this Proclamation or regulations, may, in addition to any penalty it impose upon the convicted person, order: (b) that the cost of cleaning up and the disposing of the substance, chemical or equipment seized be borne by the convicted person; and (c) The convicted person to restore to the state in which the environment was prior to the infliction of the damage, and when such restoration is not possible to pay appropriate compensation (FDRE 2002^c).

Accordingly to identify the environmental taxes of Ethiopia the first step was to identify different types of taxes listed on Ethiopian tax laws and regulations. If the tax base is included in the categories of environmental related taxes then the tax is defined as environmental tax. The environmental tax issue encompass taxes on natural resources, both non-renewable, like oil or metals, and renewable, such as forests or fisheries. Also there is the Pigouvian framework, wherein taxes are used to correct market prices so as to take account of

externalities. Moreover, there are user fees and Payments for Environmental Services (PES) (Stephen Spratt 2012). Also, according to (OECD 2010) environmental tax is defined as a tax whose tax base is a physical unit (or a proxy of it) that has a proven, specific negative impact on the environment. This approach is consistent with the international guidelines on environmental taxes.

Yet again under OECD (1997) it has been chosen to single out the tax bases that seem to have a particular environmental relevance, and to consider all taxes levied on these tax bases as environmentally related regardless of the motives behind their introduction, their names etc. Thus according to this definition, then, it is the tax base that determines whether or not they are environmental, hence not the explicit motivation. As a result on the basis of the above definition and by looking at other countries environmental tax lists the following taxes were found in Ethiopia which has environmental tax bases:

Table 4.2 Environmental taxes in Ethiopia by category

Environmental taxes in Ethiopia by category	
Pollution	• Excise tax on locally manufactured textile • Waste collection fees ¹
Energy	• Excise tax on locally manufactured petroleum • Excise tax on imported petroleum
Transport	• Custom duty on Vehicles & accessories • Excise tax on Automobiles
Resource	• Sales tax on iron and steel • Excise tax on mineral water • Rural land use fee • Sales tax on Non-metallic and Mineral Products

¹ In Ethiopia Waste collection fee is not purely a tax rather it is a user fee.

Besides table 2.2 (see page 12) lists the main categories of environmentally relevant tax bases. In Ethiopia excise tax on locally manufactured textile should be treated as an environmental tax because textile factories use chemicals and dispose chemical wastes which create pollution a base for environmental tax. Excise tax on petroleum should also be treated as an environmental tax because petroleum is energy product used for transport purpose, and energy is another base for environmental tax. Again motor vehicles, one-off import or sales taxes are grouped as environmental tax because of their base transport which has a direct link with the environment. Finally sales tax on iron and steel, excise tax on mineral water, rural land use fee and sales tax on non-metallic and mineral products are categorised as environmental taxes having a resource as base. But in Ethiopia these taxes are not designed with an environmental purpose.

4.1.3 Survey (structured review of documents)

From the general tax revenue the amount of money collected from the environmental tax basis above (see table 4.1) for the year 1993/94 up to 2010 is presented under Appendix 2. In addition the graph below (figure 4.1) shows tax revenue collected from these taxes. The graph give an idea that values of excise tax on imported petroleum (ETIP), excise tax on mineral water (ETOMW), custom duty on vehicles and accessories (CDOVA) and excise tax on automobile (ETOA) for the first four years (i.e., 1993/94 to 1996/97) are zero. This is due to the fact that the data of these taxes for those years were missing. One can also understand that revenues from most of these taxes are increasing. Also it shows that the amount collected from excise tax on locally manufactured petroleum (ETLMP), excise tax on locally manufactured textile (ETLMT) and sales tax on non-metallic and mineral products (STNM) decline after the year 2005/6.

