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ENVIRONMENTAL POLICIES AND FISCAL INSTRUMENTS IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT: AN ANALYSIS OF ENVIRONMENTAL TAXES

SÜRDÜRÜLEBİLİR KALKINMA ÇERÇEVESİNDE ÇEVRE POLİTİKALARI VE MALİ ARAÇLAR: ÇEVRE VERGİLERİ ÜZERİNE BİR İNCELEME

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Abstract
Environmental problems that have largest externalities among global commodities and that cause damages affecting future generations, exceed the limits to be solved by market solutions or countries' own efforts. Prevention or reduction of the negative effects and damages of such externalities is only possible with the solutions and measures including global business associations, international agreements, cooperation and universal approaches. In this context, environmental policies are crucial in terms of achieving sustainable development and providing concrete environmental improvements. Environmental problems and factors such as trying to realize sustainable development within these problems have exacerbated the need for regulatory effects of environmental taxes. Environmental taxes are one of the most important fiscal policy instrument used in internalizing "negative externalities".
In the study, environmental policies and applied financial instruments are addressed in the framework of sustainable development; environmental taxes are examined conceptually and in terms of scope; and environmental taxes are evaluated comparatively for both developed countries and Turkey.
Keywords: Sustainable Development, Environmental Policies, Environmental Taxes, Environmental Fiscal Instruments.

Öz
Küresel mallar içinde dışsallıkları en fazla olan ve gelecek nesilleri de etkileyebilecek zararlara yol açan çevre sorunları, piyasa çözümleri veya ülkelerin kendi çabaları ile çözümlenecek sınırı aşmaktadır. Bu nitelikteki dışsallıkların olumsuz etkilerinin ve zararlarının önlenmesi ya da azaltılması ancak küresel iş birliği, uluslararası anlaşma, dayanışma ve evrensel yaklaşımları içeren çözümler ve önlemlerle mümkün olabilmektedir. Bu çerçevede, sürdürülebilir kalkınmayı gerçekleştirmek ve somut çevresel iyileştirmelerin sağlanması açısından çevre politikaları önem arz etmektedir. Çevre sorunları ve sürdürülebilir kalkınmanın bu sorunlar içerisinde gerçekleştirilmeye çalışılması gibi unsurlar çevre vergilerinin düzenleyici etkilerine duyulan ihtiyacı şiddetlendirmiştir. Çevre vergileri "negatif dışsallıkların" içselleştirilmesinde kullanılan en önemli maliye politikası araçlarından birisidir.
Çalışmada sürdürülebilir kalkınma çerçevesinde çevre politikaları ve uygulanan mali araçlara değinilmekte, çevre vergileri kavramsal ve kapsam olarak incelenmekte ve hem gelişmiş ülkeler hem de Türkiye açısından çevre vergileri karşılaştırılarak değerlendirilmektedir.

Anahtar Kelimeler: Sürdürülebilir Kalkınma, Çevre Politikaları, Çevre Vergileri, Çevresel Mali Araçlar.

GENİŞLETİLMİŞ ÖZET

Sürdürülebilir kalkınma anlayışı, çevreye duyarlılık ve ekonomik büyüme paradoksunun tezlerini bir sentez haline getirmiştir. Sürdürülebilir kalkınmanın ekonomik kalkınmada bir araç olabileceği ve çevreye karşı duyarlı üretim politikaları yaparak da kalkınmanın mümkün olduğu ve bu ikilinin birbirini tamamlaması gerektiği bu anlayışın temelini oluşturmaktadır.

Sürdürülebilir kalkınma çerçevesinde uygulanacak çevre politikalarının önemi büyüktür. Çevre politikası geniş anlamıyla çevre sorunlarının çözümü için geleceğe yönelik olarak alınması gereken tedbirlerin ve benimsenen ilkelerin bütününü oluşturur. Türkiye, çevre politikaları açısından anayasada, ilgili yasalarda ve kalkınma planlarında çevre ile ilgili düzenlemelere yer vermiş ve çevre ile ilgili birçok uluslararası sözleşmeye taraf olmuştur.

Sürdürülebilir kalkınma amacına ulaşmada büyük önem taşıyan mali araçlar, ekonomik aktörlerin önündeki alternatif davranış seçeneklerinin maliyet ve faydalarını etkileyerek onları çevre lehine davranışta bulunmaya yönelten araçlardır. Mali araçların başında çevre vergileri (düzenleyici vergiler) gelmektedir. Çevre vergileri "negatif dışsallıkların" içselleştirilmesinde kullanılan en önemli maliye politikası araçlarından birisidir. Çalışmada, çevresel mali araçlar olarak; çevre vergileri, sübvansiyonlar, harçlar, kirlilik izni ve doğrudan kontrollere yer verilmiştir. Çalışma konusu gereği, bu araçlardan çevre vergileri ayrıntılı olarak incelenmiştir.

Bu çalışma, sürdürülebilir kalkınma çerçevesinde çevre politikalarının ve uygulanan mali araçların incelenmesini, söz konusu mali araçlar içerisinde önemli bir yeri olan çevre vergilerinin kavramsal ve kapsam olarak araştırılmasını ve çevre vergilerinin hem gelişmiş ülkeler hem de Türkiye açısından karşılaştırılarak değerlendirilmesini amaçlamaktadır.

Bu kapsamda, çalışmanın ilk aşamasında konu ile ilgili literatür taraması yapılarak sürdürülebilir kalkınma kavramı üzerinde durulmuş, kalkınma-çevre etkileşim sürecinden bahsedilmiş, Türkiye'deki çevre politikalarına değinilmiştir. Daha sonra çevre politikasının mali araçları içerisinde önemli bir yeri olan çevre vergilerinin gelişimi hem AB ülkeleri hem de Türkiye açısından incelenmiştir. Çevre vergileri; enerji, katı atık, ulaştırma-motorlu taşıtlar vergileri ile diğer vergiler ve harçlar şeklinde ele alınarak değerlendirilmiştir. Sonuç kısmında ise, özellikle Türkiye'deki çevre vergileri ile ilgili değerlendirmeler yapılarak önerilerde bulunulmuştur.

Sonuç ve Değerlendirme: Günümüzde çevresel sorunlar, bu alanda çeşitli önlemlerin alınmasını zorunlu hale getirmiş, sürdürülebilir kalkınma anlayışına uygun çevre-ekonomi entegrasyonuna öncelik ve önem veren politikalar geliştirilmiştir. Uluslararası zirve ve protokollerde konunun önemi ele alınmış ve Türkiye de bu alanda çeşitli düzenlemeler ve uygulamalar gerçekleştirmiştir. Küresel mallar içinde dışsallıkları en fazla olan ve gelecek nesilleri de etkileyebilecek zararlara yol açan çevre sorunları, piyasa çözümleri veya ülkelerin kendi çabaları ile çözümlenecek sınırı aşmaktadır. Dolayısıyla, çevre sorunları ve sürdürülebilir kalkınmanın bu sorunlar içerisinde gerçekleştirilmeye çalışılması gibi unsurlar çevre vergilerinin düzenleyici etkilerine duyulan ihtiyacı şiddetlendirmiştir.

Çevre vergilerinin en olumlu tarafı, karlar ya da ücretler üzerinden değil, zararlı atıklar ya da kullanılan enerji ürünleri üzerinden alınmasıdır. Dolayısıyla mevcut vergilere göre mükellefler tarafından benimsenmeleri ve uygulanmaları çok daha kolaydır. Çevreye zarar verenin bunun maliyetine katlanması, yani maliyetin "kirletene ödettirilmesi" de adalet ve etkinlik ilkelerine oldukça uygundur.

Ülkemizde uygulanan başlıca çevre ile ilgili vergiler Eurostat istatistiklerindeki gruplandırmaya uygun olarak değerlendirildiğinde; enerji vergileri (akaryakıt) ve ulaştırma vergilerinin (motorlu taşıtlar) ağırlığının yüksek bir seviyede olduğu görülmektedir. Türkiye'de çevre alanında en önemli gelirler çevresel vergilerden sağlanmaktadır. Türkiye'de çevre ile ilgili vergiler; çevre temizlik vergisi, motorlu taşıtlar vergisi, akaryakıt tüketim vergisi, taşıt alım vergisi, özel tüketim vergisi (ÖTV), katma değer vergisi (KDV) ve harçlar üzerinden alınmaktadır.

Yapılan değerlendirmeler ışığında, 2016 yılında OECD-Avrupa'da çevre vergilerinin GSYH'ya oranının ortalama %2,5 olduğu görülmektedir. Türkiye'de ise bu oran %3'ün üzerindedir. Çevre vergilerinin toplam vergi gelirleri içerisindeki payı ise OECD-Avrupa'da ortalama %6-7 aralığında iken, Türkiye %13,23 oranıyla toplam vergi gelirleri içerisinde çevre vergilerine en yüksek pay ayıran ülke konumundadır. Eurostat istatistiklerine göre de durum farklı değildir. Türkiye, AB ülkeleri ile karşılaştırıldığında çevre vergilerinin GSYH'ya oranının yüksek olduğu bir ülkedir. Toplam çevresel vergi gelirleri içerisinde özellikle enerji vergileri alanında da Türkiye birçok AB üyesi ülkenin önünde yer almaktadır.