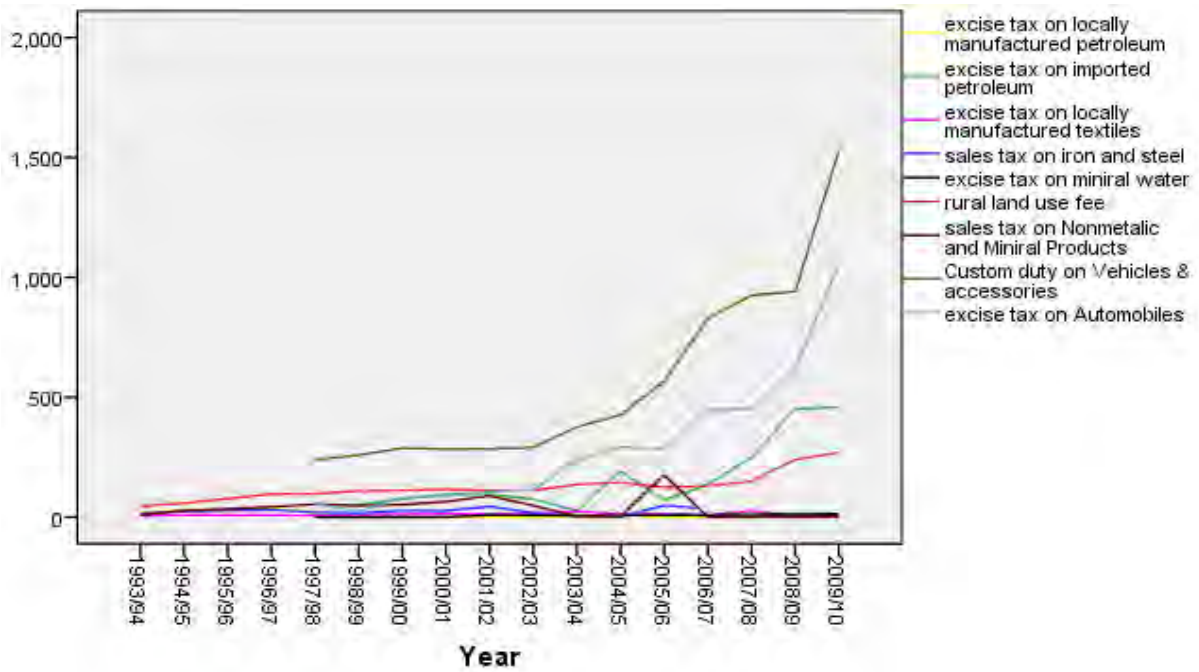


Figure 4 1 Environmental tax revenues

Moreover the descriptive statistics results are presented under table 4.3. From the table one can see that on average Ethiopia collected 8.31 million birr from excise tax on locally manufactured petroleum and 156.25 from excise tax on imported petroleum. Also 10.51 million birr is collected from excise tax on locally manufactured textile, 21.05 from sales tax on iron and steel and 6.27 million from excise tax on mineral water. Likewise, 125.10 from rural land use fee, 38.64 from sales tax on non-metallic and mineral products, finally 556.72 from custom duty on vehicles & accessories and 297.51 million birr from excise tax on automobiles were collected.

In addition the range, maximum, minimum, standard deviation and variance are presented under table 4.3. Among the environmentally related tax basis the highest amount is from custom duty on vehicles & accessories followed by excise tax on automobiles and excise tax on imported petroleum which represent 1528.82, 1055.67 and 458.6181 million birr respectively. Rural land use fee and sales tax on non-metallic and mineral products follow

those taxes with 270.00 and 176.35 million birr respectively. The rest follow with an amount below 50 million birr.

Standard deviations of these taxes indicate that on average excise tax on locally manufactured petroleum is 13 points away from the mean. Again excise tax on imported petroleum is 146 points, excise tax on locally manufactured textile is 7 point, Sales tax on iron and steel is 14 point, Excise tax on mineral water is 5 point and rural land use fee is 56 points away from average respectively. In addition, sales tax on non-metallic and mineral products 44, custom duty on vehicles & accessories 391 and excise tax on automobiles 392 points away from the average respectively. This standard deviation measure how spreads out the data points are. It also indicate that those sets with a low standard deviation have most of the data points centered around average, but sets with a high standard deviation have data points not so clustered.

Table 4.3 Descriptive Statistics

Environmental taxes	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
excise tax on locally manufactured petroleum	16	36.75	.00	36.75	8.3100	13.21263	174.573
excise tax on imported petroleum	13	432.6481	25.9700	458.6181	156.254085	145.8598156	21275.086
excise tax on locally manufactured textiles	17	25.72	.09	25.81	10.5157	6.79435	46.163
sales tax on iron and steel	15	46.42	2.67	49.09	21.0533	13.90609	193.379
excise tax on mineral water	13	13.05	.00	13.05	6.2768	4.74648	22.529
rural land use fee	17	224.44	45.56	270.00	125.1021	56.29512	3169.141
sales tax on Non-metallic and Mineral Products	17	176.35	.00	176.35	38.6408	44.48648	1979.047
Custom duty on Vehicles & accessories	13	1289.74	239.08	1528.82	556.7246	390.83600	152752.777
excise tax on Automobiles	13	1031.72	23.95	1055.67	297.5186	292.24778	85408.768
Valid N (list wise)	10						

Source: Ethiopian Revenue and Custom Authority (2011) and Ethiopian Ministry of Finance and Economic Development

On the other hand the environmental taxes as a percentage of total revenue and as a percentage of tax revenue are presented in appendix 3 and 4. Cumulatively considering those lists table 4.4 and table 4.5 below explain the mean of environmental tax as a percentage of total revenue and tax revenue respectively. Initially, among the given taxes starting from 1993/94 to 2009/10 custom duty on vehicles and accessories contributed around 2.8545 % of the total revenue and 3.9664% of the tax revenue. Also the rural land use fees shows 0.9317% of the total revenue and 1.3297% of tax revenue. Besides, excise tax on automobile put in 1.3022% of total revenue and 1.7447% of tax revenue. Nevertheless other taxes on average contribute from 0.0320 to 0.9317% of total revenue and also from 0.0422 to 0.5366 % of the tax revenues.

Table 4.4 Environmental taxes as a percentage of total revenue (averages)

Particulars	N	Mean
percentage of excise tax on locally manufactured petroleum to total revenue	16	.130737
percentage of excise tax on imported petroleum to total revenue	13	.7417
percentage of excise tax on locally manufactured textile to total revenue	17	.0944
percentage of sales tax on Iron and steel to total revenue	15	.2279
percentage of excise tax on mineral water to total revenue	13	.0320
percentage of rural land use fee to total revenue	17	.9317
percentage of sales tax on non-metallic and mineral products to total revenue	17	.3679
percentage of custom duty on Vehicles to total revenue	13	2.8545
percentage of excise tax on Automobile to total revenue	13	1.3022
Valid N (list wise)	10	

Table 4.5 Environmental tax as a percentage of tax revenue (averages)

Particulars	N	Mean
percentage of excise tax on locally manufactured petroleum to tax revenue	16	.1902
percentage of excise tax on imported petroleum to tax revenue	13	1.0282
percentage of excise tax on locally manufactured textile to tax revenue	17	.1342
percentage of sales tax on Iron and steel to tax revenue	15	.3303
percentage of excise tax on mineral water to tax revenue	13	.0422
percentage of rural land use fee to tax revenue	17	1.3297
percentage of sales tax on non-metallic and mineral products to tax revenue	17	.5366
percentage of custom duty on Vehicles to tax revenue	13	3.9664
percentage of excise tax on Automobile to tax revenue	13	1.7447
Valid N (list wise)	10	

The difference between table 4.4 and 4.5 is that, under table 4.4 environmental taxes as a percentage of total revenue of the country is computed. Total revenue comprises the countries tax revenue as well as non tax revenue (Charges & fees, Sale of goods & Services, Government Investment Income, Miscellaneous Revenue, Pension contribution and Capital Revenue). Whereas table 4.5 shows environmental taxes as a percentage of tax revenue; tax revenue is the sum of direct tax, domestic indirect tax and custom duty and tax on imported goods. Therefore the later table excludes non tax revenues.

On top of that, the environmental tax as a percentage of GDP is presented under appendix 5. In general, the mean or average result of environmental taxes as a percentage of GDP is indicated in table 4.7. the tax to GDP percentage is as follow: excise tax on locally manufactured petroleum represents 0.0204% of GDP, excise tax on imported petroleum represent 0.1499 % of GDP, excise tax on locally manufactured textile represent 0.0153% of GDP, sales tax on iron and steel represent 0.0360 % of GDP, excise tax on mineral water represent 0.0061% of GDP, rural land use fee represent 0.1618% of GDP, sales tax on non-metallic and mineral products represent 0.0595% of GDP, custom duty on vehicles represent 0.5563% of GDP and excise tax on automobile represent 0.2712% of GDP.

Table 4.6 Environmental tax as a percentage of GDP (averages)

Particulars	N	Mean
percentage of excise tax on locally manufactured petroleum to GDP	16	.0204
percentage of excise tax on imported petroleum to GDP	13	.1499
percentage of excise tax on locally manufactured textile to GDP	17	.0153
percentage of sales tax on Iron and steel to GDP	15	.0360
percentage of excise tax on mineral water to GDP	13	.0061
percentage of rural land use fee to GDP	17	.1618
percentage of sales tax on non-metallic and mineral products to GDP	17	.0595
percentage of custom duty on Vehicles to GDP	13	.5563
percentage of excise tax on Automobile to GDP	13	.2712
Valid N (list wise)	10	

4.2. Data analysis

The purpose of this section is to present the analyses part based on the findings of the previous section. The broad objective of the study is addressed through answering each research questions based on the findings. Accordingly, each research questions are addressed under the subsequent sub section as follow.

4.2.1 Environmentally related taxes currently operating in Ethiopia

As indicated under chapter two (literature review), environmentally related taxes are any payment to general government considered to be of particular environmental application. The related tax basis include energy products, motor vehicles, waste, measured or estimated emissions, natural resources, etc. Also, according to (OECD 2010) environmental tax is defined as a tax whose tax base is a physical unit (or a proxy of it) that has a proven, specific negative impact on the environment. And they are compulsory payments to the government, where the benefits provided to the taxpayer are not directly linked to the payment (OECD 2006).

Therefore to address the question data obtained from in-depth interview and documentary analysis was employed. The results from in-depth interviews showed that there are environmentally related tax basis in Ethiopia the problem is that those taxes are not known in the name of environmentally related taxes. Also the documentary analysis result shows that there are taxes whose tax base can be considered to be of particular environmental relevance (see table 4.1) therefore in Ethiopia there are ten environmental related taxes and one waste collection fee attached to water bill.

Subsequently as per the results most respondents perceived that land use fees and fees on waste treatment (which have environmental tax basis: natural resource and waste respectively) as an important contributor to the protection of the environment as well as tax

revenue. In addition during the in-depth interview participants suggested that waste fees and the land use tax must be used for the intended purpose only.