Türkiye çevre politikaları kapsamında sera gazı emisyonlarının azaltılmasını öngören Birleşmiş Milletler İklim Değişikliği Çerçeve Sözleşmesine dahil olmuş ve Kyoto Protokolüne taraf olma prosedürünü başlatmıştır. Türkiye'de çevre konusunda birçok alanda çevre kirliliğini önlemeye yönelik düzenlemeler yapılmış ve teşvikler getirilmiştir. Bütün bunlar çevre kirliliğinin önlenmesi için atılan önemli adımlardır. Ancak benzer gelişme vergi politikası alanında çok etkin olarak gözlenmemiştir. Bu alandaki vergilerin çoğunlukla çevreyi koruma amacına değil de, gelir sağlama amacına hizmet ettiği görülmektedir. AB ve OECD ülkelerinde vergilerin "yeşil" hale getirilmesi, mevcut vergilerin çevre ile uyumlu hale getirilerek yeniden düzenlenmesiyle ve kirlilik yaratan faaliyetlerin diğerlerinden daha ağır vergilendirilmesiyle gerçekleştirilmektedir. Dolayısıyla kapsamlı bir yeşil vergi reformunun gerçekleştirilmesi önem arz etmektedir. Yapılacak yeşil vergi reformu sayesinde bir taraftan çevrenin korunması için gereksinim duyulan fonlara kaynak sağlanması, diğer taraftan da emeğin vergi yükünün düşürülerek kaynak dağılımında etkinliğe ulaşılması mümkün olabilecektir.

Türk vergi sisteminde çevresel amaçlara önem veren, çevre kirlenmesinin önlenmesine hizmet eden, sadece çevrenin değil, doğal kaynakların korunması, bunların aşırı tüketiminin engellenmesi, madde ve malzemenin geri kazanımı ve yeniden kullanımını sağlayan vergi veya mali bir mekanizma ya da teşvik uygulaması gibi yeni düzenlemelere ihtiyaç bulunmaktadır. Türkiye'de çevre sorunları ile mücadelede uygulanan politikaların beklenen kapsamda ve etkinlikte gelişmesi için çevre bilincinin geliştirilmesi de önem arz etmektedir.

INTRODUCTION

Besides population growth, rapid urbanization and industrialization have caused significant social, environmental, cultural and economic changes. All these changes have brought environmental problems along. By concentrating on rapid economic growth together with industrialization and globalisation, countries have ignored the environmental costs of these changes.

Following the increase in the importance of environmental problems, countries started to develop various policies on the subject. Therefore sustainable development emerged as a basic economic concept. It has come to the fore that sustainable development may be a medium for economic development and development is also possible with environment friendly production policies and these two should complement each other. With the central and local practices, it is aimed to provide development without damaging natural resources and in order to achieve these some economic and fiscal policies were recommended. Collecting and applying various environmental taxes take place on the top of these policies.

Environmental tax is one of the most important fiscal policy instruments for the internalisation of "negative externalities". Environmental taxes have increased the significance of the use of fiscal instruments in the context of environmental policies in many European countries. By means of environmental taxes, the funds that are needed for the prevention of environment would be provided on the one hand, and on the other hand, effectiveness in the resource allocation would be ensured by decreasing the tax incidence on labour.

In the study the concept of sustainable development is elaborated, the interaction process between development and environment is mentioned and the environmental policies are discussed. Thereafter, the development of environmental taxes that has a crucial place in the fiscal instruments of environmental policies are examined for both the EU and Turkey. In this context, environmental taxes are assessed in relation with taxes of energy, solid waste, transportation-motor vehicle and other taxes, and fees. In the conclusion, particular attention is given to the environmental policies in Turkey and following related assessments some policy recommendations are made.

1. ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

In the late 1970s, sustainable development and its environmental connection turned into one of the important subjects elaborated at the international level. The first comprehensive warning about the need that reciprocal dependence of economic and natural environment should be tackled in development policies was given in 1972 in the "Limits to Growth" report of the Club of Rome. The United Nations Conference on the Human Environment held in same year brought two basic elements of sustainable development, namely "anthropocentrism" and "the protection of the sources of future generations", in the context of "eco development" that featured the balance between ecology and development (Dulupçu, 2001: 46-70; Keleş, 2006: 693-694). The concept of sustainable development was first used officially in the report titled "Our Common Future" (also known as Brundtland Report) published by the World Commission on Environment and Development (WCED) in 1987 that was presided by the Prime Minister of Norway, Brundtland[1] (Bal, 2012: 8; Aksu, 2011: 29; Keleş ve Hamamcı, 2005:169). However the transformation of sustainable development into a global active policy became possible only after the Rio Summit in 1992 (Dulupçu, 2001: 46-70). Agenda 21, that is one of the most important outputs of United Nations Conference on Environment and Development held in Rio in 1992, has loaded local governments, non-governmental organisations and other partners with a charge of more active functions

[1] With the "Our Common Future" Report (Brundtland Report) that is published in 1987, UN World Commission on Environment and Development presented the economy as a perception that is integrated with the environment and proposed that there is a reciprocal dependency and interaction between economy and environment. According to the report, the sustainability of the development depends on the acceptance of the thought that environment is the source and frontier of economic development (Pearce et al., 1993: 19).

in the fields of planning, decision making and application in the context of environmental protection and development. (Kızılboğa and Batal, 2012: 202-203; Gündüz and Agun, 2013: 66; Aksu, 2011: 11; Altınöz, 2015: 226; Keleş, 2006:698-699). Together with the Kyoto Protocol the framework of the fight against global warming and climate change was established and national policies to be applied by developed countries in order to diminish greenhouse gas were determined. In the UN Millennium Summit held in 2000, the Millennium Development Goals were established under the leadership of the UN. In 2002, World Summit on Sustainable Development was realised in Johannesburg in order to establish more efficient sustainable development strategies for the application of the decisions of the Rio Conference (UN, 1992a, Aksu, 2011: 7; Turner, 2008; Güçlü, 2007: 78-116; Sencar, 2007: 100-105; Tarlabaşı, 2007).

The understanding of sustainable development synthesized the prevailing ideas of 1970s that are environmental consciousness and economic growth paradox discourse. It is proposed that sustainable development may be medium of economic development and production policies that are sensitive to the environment can be developed, and these two should complement each other (European Parliament, 2001; Keleş ve Hamamcı, 2005:168). Sustainable development is defined as "*to meet the needs of the present without compromising the ability of future generations to meet their own needs"* (UN, 1987). The definition contains a sense of fairness between people living today and the next generations and explains the development of current sources by preserving them (Altınöz, 2015:225-226). Being more in and respectful to community life, increasing the quality of life, preserving the species in the world, minimizing the non-renewable resources, preserving the global carrying capacity, altering personal behaviours and habits and reinforcing global alliance take place are among the basic elements of sustainable development (Adams and Thomas, 1993: 596; Uçak and Usupbeyli, 2013: 494). While sustainable development approach prescribes long term and intergenerational social and ecological benefits instead of short term economic benefits, it also aims a development process that pursues ecological balance (Uçak and Usupbeyli, 2013: 494; Dulupçu, 2001: 52).

Environment that has the characteristic of global public good provides that "poverty" is one of the most important problems of the century. Because of poverty people become less environment-friendly and primary aim is perceived as economic growth. It is obvious that the shackles of the vicious circle between "relinquishing production in order not to damage the environment" and "developing in any case and ignoring the damage to the environment for the sake of development" should be resolved and it should be understood that an environment-friendly development is possible. Hence, environmental policies that would be applied in the context of sustainable development are quite crucial (Acar, 2006: 222; Toprak, 2006: 150).

2. ENVIRONMENTAL POLICIES: THE EVALUATION OF ENVIRONMENTAL POLICIES IN TURKEY

In general terms environmental policies are defined as the determination of preferences and targets of a country in terms of environment. The environmental policy makes up the prudential measures to be taken and the principles to be employed for the resolution of environmental problems (Durmaz, 2004: 3; Mutlu, 2006: 13). The principles of environmental policies could be determined as follows (Mutlu, 2006: 14-15):

• **'Polluter Pays' Principle:** It expresses that the cost of the precautions taken for the elimination of the damages brought to the environment should be borne by the polluter. The principle was brought up by OECD at the beginning of 1970s and has been embodied with the decisions taken in various meetings. In the context of the principle, in order to achieve efficiency it is ensured that the polluters borne the aforementioned social costs. In this way, exogenous influences could be internalised.[2]

[2] Since the beginning of 1970s when modern environmental policies rose, industrial countries have been applying the principle of "Polluter Pays". The aims of the principle whose origins dates back to the Rome Agreement are to impose restrictions to subsidies given

• **Principle of Precaution:** Compared to the economic basis of polluter pays principle, the principle of precaution is rather a legal approach. The principle aims to foresee the cases that would cause environmental problems in advance, to avoid the damages and to protect the eco-systems in the long run. Therefore by taking appropriate measures pollution should be removed. Environmental Impact Assessment (EIA) applications serve this purpose.