Thus the result implies that the tax authority has not introduced environmental related taxes in Ethiopia but one can clearly see that there are environmentally related taxes from in- depth interview as well as the documentary analysis. Even though these taxes are not mentioned in the tax laws as environmental tax the definition above make sure that having environmental relevance base categorise those taxes as environmental taxes. Also as indicated under the literature review although there could be criteria like the name and stated purpose a tax basis is a good basis and useful for identifying possible environmental taxes. And it was seen as the only objective basis for identifying environmental taxes for the purpose of international comparisons.

4.2.2 The revenue performance of environmental taxes in Ethiopia

The statistical results show that majority of the environmental tax are from custom duty on vehicles and accessories which is a tax from transport category of environmental tax. Also, lesser variation and greater uniformity from year to year is observed in some of the tax categories while others like excise tax on imported petroleum, rural land use fee, custom duty on vehicles and accessories, and excise tax on automobiles have shown greater variation and lesser uniformity as statistically indicated by high standard deviation.

In addition it can be seen that these environmental taxes contribute 0.03% to 2% of total revenue as well as 0.04% to 3% of tax revenue of the country. But the percentage of these taxes to GDP is low; it is shown that all taxes are below 1% of GDP. In European Union member states (EU-27) roughly one euro out of every sixteen in revenue is raised from environmental taxes. The vast majority of Member States tend to fall in a band ranging from 2% to 3% of GDP. Only four Member States show levels below 2% of GDP, while in three other countries environmental tax revenues exceed 3.5% of GDP. At 4.0% in 2010,

Denmark and the Netherlands display the highest level of ‘green’ taxes followed by Slovenia (3.6 %). The lowest environmental tax revenues in relation to GDP are instead found in Spain, France, Lithuania and Slovakia, all below 2 % in 2010 (European Union 2012).

Accordingly developing countries environmental related taxes to GDP percent in the year 2010 and 2001 are as follow: Chile 1.14 and 1.59, South Africa 3.21 and 2.83, Turkey 3.89 and 2.38, China 1.44 and 0.39 as well Poland 1.86 and 1.97 respectively. While Mexico is shown as having -0.25 and 1.33 percent, it is negative in 2010 because tax revenues are shown net of subsidies (OECD 2013).

Tax to GDP ratio is the environmental tax collections divided by the country's GDP. It drops when tax revenues grow at a slower rate than the GDP of a country. Thus a comparatively low tax to GDP ratio indicates the need to strengthen revenue raising performance. Even though these taxes are generating revenue; it could become more effective and may improve the environment if implemented as an environmental tax.

Since tax is government source of revenue increasing the tax base increase the total amount of tax revenue. Most of the interviewees indicate that having inadequate tax revenue might lead to lack of environmental protection which includes resource as well as water management. In general one can see that these environmental tax bases have contribution to the total revenue of the country.

4.2.3. Environmental taxation practice

There are land use fees as well as waste fees which is clear to all that having this taxes and fees shows that there are environmental taxation practices in Ethiopia even if this and other taxes are not mentioned as an environmental taxes. Also from the documentary analysis result it is found that Ethiopia has the conservation strategy as well as the Ethiopia's Climate-

Resilient Green Economy Strategy also there are various environmental protection policies. These strategies and policies show that much has been done to protect the environment.

As well Bluffstone (2004) said that environmental taxes use fees as the incentive instrument. For that reason those suggestions from the participants on environmental fees indicated that there are some practices towards the environmental taxation but this has to be improved so that the tax payers notice their impact. Also they indicate that having those taxes introduced as environmentally related taxes may possibly lead the polluters, emitters as well as industries to device a technique that minimize their waste.

All in all different participants indicate their views and the Ethiopian tax laws and regulation shows that implicitly there exist environmental taxes. However since these taxes are not introduced by the tax authority as an environmental taxes knowledge regarding them is very little. Above and beyond most environmental protection proclamations lack implementation action, which could pave the way for the introduction and broader practice of environmental tax in Ethiopia. Finally, along with the current practices, parties who might have certain contribution for further environmental taxation practices could be the society, experts as well as governmental and nongovernmental offices.

4.2.4 Areas of economic activities in Ethiopia where environmental taxes could be introduced

Result from the in-depth interviews shows that environmental taxes may contribute for environment protection. Participants suggested that polluters have to be punished or heavily taxed. They believe that those taxes: could be used for rehabilitation, may make the producers value the natural resource, made payers realize their accountability, change their behaviour and create energy efficiency.

In Ethiopia farmers (peasants) who use excessive chemical fertilizers particularly nitrogen fertilizers have to pay environmental taxes so as to encourage the rehabilitation of land

degradation. Similarly if the farmer did not farm sloppy land in a contour line or in an inappropriate way he/she have to be taxed. As well as those who mismanage the environment for example by deforesting have to pay. In addition traders, manufacturers, investors and owners of vehicles can be mentioned. In general everyone who has negative impact as well as those who utilize the natural resources should pay environmental related taxes in Ethiopia.

Therefore, from the above investigation those who engage in agricultural activity, live stock production, floricultures, chemical laboratories, hotels, garage, transport organizations, aviations, laundry, plastic production and also different factories and industries that emit chemicals have to pay environmental tax in Ethiopia.