• **Principle of Prevention:** As one of the crucial principles among the applications of the EU in terms of environment, it necessitates interference during the emergence stage of environmental problems. The prevention principle underlines that necessary precautions should be taken before the damage arises all-out.

• **Integration Principle:** It is necessary to collaborate and facilitate coordination both on national and international scales. In the context of the principle, the collaboration of local governments, central government and the representatives of the sectors of industry, trade and tourism is needed. The international institutions that would ensure the collaboration are the EU, on the regional scale; and the public enterprises such as the UN and World Bank (WB) and to a certain extend some non-governmental organisations, on the international scale. For the application of integration principle information exchange and transparency are crucial. The principle also appears in the EU environmental policies.

In Turkey who started to encounter environmental problems in the 1970s, the Environmental Rights Regulation made with the 56th provision titled "Social and Economic Rights and Duties" of the 1982 Constitution Act is the first and most important constitutional regulation regarding the environment (Gürseler, 2008: 200; Mutlu, 2002: 215-216; Keleş ve Hamamcı, 2005:348). According to the 56th provision of the constitution, *"Everybody has the right to live in a healthy and balanced environment. The development of environment, the protection of environmental health and the prevention of the pollution of environment are the duties of the state and the citizens"*. In this context, the statement of *"In the protection of environment and the prevention of environmental pollution, some certain duties fall to the state and the citizens."* appears in the constitution (The Constitution of the Republic of Turkey, 1982).

Since the Fourth Five Year Development Plan period, development plans that draw attention to the environmental problems of the country, that indicate current situation and the precautions to be taken, and that emphasize the necessity of the assessment of these with an integrative planning perception have been prepared (Aksu, 2011: 20; Keleş ve Hamamcı, 2005:337-347; Erkan, 2004:181-185). In the Fourth Five Year Development Plan period (1979-1983) preventive and remedial character attracts attention in the environmental policies. In this period, the policies determined were tried to be applied in parallel with the laws and regulations enacted and the international treaties that were accepted as a party. In this plan period, Prime Ministry Undersecretariat for Environment was established; the "Environment Law" (No. 2872, dated 1983) was enacted in 1983 in order to preserve the environment in accordance with the sustainable development principle. In the Law, some provisions such as the protection, improvement of the environment and the prevention of pollution are everyone's responsibility, the participation principle in the formation of environmental policies, rights to information and application, sustainable development principle, principle of prevention, polluter pays principle, absolute liability principle, market based mechanisms and environmental education take part (Environment Law No. 2872 dated 1983; Yüksek, 2010: 75-76; Aksu, 2011: 20-21).

For the assurance of sustainable development in Turkey, besides economic and social policies, in order to develop strategies regarding the environment, to determine the priorities of environmental investment decisions, to form a cooperation among related institutions and to provide data for environmental investment programs to be supported by international institutions the "National

for environmental protection and to make those whose activities cause pollution pay the related cost (For further information please refer to Ekins, 1999).

Environmental Strategy and Action Plan" (NEAP) was prepared (Yoğurtçuoğlu, 1999: 1-8). In the preparation period of NEAP, it was aimed to enhance life quality, to improve environmental consciousness and sensitiveness, to enhance environmental management, to ensure sustainable economic, social and cultural development (Kayapınar, 2006). Although the plan is still at the implementation phase, it is thought that NEAP would constitute a basis for the enabling of sustainable development in Turkey (Aksu, 2011: 20-21).

Besides, regarding the application of "Convention for the Protection of the Mediterranean Sea against Pollution" (Barcelona Convention) and its attachments in Turkey, a study titled "Mediterranean Action Plan" have been carried on by Mediterranean countries and European Community since 1975. The plan in which environmental problems in the Mediterranean have been tackled integrally and that was accepted in order to provide regional cooperation, has turned into a plan that aims to provide sustainable development in the Mediterranean (instead of being a plan that only offers precautions against marine pollution) following the Rio Conference held in 1992. After becoming a party to Barcelona Convention and protocols Turkey has formed the Environmental Protection Agency for Special Areas and announced Specially Protected Environment Areas. Following the Stockholm Environment Conference held in 1972, the Convention on the "Conservation of European Wildlife and Natural Habitats" (Bern Convention) was signed in 1979. In 1984 Turkey became a party to the convention. Another convention that Turkey became a party is the "Convention on Wetlands of International Importance especially as Waterfowl Habitat" (Ramsar Convention) that came into force in 1975 (Yüksek, 2010: 117-122; Aksu, 2011: 20-21; Kaya, 2011: 448-449). In 1997 the "Kyoto Protocol" was signed by the participant governments of UN Framework Convention on Climate Change.[3] This protocol has been the broadest cooperation protocol signed ever[4] (The Ministry of Environment and Urbanisation, 2018).

While countries determine sustainable development strategies on the national scale in accordance with their liabilities and needs on the international scale; on the local scale, the "Local Agenda 21" constitutes the basis for strategies and plans in the field of environment (Shearlock et. al., 2000). The Primarily Local Agenda 21, with the preparation and application of a strategic plan for the long term solution of the problems of local sustainable development, is a participatory and multi-sectoral process that aims to achieve the desired goals (The Ministry of Foreign Affairs, 2018a). Here, the basic element is that the problems that were generated with the environmental policies in the framework of sustainable development and the solution proposals are based to a great extent on the activities, and participation and cooperation have determining roles on the local scale. At this point where the concept of "Local Agenda 21" emerges, it is decided to determine the problems of provinces by local governments with the participation of non-governmental organisations and other partners, and to constitute the "21st Century Local Agenda" for their own cities (Yıldırım and Öner, 2003: 14). Local Agenda 21 becomes prominent in terms of the formation of urban environmental policies in the context of sustainable development; and refers to the subjects such as water and waste water management, air pollution, energy management and waste management (UN, 1992b).

The Local Agenda 21 applications in Turkey gained momentum at the end of 1997 with the project of "The Promotion and Development of Local Agenda 21 in Turkey" in coordination with International Union for Local Authorities (IULA-EMME) (The Ministry of Foreign Affairs, 2018a). Besides, the works within the scope of "Localization of UN Millennium Development Goals in Turkey via the Governance Networks of LA-21's" were completed at the end of 2009. Following the local elections in March 2009, it was aimed to support the City Councils that attained legal foundation with Municipal Law No. 5393 and at the final stage, to maintain the Local Agenda 21 processes that target the localisation of sustainable development at the basis of democratic local governance within the body of City Councils (Yıldırım and

[3] For major environmental treaties that Turkey accede to please refer to The Ministry of Foreign Affairs (2018b).
[4] For further information please refer to. UN (2018).

Öner, 2003: 7). The functions of city councils were defined with the 76th article of the Law of Municipality as follows: "The city council works for the development of city vision and citizenship consciousness, for the prevention of the rights and law of city, actualization of the principles of sustainable development, environmental consciousness, social cooperation and solidarity, transparency, accountability, participation and decentralisation." (Municipality Law No. 5393, 2005). Those people in the city councils coming from various disciplines work through for the formation of local sustainable development actions plans (Aksu, 2011: 24-25).

When examined in terms of institutional framework, central government in Turkey is responsible for the formation of administrative framework for the formation and application of environmental policies. At this point, the Ministry of Environment and Urbanisation, and Presidential Department of Strategy and Budget play crucial roles. Presidential Department of Strategy and Budget is the institution which controls and approves the investments of all the related institutions and organizations about the application of aims determined in five year development plans that are accepted as the basic strategic action plan of the state. In principle, the institution that ensures the coordination about environment in Turkey is the Ministry of Environment and Urbanisation. Besides the Ministry of Environment and Urbanisation, the Ministry of Agriculture and Forestry, the Ministry of Health, the Ministry of Industry and Technology, the Ministry of Energy and Natural Resources and the Ministry of Culture and Tourism have environmental responsibilities, as they are implementing institutions. Besides these, those specialised institutions such as the General Directorate for State Hydraulic Works, Provincial Bank, South Eastern Anatolia Project Regional Development Administration also have roles at the implementation of environmental policies. Locally, particularly municipalities are responsible for the implementation of environmental policies.