In addition according to Bruce and Ellis (1993) taxing polluting inputs and outputs is a particularly attractive policy, in developing countries, which often lack experience in administering and enforcing other types of environmental regulation. Corrective taxes make use of existing administrative structures and increase tax revenues, which can be spent on public goods to improve environmental quality (including treatment facilities for water and sewage, waste disposal, and sanitation) or can be used to reduce other taxes (which are often highly distortionary in countries with a narrow tax base) (Bruce and Ellis 1993). Accordingly it is necessary to tax polluting inputs and outputs.

4.2.5 Source of funds to finance environmentally beneficial projects in Ethiopia

In Ethiopia funds for environmentally beneficiary projects are generated from different sources. Interviewees stated different international organizations, government budgets, NGOs, office development assistance and climate finance as the sources of finance for environmentally beneficiary projects. In the contrary environmental tax is not used as a source for those projects.

Under the literature review it is also indicated that environmental taxes could be levied aiming at raising revenue from the users of the environment in order to cover the cost of monitoring or controlling activities. This could be when the charge is paid for a specific environmental service provided to the charge payer, or when the charge is used to cover related environmental purposes but not in the form of a specific service to the charge payer. It is also indicated that the transition countries of Central and Eastern Europe have particularly used environmental taxes to generate funds for environmental investments (OECD 1999a). Thus environmental taxes can be used to finance funds for environmentally beneficiary activities.

Moreover participants indicated that by levying tax on various activities funds could be generated for the rehabilitation as well for the support of environmentally beneficiary projects. Thus it is clear that revenue from these taxes is important for performing environmental protection activities.

4.3 Conclusions

In general, the discussions in this chapter tried to integrate the results of quantitative and qualitative methods so as to address the research objective through answering specific research questions. The subsequent chapter presents the conclusions together with recommendations for policy makers' taxpayers and regulators and gives directions for further study.

Chapter five: Conclusions and recommendations

The purpose of this final chapter is to summarize the whole study and highlight possible suggestions. Accordingly, this chapter presents an overview of the entire study and its key findings in the first section followed by recommendations for policy makers and other stakeholders in developing environmental tax.

5.1. Overview of the whole study

The study began with discussion that the current growth of population and different activities may raise environmental damage. Also how these environmental ideas and associated studies are inviting individuals from different fields. Further it is discussed that through environmental taxes environmental problems could be tackled. In respect to this, theoretical review was done on environmental taxes. Additionally empirical studies on the rational for these taxes and studies conducted in different countries were reviewed.

The review highlighted several issues in theoretical aspect such as definition of environmental taxes. It explains different definitions given to define environmental taxes; simply it can be mentioned as a tax whose tax base has environmental relevance. At the same time different types of environmental taxes which are pollution, energy, resource and transport were reviewed also the summary of tax bases of environmental tax were shown.

Moreover the advantage and disadvantage of environmental taxes are also theoretically reviewed that 'static' efficiency gains through reallocation of abatement, 'static' efficiency gains through performance incentives, dynamic innovation incentive, robustness to negotiated erosion ('regulatory capture') and cost-limiting properties are listed as advantages of these taxes whereas uncertain environmental impact, compatibility with firm decision-making structures, lack of experience, administration and enforcement costs, geographical

differences, effect on attitudes and perception can be mentioned as limitations of environmental tax.

With regard to empirical aspects, survey studies which indicated why there should be a deviation from the normal tax basis or why these taxes should be introduced are reviewed. Accordingly for some the primary rationale for the use of environmental tax is the externalities argument which says a polluter will not take into account the costs imposed on society at large from their private actions. Again the so-called 'polluter pays principle' (PPP) whereby the costs of pollution control are paid by the polluter themselves and not by society at large is another reason. As well it is looked as means to correct for negative externalities and taxes on environmentally harmful behaviour have the potential to raise revenues for governments. These are mentioned as the rationales for having environmental taxes.

The review of past studies also indicates an overview of key economic issues in the use of taxation as environmental policy. It is found that Environmental taxes could make a significant contribution to tax revenues. The other studies reported the distributional effects of environmental tax reform which concluded that distributional concerns, while important in many cases, should not prevent or delay the introduction of environmental taxes. Also the different experience in different countries with respect to these taxes particularly Europe, Mauritius, Uganda and studies in developing countries were assessed. Concerning the environmental tax most empirical studies indicate these taxes can better address externalities.

In general, the literature review of this study finds there is limited study related with the topic especially in developing countries, also in Ethiopia knowledge towards these tax is low and study regarding this aspect seems low; therefore this cause the researcher to undertake the study.

The broad objective of the study is to investigate the environmental taxation practices and their revenue performance in Ethiopia. The study is a mixed approach; particularly based on the data needed in the study in- depth interview and documentary analysis (qualitative aspect) and survey- structured review of documents (quantitative aspect) were employed.

To achieve the broad objective of the study research questions should be answered by analyzing data gathered through interview data collection and structured review of documents instrument. The study incorporated 32 interviewees sample respondents for qualitative questions through purposive sampling and 17 years revenue data for quantitative survey.

The data gathered from the interview were analysed through description together with findings from documentary analysis and the seventeen year quantitative data gathered from survey of structured review of documents were analyzed through descriptive analysis to answer the research questions.

Hence, the major findings identified under the study were summarized as follows: first it is found that the tax authority has not introduced environmental related taxes in Ethiopia but the documentary analysis result indicates there are environmentally related taxes. Even though these taxes are not mentioned in the tax laws as environmental tax the definition make sure that having environmental relevance base categorise those taxes as environmental taxes. Second taxes which have environmental tax bases in Ethiopia have high contribution to the tax as well as total revenue of the country but it needs attention to be more effective in protecting the environment as well as generating revenue. Thirdly Ethiopian tax laws and regulation shows that implicitly there exist environmental taxes however since these taxes are not introduced by the tax authority as an environmental taxes knowledge regarding them is very little. Above and beyond most environmental protection proclamations lack implementation action, which could pave the way for the introduction and broader practice of

environmental tax in Ethiopia. Fourth it is found that in Ethiopia on the economic activities which damage the environment and utilize resources environmental taxes could be introduced. Finally it is found that in Ethiopia funds which might finance environmentally beneficiary projects are not from environmental taxes but by levying these taxes on various activities funds could be generated. As a result the study points out that there are only some environmental taxation practices in Ethiopia.

Finally agencies responsible for environmental matters in Ethiopia include the Ministry of Agriculture, Environmental Protection Authority, and the Ministry of Water and Energy. But there is also a way in accounting that averts the undesired environmental factors. This could be by imposing environmental related taxes. Accordingly, the tax authority also has a responsibility for environment matters.

5.2. Recommendations

Based on the key findings of the study the following suggestions are forwarded:

- ❖ Policy makers, tax payers and regulators need to understand environmental taxes how and why they are imposed, more specifically awareness creation concerning these environmental taxes is necessary. Furthermore the laws need further guiding principle and manuals.
- ❖ Prior laws like environmental impact assessment proclamations are already issued these proclamations help to discover the activities with negative externalities. Strict implementation of environmental impact assessment is needed especially on projects that have major impacts on environment. Mitigation measures have to be implemented. Assessment of the environment should reveal realization of the healthy environment.

- ❖ The environmental tax bases as a percentage of GDP are low; this shows that there is the need to strengthen revenue raising performance. And since environmental taxes could also be introduced with the intention of raising revenue introducing appropriate environmental tax is therefore essential.
- ❖ It is important to rehabilitate damaged environment by imposing environmental tax on activities that might lead to deforestation, degradation of the land (such as using chemical fertilizers and pesticides); activities that generate too much wastes and noises as well as those which consume the energy so much (such as on electricity).
- ❖ The society, experts as well as governmental and nongovernmental offices certain contribution for further environmental taxation practices is essential.

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Appendix 1 Interview questions

1. Mention the environmental related taxes implemented in Ethiopia?
2. How do you see land use fee's contribution for the protection of land degradation?
3. How do you see the country's fees on waste treatment?
4. What part of the society can pay environmental related taxes?
5. How do you think inadequate levels of tax revenue in the country could lead to lack of this resource protection?
6. How do you think inadequate levels of tax revenue in the country could lead to lack of environmental protection?
7. How do you think inadequate levels of tax revenue in the country could lead to lack of Water management?
8. What do you think the contribution of the environmental tax would be for Ethiopia's total tax revenue?
9. What strategies have you currently employed to protect the environment?
10. How do you think that Environmental tax could contribute to resource savings?
11. How do you think Environmental tax will change behaviours of industries that manufacture wooden products?
12. How do you think Environmental tax will change behaviours of industries that manufacture consumer goods using polluting technologies and environmentally below standard processes?
13. How do you think environmental tax could be used in order to protect water pollution?
14. How can environmental taxes viewed as a suitable instrument for altering behaviours of some of the industries or companies producing different products and dumping poisonous and non-degradable wastes directly in to local rivers?

15. Who are the main stakeholders that could involve in the environmental tax of Ethiopia?
16. How can environmental taxes viewed as a suitable instrument for energy efficiency improvement?
17. How do you think taxes or fees on Measured or estimated effluents to water will contribute for the protection of water?
18. What alternatives is there that might finance the funds for environmentally beneficiary projects?
19. Do you think environmental tax could be used to finance environmentally beneficiary projects? How?