3. FISCAL INSTRUMENTS OF ENVIRONMENTAL POLICIES: THE REVIEW OF ENVIRONMENTAL TAX

In practice, due to the uncertainty in proprietary rights and as environmental goods and services are generally unpriced, it is seen that market prices do not implicitly reflect the effects of the goods and services produced on public wealth. This, in turn causes externalities that can be defined as costs or benefits that are not measured with market prices (Onshus and Skeie, 2008: 8; Keleş and Hamamcı, 2005:159). By creating a differentiation between personal and social economic benefits, this kind of external effects may cause high environmental costs for the society (Commission of the European Communities, 2000: 3-4; Repetto et al., 1992: 7-8). Laying the costs on society creates an increase in tax incidence and it is not a solicited status among taxpayers. One of the most important precautions for preventing this is the internalisation of externalities by laying the costs and benefits to those who causes them (Speck, 2007: 36-37).

Unlike public goods having externalities, private goods and services produced and consumed in the market external economies arises. Marshall who revealed the concept of externality for the first time referred to external economies in addition to internal economies when explaining the economic growth and per capita productivity increase in industrialised countries, notable England, and used the concept in order to explain increasing returns when examining the cost increases of firms in the industry (Sönmez, 1987:123). A. C. Pigou approached the concept of external economies that was revealed by Marshall differently and examined it in the context of welfare economics. Although Marshall mentioned the positive sides of externalities, Pigou has extended the concept as (positive) external economies and negative diseconomies and due to these concepts has given the details of the fact that the marginal social benefit that arises from an economic activity may differ from marginal private benefit (Nath, 1973:44).

Externalities may be defined as the positive or negative influences that arose as a result of economic activities of some producers or consumers in the functioning of market economy and has effects on other producers or consumers (Çelebi, 2003:50; Bilici and Bilici, 2013: 246; Akdoğan, 2011: 54-57). Externalities

are one of the reasons of market imperfection that inhibits the accession to social welfare. In perfect competition markets having no externality, on the point where private cost is equal to private benefit the general optimality is attained. In the existence of externalities, social optimality cannot be attained. External economies inhibits the actualization of social optimality in a competitive market by causing an inequality between marginal social benefit and marginal social cost. Besides market solutions in order to avoid externalities Pigou has revealed the need for public solutions (Çelebi, 2003:65-67).

Private solutions consist of propositions that the external costs are induced rather in the market should be internalised through the market itself. One of them is Coase Theorem. According to Coase, externalities should be solved with negotiations between the responsible of the externality and those who are effected and hence the need for public intervention disappears (Coase, 1960: 1-44). Another approach that asserts that externalities could be internalised in the market mechanism is the Hicks-Kaldor Criterion. Hicks-Kaldor Criterion has the characteristics of the extension of Pareto criteria and in order to enlarge the application areas of the Pareto criterion and in order to abolish uncertainty it forms a compensation principle without a public intervention. Accordingly, in case of a transition from a balance of Pareto optimum to another balance, if the gains of those positively affected is greater than the loss of those who are affected negatively then it means the change increases social welfare. In this way, as long as the losses of losers are compensated with the gains of those having gains (without public intervention) Pareto optimum[5] could be attained (Sönmez, 1987:86; Kargı and Yüksel, 2010: 198). Another proposition is that private property rights should be protected. One of the reasons of externalities is related not to use of private property right on some goods and services (Bator, 1958: 351-379). Further, property rights should be extended in order to encompass environmental issues (Mishan, 1969).

In case of an imbalance between marginal social benefit and marginal social cost due to externality Pigou proposes public solutions in order to attain social welfare. If marginal social benefit is greater than marginal social cost the government should apply subsidy; is marginal social cost is greater than marginal social benefit the government should apply tax.

In order to attain socially optimum production levels of those goods and services having external benefits besides their internal benefits, the government should give subsidy to the producer of those goods and services. The tax reductions made for this reason is also a kind of subsidy. In this way together with the private benefit external benefits are also produced. For those goods and services having external cost the conditions differ. Environmental pollution is the most striking case in terms of external costs. As those polluting the environment bear only the cost of marginal internal costs, the production and consumption levels of the relevant good is more than the socially efficient production level. According to the sustainable development approach, the over production and consumption should be draw back to acceptable levels. As external costs cannot be eliminated completely, the purpose of normative public solutions is to draw external costs to an optimum level. At the optimum pollution level, the marginal benefit of decreasing pollution is equal to the marginal cost of it. In order to draw pollution to optimum level the instruments to be used by the government can be divided into two categories. These are the instruments based upon price mechanism and quantity restriction. Neoclassical economists suggest the use of instruments based on price mechanism particularly such as Pigouvian taxes (regulatory taxes) (Çelebi, 2003:69-72).

Economic tools which are quite important in attaining the goal of sustainable development are defined as the tools that direct economic actors to behave in favour of environment by affecting the costs and benefits of the alternative behaviour choices in front of economic actors. The development of these tools can be ensured with the addition of information into the decision process and with the establishment of environmental data system (Dündar, 1997: 186) as the decisions of people and firms on

[5] Pareto optimum could be defined as the case in which the welfare of an individual cannot be increased without decreasing the welfare of other individuals.

subjects such as production, consumption and transportation play roles in the actualization of sustainable development. Economic tools that are effective in this context direct related people through the prices and other information in the market to make choices that take environmental costs of the goods and services in the production and consumption into account and hence act environment-friendly. In order to realise the use and allocation of environmental resources efficiently economic tools aim to determine proper prices of these resources by avoiding externalities (OECD, 1991: 10).

It is necessary to take precautions that would decrease difference between personal benefit and social benefit by effecting the costs and benefits attained by the actors in the society directly or indirectly. The most important ones of these precautions are enacting laws that regulate the goods and production technology and using the economic tools (among which taxes appear) that ensure the pricing of environmental goods and services by defining proprietary rights better (Acar, 2006: 224; Keleş and Hamamcı, 2005:161-162).

In general, in the choice of environmental policy tools; criterion such as environmental efficiency, economic efficiency, fairness (equality), administrative feasibility, cost and honouring play crucial roles. Hence economic tools embody some advantages such as decreasing costs to a large extent, fostering the decrease of pollution, increasing elasticity, ensuring the environmental efficiency and creating financial resources (OECD, 1991: 12-18).

The types of economic tools can be stated as environmental taxes and fees, sellable permissions, deposit-repayment systems, incentives/subsidies, environmental label application and other applications that contain environmental treaties (Acar, 2006: 225-226; Keleş ve Hamamcı, 2005:161). In the study, environmental taxes, subsidies, fees, pollution permits and direct controls are given place as environmental economic instruments. In the context of the subject of the study, among others, environmental taxes are examined in detail.

3.1. Environmental Taxes and Application of Environmental Taxes in Turkey

3.1.1. Environmental Taxes

Environmental taxes (regulatory taxes) are the most important elements of financial tools. In the solution of environmental problems that reach to a certain dimension and the cost of which is quite high even with the current technology, the role and importance of environmental taxes are quite high (Tol, 2008: 55; Agnolucci, 2009: 3043).

Environmental taxes express the total of some levies and charges that are collected from the environment related tax assessment more or less "in return" for "compulsory" and "uncovered" the payments and the services offered (OECD, 2016:2). OECD and EUROSTAT assesses all the taxes collected from a physical unit or from its segments that create negative effects on the environment as environmental taxes. Accordingly, all the economic activities that are related to environment such as transportation means and services, air and water emissions, ozone damaging substances, resources of water pollution, waste management, noise pollution, water, land, soil, forest and wildlife, fish stocks are all included in environmental tax assessment (OECD, 2016; EUROSTAT, 2013). Moreover EUROSTAT also inserts the resource taxes collected from the economic rent due to natural resource mined into the environmental tax group. The fiscal value added tax collected in order to decrease the supply of environmentally hazardous substances or the value added tax collected from fossil fuels are included in the environmental tax definition of EUROSTAT. Thus, the rate of some value added taxes are determined in order to affect the environmental behaviours. For instance, the value added tax levied on motor vehicles in Austria and Spain are higher than the ones on other goods (Bruvoll, 2009: 3, 9-10).

Environmental taxes have drawn more attention particularly after the beginning of 1980s when market economy started to get strength. Contrary to the environmental policies in the 1970s, together with

the 1980s, it has started to be thought that the cost of using taxes instead of traditional "command and control" systems in the regulation of environment would diminish the costs; thanks to the polluter pays principle the progressive taxation would be ensured and the environmental costs would be internalised in the price of the related good. Not only in Europe, also in rapidly industrializing Asian countries such as Taiwan, Korea, Malaysia, Thailand, Singapore, the attention to environmental taxes has increased and with the traditional "command and control tools" (such as technological and ecological precautions) environmental taxes have also been utilised frequently. In the beginning of the 1990s the recession that caused unemployment in the public sector of all Europe has caused the attention to the environmental taxes to increase (Ekins, 1999: 39-41; Speck, 2007: 25). Notably Scandinavian countries and European countries such as Holland, England, Germany have increased environmental taxes in order to decrease tax incidence and hence without a change in total tax incidence the tax has started to be moved towards to the activities hazardous to the environment (from good ones to bas ones) (Çelikkaya, 2011). The environmental tax reforms have shifted the tax incidence from labour and enterprises that affect economy negatively and decrease efficiency, to the pollution and natural resource usage. The aim here is to promote the decrease of the activities that are hazardous to the environment and to shift the tax incidence from good to bad. In other words the environmental tax reform aims to attain both environmental and economic benefits (Ekins et al., 2010: 1561).

Environmental tax is the most appropriate medium of the implementation of "polluter pays" principle. At the same time, the basic reality behind this principle, which is one of the elements of EU environmental policies, is the internalisation of environmental costs (Speck, 2007: 36-37). Environmental taxes may be used as a tool in the regulation of market failures (Hanson and Sandalow, 2006: 3-4). No doubt, polluters cause damages that are not reflected in market price. These damages that are also known as externalities or external costs are not born by the polluter but instead by the whole society. The most widely accepted way of internalisation of such external costs is to use environmental taxes (Pigouvian taxes). As environmental resources (such as air and water) are public goods their costs are distributed among all the users. If incentive policies for the protection of environment are not utilised, it would not be easy to lay such costs and activities to the polluters. The taxation of the activities that are hazardous to the environment would both cause divergence from such activities with an increase in price and promote the emergence of new production, transportation, sheltering, energy usage and consumption habits (Ekins, 1999: 41; EUROSTAT, 2016: 199; Sollund, 2007: 1).

The idea of the taxation of goods that cause externalities was first suggested by A. C. Pigou (Chan, 2007: 116). According to Pigou (1952) in an imperfectly competitive industry, a greater marginal net social revenue than marginal net private revenue means that the output is less than the ideal level. On the contrary, if the level of the marginal net social revenue is less than the level of marginal net private revenue, it means that output is more than the ideal level. Therefore, under imperfect competition, the case of a greater marginal net social revenue than the private revenue should be accompanied with a certain level of subsidy (bounty) for each industry; the case of a less marginal net social revenue than the private revenue should be accompanied with a certain level of tax for each industry. Hence, the government by changing the output in order to equalise both marginal values (in other words, by having optimal effect) increases economic welfare (Pigou, 1952: 224). Pigou emphasized that with personal property, optimum output would not be attained and as individual actions would create an extra cost on other individuals, public activities through taxes are needed in order to eliminate this cost (Tullock, 2005: 18; Pigou, 1952:223-225). Per unit rate of tax is equal to the predicted monetary value of marginal effect of negative external economies (Nath, 1973: 44). In other terms, a Pigouvian tax is a tax that is collected from each unit of output which is equal to the marginal loss of the polluter.

According to Pigouvian theory with the conditions that all the polluters would be subjected to the same ratio and for different economic actors the ratio would not be differentiated, a well-designed taxation would minimise social costs in the one hand and on the other hand it would limit polluting

behaviour (Ciocirlan and Yandle, 2003: 203-204). Pigouvian taxes (regulatory taxes) are suggested for preventing over production and for attaining socially efficient level of production in the industries causing external cost (Çelebi, 2003:72).

One of the taxes to be applied in order to avoid externality, is the collection of tax based on the quantity of waste causing externality or based on the inputs of production and/or consumer goods whose usage cause environmental damage (Plott, 1966: 84-87). The carbon dioxide tax or energy taxes preferred particularly in Northern Europe are examples of such instruments. While the monitoring of emissions is quite difficult and expensive, such a relationship, in which the determination of the tax for the relevant good is easy, is a proper choice for decreasing carbon dioxide emissions (Cuervo and Gandhi, 1998: 17).

In terms of environmental taxation, differential taxation may be relevant. Instead of creating new eco-taxes the customisation of existing taxes to environmental purposes could be accepted as a policy tool. The change of the criteria for the horse power of engines, the fuel type of the vehicle, the weight or the engine volume of the vehicle according to a certain fuel consumption ratio can be given as an example to differential taxation (Kargı and Yüksel, 2010: 195).

The early studies on Pigouvian taxes have ignored the subject of revenue. Double dividend hypothesis is a policy mechanism that allows the finance of the revenue decrease caused by a decrease in other taxes in the economy with a revenue attained with a tax collected from pollution emission (McKitrick, 1997: 417-418). According to this approach, a tax levied on carbon dioxide emission which is the root cause of greenhouse effect would decrease emission; the tax revenue attained may be used for decreasing the taxes that deteriorate efficiency and the efficiency may be attained. Thereby a low level of carbon dioxide which is an environmental target and a low level of unemployment which is an economic target are ensured simultaneously. The hypothesis is named after the simultaneous attainment of these two targets (Manresa and Sancho, 2005: 1577-1578). The "double income" hypothesis has brought a new dimension to the optimum taxation analysis in environmental issues. According to the hypothesis, an environmental tax reform that would shift the current taxes from non-polluters (the good) to polluters (the bad) would both cause the environment to develop and the malfunctions in the current tax system to disappear (Çelikkaya, 2011; Schöb; 1996: 537; Agnolucci, 2009: 3046).

Therefore, environmental taxes serve to an increase in the quality of environment with the internalisation of negative externalities on the one hand and on the other hand they would also cause an increase in the efficiency of resource distribution by decreasing tax incidence on the labour. This "double income" hypothesis is supported by the EU 6th Environmental Action Plan (Decision No: 1600/2002/EC), and the revenue from environmental taxes attained notably from Scandinavian countries and many European countries such as Holland, England, Germany is used to decrease the tax incidence (particularly income tax and social security contributions) on the labour (Çelikkaya, 2011; EEA, 2007). Thus, it shifts the tax incidence from traditional sectors such as production, employment and capital (the good) to environment related fields such as environmental pollution or natural resource usage (the bad) with EU environmental tax reforms. In short, it is possible to indicate the aims of the environmental taxes as the internalisation of negative externalities, reduction in the tax incidence on labour, and income generation (Topal, 2017).

If the inconveniencies of environmental taxes are examined, the most important inconveniency of environmental tax is that it has a "regressive" character. Many environmental taxes have the appearance of private consumption or expenditure tax and they increase the cost of some consumption goods (such as energy). This situation results negatively for the poor who spend higher portion of their disposable income to consumption goods (Çelikkaya, 2011; Sollund, 2007: 1-10). In order to eliminate this negativeness economists suggest that environmental taxes should be applied as a part of a bigger tax reform and lower tax brackets should be determined for the low income groups (Hanson and Sandalow, 2006: 1). Another inconveniency of environmental tax is the decrease in the competitiveness of domestic

industries due to unilateral application of the tax. In other words in case of a unilateral application environmental taxes may create a negative effect on competition. The last inconveniency of environmental taxes is that together with the ease of management of it, the exception and return applications would create opposite results. In contrary to the commitments made about environment in some countries, in order to support some industries the need for crucial subsidies make the application of the system difficult (Çelikkaya, 2011; Sollund, 2007: 1-10; Speck, 2007: 20).

The transformation of taxes into "green" is realised in two ways in the EU and OECD countries. The first way is the reorganisation of current taxes into environment-friendly taxes (such as the tax differentiation between leaded and non-leaded oil). The second is the taxation of pollution creating activities more heavily (source) than others.

According to Table 1, the environmental taxes to GDP ratio in OECD-Europe is 2.5% on average. The ratio with was over 3% for Finland, Italy, Latvia, Netherlands and Turkey in 2016; was around 4% for Slovenia and Denmark. The same figure is under 1.5% for Chile, Japan and New Zealand. The lowest rate belongs to the USA, 0.66%. Among OECD countries, only Mexico has a negative environmental taxes to GDP ratio for 2006-13 period due to the subsidies given in order to decrease gasoline and diesel fuel prices.

Table 1 also reveals that the rate of environmental taxes in total tax revenue in OECD-Europe differs between 6-7% on average. Turkey and Latvia have the highest figure of environmental taxes to total tax revenue, namely 13.2%, in 2015. In this context Turkey is ahead the EU countries. Turkey has the country status among OECD members that attain the highest revenue from environment related taxes. However none of these taxes is designed for environmental purposes.