Appendix 2 Summary raw data from 1993/94 to 2009/10

Year	ETOLMP	ETOIP	ETOLMT	STOIS	ETOMW	RLUF	STONM	CDOVA	ETOA	TR	TaxR
1993/94	20.03	999.00*	5.91	15.25	999.00*	45.56	8.63	999.00*	999.00*	3938.80	3029.99
1994/95	29.19	999.00*	8.49	23.63	999.00*	58.05	27.55	999.00*	999.00*	5912.75	3878.72
1995/96	27.92	999.00*	7.91	28.17	999.00*	77.16	33.86	999.00*	999.00*	6966.09	4723.39
1996/97	36.75	999.00*	8.20	30.76	999.00*	95.81	42.94	999.00*	999.00*	7885.63	5358.94
1997/98	18.44	52.34	6.90	19.36	0.00	97.49	53.24	239.08	57.20	8381.32	5292.22
1998/99	0.02	51.24	9.09	16.75	0.00	108.89	47.61	258.82	23.95	9557.54	5535.92
1999/00	0.00	75.76	11.22	26.98	0.00	111.58	51.54	287.54	83.32	9983.29	6344.16
2000/01	0.00	95.10	13.96	26.45	0.00	115.95	64.47	284.06	86.23	10636.41	7392.19
2001/02	0.01	94.43	10.80	44.10	9.31	111.83	88.87	284.67	106.46	10430.61	7858.21
2002/03	0.02	74.96	14.46	17.38	7.25	111.87	47.51	290.51	113.56	11699.34	8194.30
2003/04	0.02	25.97	24.62	4.17	6.41	136.15	3.86	375.53	239.02	13266.03	10324.94
2004/05	999.00*	193.06	10.93	2.67	6.83	144.36	2.97	426.77	292.40	15183.35	11923.03
2005/06	0.00	72.71	12.26	49.09	8.61	123.98	176.35	567.70	286.02	18353.81	13939.62
2006/07	0.30	136.32	7.93	999.00*	7.70	129.86	0.00	827.63	448.10	21314.19	16870.46
2007/08	0.12	249.63	25.81	999.00*	11.03	149.10	0.00	925.60	451.82	30982.45	23981.09
2008/09	0.02	451.17	0.09	5.18	11.41	239.10	2.45	940.69	623.99	40184.00	29007.00
2009/10	0.12	458.62	0.19	5.86	13.05	270.00	5.04	1528.82	1055.67	53864.00	43318.00

Source: Ethiopian Revenue and Custom Authority (2011) and Ethiopian Ministry of Finance and Economic Development

Whereas “999.00*”: represents missing values (not available), ETOLMP excise tax on locally manufactured petroleum, ETOIP excise tax on imported petroleum, ETOLMT excise tax on locally manufactured textiles, STOIS sales tax on iron and steel, ETOMW excise tax on mineral water, RLUF rural land use fee, STONM sales tax on Non-metallic and Mineral Products, CDOVA Custom duty on Vehicles & accessories, ETOA excise tax on Automobiles, TR Total Revenue, TaxR Tax Revenue.

Appendix 3 Environmental tax as a percentage of total revenue

Year	PETLMPtTR	PETIPtTR	PETLMTtTR	PSTOIStTR	PETOMWtTR	PRLUFtTR	PSTNMtTR	PCDVtTR	PETOAtTR
1993/94	0.51	#NULL!	0.15	0.39	#NULL!	1.16	0.22	#NULL!	#NULL!
1994/95	0.49	#NULL!	0.14	0.40	#NULL!	0.98	0.47	#NULL!	#NULL!
1995/96	0.40	#NULL!	0.11	0.40	#NULL!	1.11	0.49	#NULL!	#NULL!
1996/97	0.47	#NULL!	0.10	0.39	#NULL!	1.21	0.54	#NULL!	#NULL!
1997/98	0.22	0.62	0.08	0.23	0.00	1.16	0.64	2.85	0.68
1998/99	0.00	0.54	0.10	0.18	0.00	1.14	0.50	2.71	0.25
1999/00	0.00	0.76	0.11	0.27	0.00	1.12	0.52	2.88	0.83
2000/01	0.00	0.89	0.13	0.25	0.00	1.09	0.61	2.67	0.81
2001/02	0.00	0.91	0.10	0.42	0.09	1.07	0.85	2.73	1.02
2002/03	0.00	0.64	0.12	0.15	0.06	0.96	0.41	2.48	0.97
2003/04	0.00	0.20	0.19	0.03	0.05	1.03	0.03	2.83	1.80
2004/05	#NULL!	1.27	0.07	0.02	0.04	0.95	0.02	2.81	1.93
2005/06	0.00	0.40	0.07	0.27	0.05	0.68	0.96	3.09	1.56
2006/07	0.00	0.64	0.04	#NULL!	0.04	0.61	0.00	3.88	2.10
2007/08	0.00	0.81	0.08	#NULL!	0.04	0.48	0.00	2.99	1.46
2008/09	0.00	1.12	0.00	0.01	0.03	0.60	0.01	2.34	1.55
2009/10	0.00	0.85	0.00	0.01	0.02	0.50	0.01	2.84	1.96

Source: Ethiopian Revenue and Custom Authority (2011) and Ethiopian Ministry of Finance and Economic Development

Whereas: PETLMPtTR percentage of excise tax on locally manufactured petroleum to total revenue , PETIPtTR percentage of excise tax on imported petroleum to total revenue, PETLMTtTR percentage of excise tax on locally manufactured textile to total revenue, PSTOIStTR percentage of sales tax on Iron and steel to total revenue, PETOMWtTR percentage of excise tax on mineral water to total revenue , PRLUFtTR percentage of rural land use fee to total revenue, PSTNMtTR percentage of sales tax on non-metallic and mineral products to total revenue, PCDVtTR percentage of custom duty on Vehicles to total revenue, PETOAtTR percentage of excise tax on Automobile to total revenue.