Table 1. The Shares of Environmental Tax Revenues to GDP and Total Tax Revenue in the OECD Countries (1995-2016)

	% of GDP						% of Total Tax Revenue*					
Year\Country	**1995**	**2000**	**2005**	**2010**	**2015**	**2016**	**1995**	**2000**	**2005**	**2010**	**2014**	**2015**
Australia	2.61	2.41	2.17	1.86	1.82	1.78	9.23	7.93	7.23	7.30	6.94	..
Austria	2.47	2.93	3.20	2.83	2.73	2.71	6.03	6.96	7.84	6.96	6.77	6.36
Belgium	2.41	2.37	2.46	2.21	2.09	2.16	5.65	5.45	5.69	5.18	4.64	4.68
Canada	1.65	1.37	1.21	1.17	..	..	4.72	3.86	3.70	3.77	3.51	..
Chile	1.22	1.53	1.28	1.04	1.21	1.23	6.67	8.11	6.20	5.32	6.26	5.92
Czech Republic	2.76	2.33	2.74	2.45	2.14	2.15	7.96	7.18	7.97	7.55	6.75	6.46
Denmark	4.34	5.00	5.06	4.12	4.01	4.00	9.34	10.66	10.55	9.20	8.26	8.78
Estonia	0.98	1.69	2.30	2.94	2.54	2.88	2.72	5.44	7.68	8.84	8.54	7.61
Finland	2.98	3.13	3.03	2.73	2.92	3.12	6.70	6.83	7.19	6.68	6.74	6.66
France	2.45	2.36	2.25	2.10	2.20	..	5.82	5.46	5.25	5.00	4.85	4.89
Germany	2.31	2.31	2.43	2.14	1.92	1.90	6.39	6.38	7.16	6.12	5.48	5.21
Greece	2.87	2.25	2.03	2.49	..	..	10.32	6.74	6.51	7.71	8.30	..
Hungary	2.79	2.88	2.81	2.89	2.58	2.70	6.85	7.49	7.70	7.76	6.30	6.67
Iceland	3.43	3.44	3.04	2.09	1.91	1.91	11.00	9.49	7.65	6.28	5.24	5.24
Ireland	2.95	2.74	2.46	2.43	1.64	1.53	9.28	8.92	8.35	9.00	8.32	7.10
Israel	2.83	2.65	2.96	3.28	..	..	7.98	7.62	8.81	10.71	9.51	..
Italy	3.59	3.09	2.92	2.84	3.43	3.54	9.30	7.62	7.45	6.79	8.33	7.99
Japan	1.65	1.67	1.69	1.53	1.36	1.35	6.35	6.48	6.41	5.79	4.59	..
Korea	1.85	2.51	2.65	2.63	..	..	9.68	11.71	11.77	11.24	10.56	..
Latvia	0.99	2.47	2.59	3.34	3.84	3.82	3.32	8.49	9.30	11.89	13.13	13.21
Luxembourg	2.84	2.65	2.98	2.40	1.85	1.77	8.16	7.19	7.87	6.42	5.24	5.01
Mexico	0.94	1.27	0.45	-0.17	1.41	1.61	9.26	10.19	3.57	-1.23	0.91	8.83
Netherlands	3.21	3.55	3.65	3.59	3.47	3.48	8.52	9.49	10.30	9.95	9.16	9.26

Table 1 (cont.)

	% of GDP						% of Total Tax Revenue*					
New Zealand	1.71	1.37	1.39	1.33	1.40	1.34	4.77	4.16	3.86	4.38	4.24	4.39
Norway	3.41	2.84	2.75	2.47	2.21	2.27	8.52	6.79	6.45	5.89	5.53	5.79
Poland	1.67	2.01	2.38	2.11	2.02	2.02	4.43	6.11	7.23	6.77	6.36	..
Portugal	3.31	2.60	2.89	2.43	2.41	2.59	11.31	8.37	9.37	7.99	6.64	7.02
Slovak Republic	2.39	2.33	2.51	2.01	1.96	1.99	6.05	6.93	8.06	7.19	6.32	6.14
Slovenia	0.29	3.26	3.26	3.56	3.95	3.95	0.76	8.89	8.60	9.65	10.80	10.86
Spain	2.12	2.13	2.02	1.75	1.93	1.84	6.76	6.37	5.72	5.55	5.49	5.69
Sweden	2.69	2.65	2.72	2.59	2.21	2.22	5.90	5.41	5.84	6.00	5.18	5.16
Switzerland	1.58	1.76	2.03	1.69	1.55	1.56	6.22	6.44	7.65	6.40	5.98	5.68
Turkey	1.19	2.42	3.96	3.73	3.32	3.28	7.24	10.25	16.96	15.03	13.30	13.23
United Kingdom	2.49	2.68	2.27	2.50	2.45	2.43	8.49	8.24	7.04	7.71	7.77	7.59
United States	1.02	0.90	0.81	0.74	0.68	0.66	3.84	3.19	3.11	3.15	2.68	2.58
OECD-Europe	**2.55**	**2.58**	**2.63**	**2.48**	**2.47**	**2.47**	**7.22**	**7.04**	**7.38**	**7.01**	**6.87**	**6.79**
OECD-Total	**1.82**	**1.80**	**1.75**	**1.63**	**1.63**	**1.63**	**6.14**	**5.83**	**5.89**	**5.67**	**5.29**	**5.35**

***** No data available for 2016.
Source: OECD, 2018.

Environmental taxes may be classified as follows:[6]

• **Energy (Carbon) Taxes**, are collected during transportation or constant use of energy products. The most important products in the transportation are fuel and diesel fuel. Among the constantly consumed energy products are the fuel oil, natural gas, coal and electric may be sorted (Ferhatoğlu, 2003; Özdemir, 2009:24; EC, 2010: 395-396).

Carbon tax is a tax that permanently become a current issue in the environment related reform discussions and virtually applied in various countries. The aim of this tax is to control the carbon dioxide emission that is the main reason of global warming and climate change (Ekins: 1999: 45). Everyone who uses fossil fuel or electricity generated through fossil fuels causes an increase in carbon dioxide emission in the atmosphere. Rapid increase of population, economic growth and the proliferation of coal usage cause carbon dioxide emission all around the world to increase rapidly and if no precaution is taken, irreparable crucial environmental problems would be confronted. As per unit carbon dioxide amount spread due to the burning of each fossil fuel can be calculated with a reasonable error and as no more economically feasible way of eliminating carbon dioxide emission in fossil fuel usage is found, the best way of regulating the emission is thought to be that a "carbon tax" should be collected from each fuel according to the carbon amount they contain. The tax would reflect the cost of greenhouse gases spread to the atmosphere and in order to decrease the emission it would provide a fiscal support. Thus, it may be possible that for instance cars may be used less and more efficiently, more efficiently designed plants may use less coal and more natural gas, energy efficient projects may be developed and the structure of products may be changed (WRI, 2008: 1; Anderson and Lohof, 1997; Çelikkaya, 2011; Repetto et al., 1992: 54). The most important legal document regarding the reduction in carbon emission is the Kyoto Protocol. The Protocol signed in the context of United Nations Framework Convention on Climate Change (UNFCCC) obliges a deduction in six greenhouse emission into a level (to the level in 1990) that would not be harmful on the climate. Accordingly the countries listed in the attachment No. 1 of the Protocol (initially the EU countries) have to reduce their emissions between 2008 and 2012 to a level 5% less than the level in 1990 (UN,2018).

[6] In some sources, the environmental taxes applied in world countries are sorted as follows (Değirmendereli, 2000; Öz and Buyrukoğlu, 2012: 95): a) Emission Taxes, b) Product Based Taxes, c) Usage Based Taxes (Duty Fee), d) Tax Differentiation, e) Tax Advantage.

• **Pollution (Solid Waste) Taxes** can be collected from dirty water and emissions, and solid waste and noise (Ferhatoğlu, 2003; Özdemir, 2009: 24; EC, 2010: 395-396). The purpose of the pollution tax is to increase recycling and to reduce environmental waste. Thus, the coal gas emission in scrapheap, pollution spread to earth surface, noise, smell, unpleasant view and toxic pollutions due to the burning of garbage are going to be minimized (Ekins, 1999: 45). The basic problem regarding the pollution tax is the lack of fiscal incentives that would discourage households in terms of solid waste and make them choose recycling (Çelikkaya, 2011).

• **Shipping-Transportation-Motor Vehicles Taxes:** Transportation taxes are implemented to those who have and/or use motor vehicles. Transportation taxes may be collected from the import or sale of motor vehicles via one time or annual payments (Ferhatoğlu, 2003; Özdemir, 2009: 24; EC, 2010: 395-396). The congestion in highways is a crucial economic and environmental problem. In order to solve this problem during the rush hour (such as quitting times) "toll" application is emphasized for additional vehicles that participate to other vehicles. Thus, drivers are obliged to think about all the economic results when they are making decisions and in the rush hour the roads that have the characteristic of "scare good" would be allocated efficiently among the users. The economic costs of the congestion (such as waiting, accident, fuel, pollution, more cigarette, acid rains and carbon dioxide emission) would decrease and net economic saving (income) would be made. Drivers would re-plan their routes and would prefer alternative means of transport or public transportation (Çelikkaya, 2011; Repetto et al., 1992: 10, 35-36; MacKenzie et al., 1992: 26). Motor vehicle tax is not a direct environmental tax. However, many OECD member countries have started to determine the tax ratios according to the carbon dioxide emission for both motor vehicle purchases and usage (OECD, 2009: 5).