Appendix 4 Environmental taxes as a percentage of tax revenues

Year	PETLMPtTaR	PETIPtTaR	PETLMTtTaR	PSTOIS tTaR	PETOMWtTaR	PRLUFtTaR	PSTNMtTaR	PCDVtTaR	PETOAtTaR
1993/94	0.66	#NULL!	0.20	0.50	#NULL!	1.50	0.28	#NULL!	#NULL!
1994/95	0.75	#NULL!	0.22	0.61	#NULL!	1.50	0.71	#NULL!	#NULL!
1995/96	0.59	#NULL!	0.17	0.60	#NULL!	1.63	0.72	#NULL!	#NULL!
1996/97	0.69	#NULL!	0.15	0.57	#NULL!	1.79	0.80	#NULL!	#NULL!
1997/98	0.35	0.99	0.13	0.37	0.00	1.84	1.01	4.52	1.08
1998/99	0.00	0.93	0.16	0.30	0.00	1.97	0.86	4.68	0.43
1999/00	0.00	1.19	0.18	0.43	0.00	1.76	0.81	4.53	1.31
2000/01	0.00	1.29	0.19	0.36	0.00	1.57	0.87	3.84	1.17
2001/02	0.00	1.20	0.14	0.56	0.12	1.42	1.13	3.62	1.35
2002/03	0.00	0.91	0.18	0.21	0.09	1.37	0.58	3.55	1.39
2003/04	0.00	0.25	0.24	0.04	0.06	1.32	0.04	3.64	2.31
2004/05	#NULL!	1.62	0.09	0.02	0.06	1.21	0.02	3.58	2.45
2005/06	0.00	0.52	0.09	0.35	0.06	0.89	1.27	4.07	2.05
2006/07	0.00	0.81	0.05	#NULL!	0.05	0.77	0.00	4.91	2.66
2007/08	0.00	1.04	0.11	#NULL!	0.05	0.62	0.00	3.86	1.88
2008/09	0.00	1.56	0.00	0.02	0.04	0.82	0.01	3.24	2.15
2009/10	0.00	1.06	0.00	0.01	0.03	0.62	0.01	3.53	2.44

Source: Ethiopian Revenue and Custom Authority (2011) and Ethiopian Ministry of Finance and Economic Development

Whereas: TaR is tax revenue

Appendix 5 Environmental taxes as a percentage of Gross Domestic Product

Year	PETLMPtGDP	PETIPtGDP	PETLMTtGDP	PSTOItGDP	PETOMWtGDP	PRLUftGDP	PSTNMtGDP	PCD VtGDP	PETOAtGDP
1993/94	0.06	#NULL!	0.02	0.05	#NULL!	0.13	0.03	#NULL!	#NULL!
1994/95	0.08	#NULL!	0.02	0.06	#NULL!	0.15	0.07	#NULL!	#NULL!
1995/96	0.07	#NULL!	0.02	0.07	#NULL!	0.19	0.08	#NULL!	#NULL!
1996/97	0.08	#NULL!	0.02	0.07	#NULL!	0.21	0.10	#NULL!	#NULL!
1997/98	0.04	0.12	0.02	0.04	0.00	0.22	0.12	0.53	0.13
1998/99	0.00	0.08	0.01	0.03	0.00	0.17	0.08	0.41	0.04
1999/00	0.00	0.11	0.02	0.04	0.00	0.17	0.08	0.43	0.13
2000/01	0.00	0.13	0.02	0.04	0.00	0.16	0.09	0.39	0.12
2001/02	0.00	0.13	0.01	0.06	0.01	0.15	0.12	0.39	0.15
2002/03	0.00	0.10	0.02	0.02	0.01	0.16	0.07	0.41	0.16
2003/04	0.00	0.03	0.03	0.01	0.01	0.17	0.00	0.46	0.29
2004/05	#NULL!	0.21	0.01	0.00	0.01	0.16	0.00	0.47	0.32
2005/06	0.00	0.07	0.01	0.05	0.01	0.12	0.17	0.56	0.28
2006/07	0.00	0.12	0.01	#NULL!	0.01	0.12	0.00	0.74	0.40
2007/08	0.00	0.20	0.02	#NULL!	0.01	0.12	0.00	0.74	0.36
2008/09	0.00	0.33	0.00	0.00	0.01	0.18	0.00	0.69	0.46
2009/10	0.00	0.30	0.00	0.00	0.01	0.18	0.00	1.00	0.69
Total sum	.33	1.95	.26	.54	.08	2.75	1.01	7.23	3.53

Source: Ethiopian Revenue and Custom Authority (2011) and Ethiopian Ministry of Finance and Economic Development