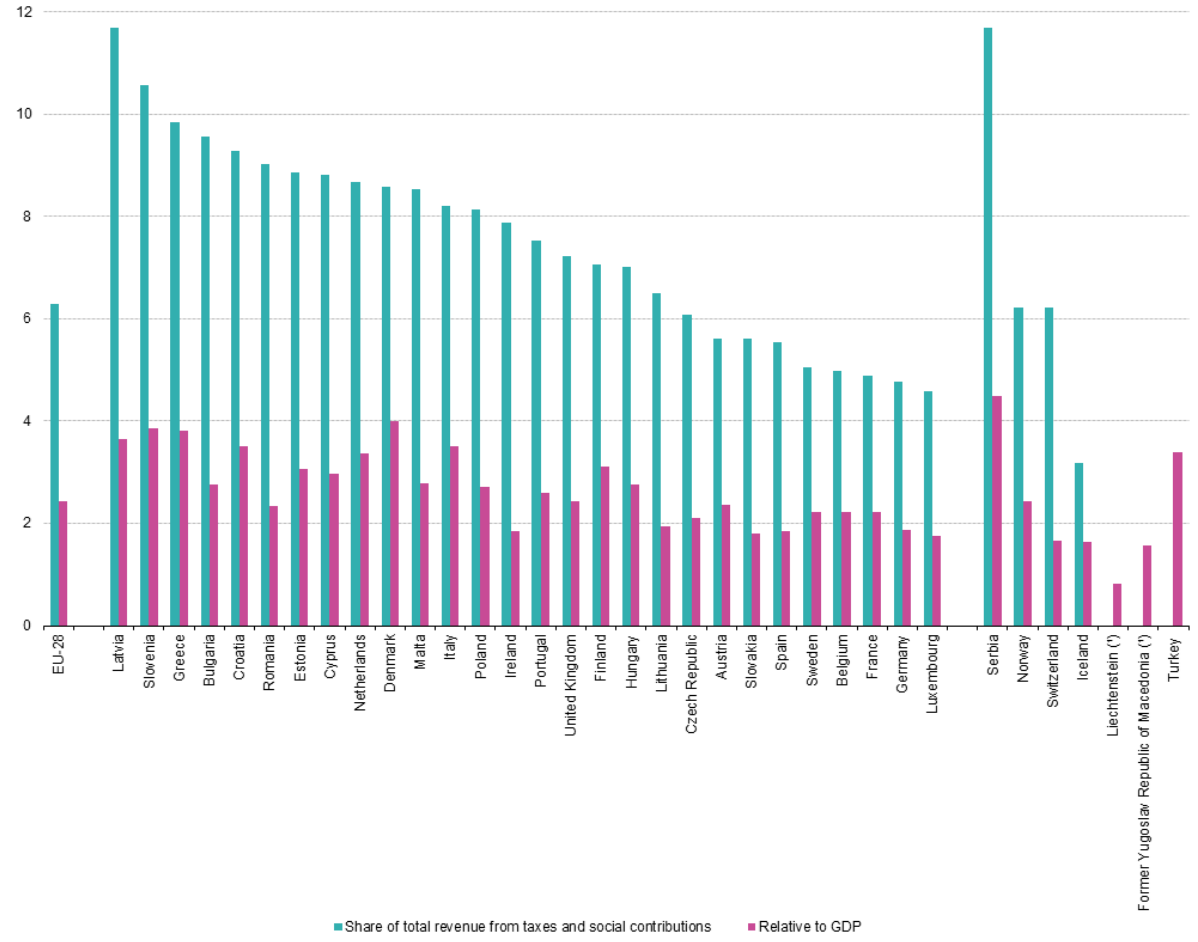
• **Natural Resource Taxes** are collected from the rental of precious mines and oil-wells. Therefore, they do not increase the prices in contrary to other environmental taxes that are levied on the prices of goods and increases the prices of goods (Ferhatoğlu, 2003; Özdemir, 2009: 24; EC, 2010: 395-396).

According to Table 2, in EU-28, energy taxes, transportation taxes and the last two categories (pollution and resources) constitute 76.9%, 19.7% and 3.4% of the total environmental taxes, respectively. The rate of total environmental taxes to GDP in EU-28 in 2016 is 2.4%. The rate of energy taxes to GDP, 1.9%, is the highest rate among other environmental tax types.

Table 2. The Development of Environmental taxes in the EU
(Total Environmental Tax Revenue by Type of Tax, EU-28, 2016)

	Million EUR	% of Total Environmental Taxes	% of GDP	% of Total Revenues from Taxes and Social Contributions
Total Environmental Taxes	364,398	100.0	2.4	6.3
Energy Taxes	280,354	76.9	1.9	4.8
Transport Taxes	71,747	19.7	0.5	1.2
Taxes on Pollution and Resources	12,297	3.4	0.1	0.2

Source: EUROSTAT, 2018.



(*) 2015 instead of 2016.

Figure 1: Total Environmental Tax Revenue, 2016 (%)
Source: EUROSTAT, 2018.

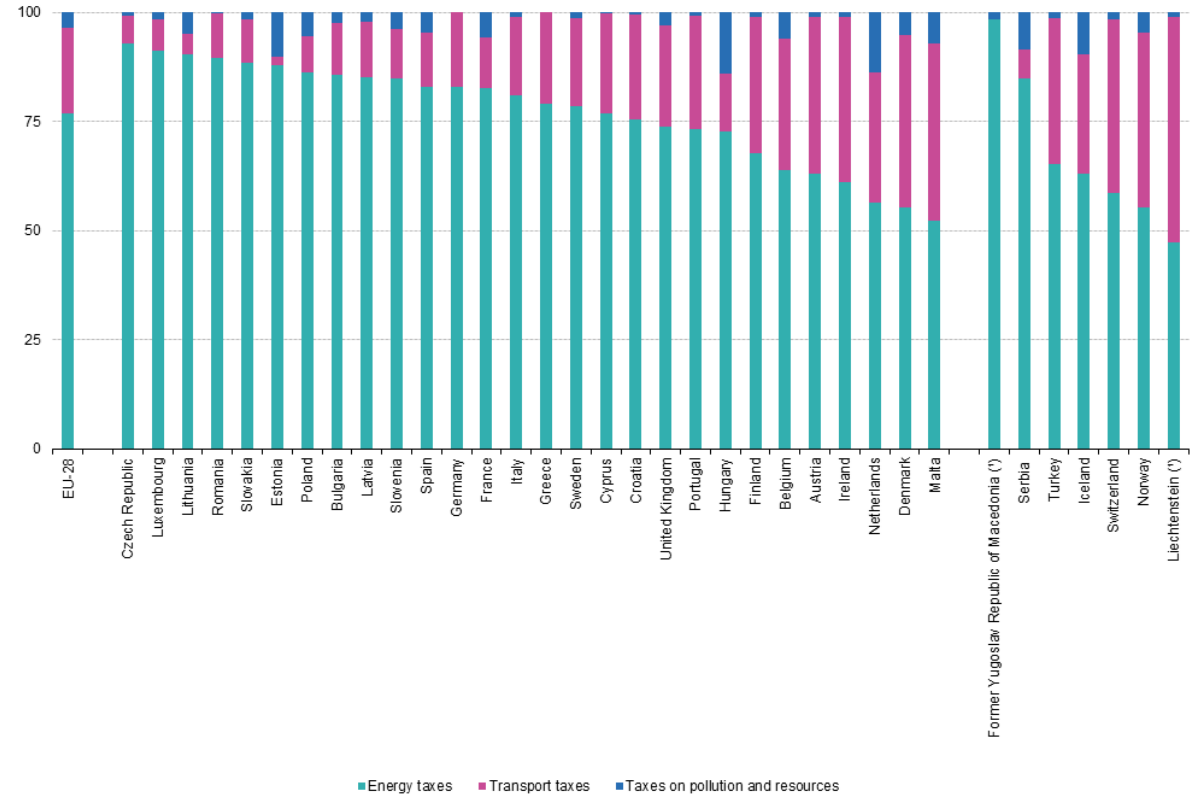
Figure 1 shows the 2016 environmental tax revenues by country both in relation to GDP and to the total government revenues from taxes and social contributions. Relative to GDP, the largest level of environmental tax revenue was recorded in 2016 in Denmark (4.0 %), followed by Slovenia (3.9 %), Greece (3.8 %), Latvia (3.7 %), Croatia and Italy (both 3.5 %).The lowest environmental tax revenue in relation to a country's GDP (below 2 %) were reported by six EU Member States (Lithuania, Germany, Spain, Ireland, Slovakia and Luxembourg).

Serbia stands out with its 2016 environmental tax revenue-to GDP ratio at 4.5 %, followed by Turkey (3.4 %). Out of the EFTA countries, Norway recorded in 2016 the largest level of the environmental tax revenue relative to GDP (2.4 %). For Switzerland and Iceland, the 2016 environmental tax revenue amounted to 1.7 % and 1.6 % of GDP.

The proportion of environmental taxes in total government revenues from taxes and social contributions also varied significantly across the EU Member States. Latvia had the largest share in the EU (at 11.7 %), slightly ahead of Slovenia (10.6 %). Four other EU Member States recorded a share of at least 9 %: Greece (9.8 %), Bulgaria (9.6 %), Croatia (9.3 %) and Romania (9.0 %).

At the opposite end of the scale, Luxembourg (4.6 %), Germany (4.8 %), France (4.9 %), Belgium (5.0 %) and Sweden (5.1 %) had the lowest shares of environmental taxes, followed by Spain (5.5 %), Slovakia and Austria (both 5.6 %).

The share of environmental taxes in total government revenues from taxes and social contributions recorded by Serbia (11.7 %) was at the same level as as for Latvia, the country with the largest share in the EU. Environmental tax revenue collected in 2016 in Norway and Switzerland accounted for 6.2 % of the total government revenues from taxes and social contributions whilst for Iceland the equivalent share was relatively low (at 3.2 %).



Note: Ranked on the share of energy taxes.
(*) 2015 instead of 2016.

Figure 2: Environmental Taxes by Tax Category, 2016
(% of Total Environmental Taxes)
Source: EUROSTAT, 2018.

Energy taxes (which include taxes on transport fuels) represented by far the highest share of overall environmental tax revenue, accounting for 76.9 % of the EU-28 total in 2016 (see Figure 2). Energy taxes were particularly prominent in the Czech Republic, Luxembourg and Lithuania, where they accounted for more than nine tenths of total environmental tax revenues. By contrast, energy taxes slightly exceeded 50 % of the revenues from environmental taxes in Malta (52.2 %) and accounted only for 55-56 % of the total in Denmark (55.4 %) and in the Netherlands (56.3 %).

The 2016 data on breakdown of the environmental tax revenue by category are available for three EFTA countries as well as for Serbia and Turkey. For EFTA countries, the share of energy tax revenue ranged from 55.2 % in Norway to 63.1 % in Iceland. For Serbia, energy taxes accounted in 2016 for 84.8 % and for Turkey 65.3 % of the total environmental tax revenue.

Transport taxes represented the second most important contribution to total environmental tax revenues, with 19.7 % of the EU-28 total in 2016. Their relative significance was considerably higher in Malta (40.8 %), Denmark (39.5 %), Ireland (37.8 %) and Austria (36.0 %). On the other hand, in some EU Member States the share of transport taxes in total revenues from environmental taxes was well below the EU average, with the lowest shares recorded in Estonia (1.9 %), Lithuania (4.5 %), the Czech Republic

(6.4 %), and in Luxembourg (7.3 %). In the non-EU countries, for which 2016 data are available, the share of transport taxes ranged from 6.6 % in Serbia to 39.8 % in Switzerland and 40.3 % in Norway.

Pollution and resource taxes represented a relatively small share (3.4 %) of total environmental tax revenues in the EU-28 in 2016. This category of environmental taxes groups a variety of taxes levied e.g. on waste, water pollution and abstraction. In many European countries such taxes were introduced more recently than energy or transport taxes. As yet, no taxes of this category have been levied in Greece and in Germany, whilst in Cyprus, Romania, Croatia, the Czech Republic, and Portugal only marginal amounts of the pollution and resource taxes were recorded. In two EU Member States, Hungary (14.0 %), and the Netherlands (13.6 %), however, pollution and resource taxes are a relatively important source of environmental tax revenue. With 9.5 % of the total environmental taxes, Iceland recorded in 2016 the highest share of pollution and resource taxes among non-EU countries for which the 2016 data are available.

3.1.2. Environmental Taxes Applied in Turkey

Turkey having vast amount of conserved natural habitats and ecosystems, face environmental pressures due to the factors such as rural-urban migration, economic development and rapid population increase (European Environment Agency, 2005: 494-495).

Turkey has made progress in almost every areas from air and water management to nature conservation, from sustainable development goals to international liabilities and as of 2016 the rate of environmental expenditures to GDP increased to 1.2% (0.9% of which is public expenditure, 0.3% is private expenditure). The largest rate of total environmental expenditure in the public sector belongs to the municipalities, 86.3% (TÜİK, 2017). However, when the tax policy is analysed, although Turkey has the largest rates among OECD member countries in terms of environmental tax revenue to GDP and to total tax revenues (for instance the highest oil taxes in the world is in Turkey), all the taxes aim "endowment", but not to protect the environment in general. After all, in terms of environment, crucial steps have been taken lately and with a change in Environment Law No. 2872 in 2006 it is stated that in order to protect the environment "economic tools" such as emission and pollution fees would be benefited (Çelikkaya, 2011; OECD, 2008: 167).

The most crucial revenues in the field of environment are attained from environmental taxes. For Turkey these taxes may be classified as follows (Özdemir, 2009: 28-29):

• **Sanitation Tax:** The subject of the tax is defined as the utilization from the solid waste collection and sewage services of the municipalities. The tax is a local administrative tax that is collected in the municipal boundaries and municipal adjacent area from houses, workplaces and buildings used for other purposes that use the sanitation services of municipalities according to the fixed tariff since January 1st, 1994.

• **Motor Vehicles Tax:** The tax started to be levied in Turkey with the Motor Vehicle Tax Law No. 197 dated 18.02.1963 is a special property and wealth tax that is applied to land- and air-vehicles and vessels. While vehicle taxes had been implemented according to the weight, cylinder volume and age of the vehicles, following the regulation with the Law No. 5035 dated 01.01.2003 that was enforced on 01.01.2004 the vehicles started to be taxed according to cylinder volume and age. As the main aim in such taxation is not the protection of environment, the tax amount decreases with an increase in the age of vehicles.

• **Fuel Consumption Tax** (Cancelled with the Law No. 4760 dated 06.06.2002 and taken into the scope of Special Consumption Tax)

• **Motor Vehicles Purchase Tax** (Cancelled with the Law No. 4760 dated 06.06.2002 and taken into the scope of Special Consumption Tax)

• **Special Consumption Tax (SCT)** (the Law No. 4760 dated 06.06.2002): The part of SCT related to environmental taxes fall into the list No. 1. While in the A statement of the list, various petroleum products and oil types such as aviation gasoline, non-leaded regular gas, non-leaded premium gasoline, leaded premium gasoline, leaded regular gasoline, natural gas, fuel oil, lubrication oil, differential oil, base oil, jet fuel and diesel oil take place; in the B statement of the list benzol, solvent, lacquers, pentane, ether, thinners and related product take place.

• **Value Added Tax (VAT)** (the Law No. 3065 dated 25.10.1984): Natural gas, petroleum and their by-products (including the transport of them with pipelines) that are within the scope of law and all the energy products, the buying and selling of motor vehicles are subject to VAT.

• **Charges** (Law No. 492 dated 02.07.1964): The fees collected from oil exploration and operation permissions can be given as examples.

Below, the main environment related taxes in Turkey are assessed according to the grouping of EUROSTAT statistics. However, it is necessary to mention that among these taxes the weight of energy taxes (fuel) and transport taxes (motor vehicles) is quite high.

3.1.2.1. Energy Taxes

Fuel products and electric enter to the energy taxes group. In Turkey fuel and fuel products fall into the No. 1 list of the Private Consumption Tax Law No. 4760 dated 06.06.2002. The delivery of these products is also subject to value added tax. Turkey is the country that has the highest fuel consumption tax among OECD countries.

Private consumption tax is a tax that can serve many purposes except its fiscal purpose. However, it is difficult to claim that the aforementioned tax serves to the protection of environment in Turkey. The contribution of private consumption tax in Turkey to environment pollution is only indirectly, by increasing the price of fuel price. In the taxation of fuel, not the damage it brought to environment (the emission spread) but the amount of consumption (kilogram/litre/cubic meter) is taken into account and according to the type of fuel (such as gasoline, diesel, auto gas, fuel oil, biodiesel, natural gas) tax rates may be differed. This, in turn, makes the use of the tax for environmental purposes difficult and brings its fiscal purpose to forefront.

In the context of EU harmonisation (Chapter 20: Environment was opened in 2009) the Energy Market Regulatory Authority (EMRA) forbade the sale of rural diesel to trucks, coaches, minibuses and other vehicles in November 1st, 2009. Rural diesel can only be used in off-road moving vehicles and tractors used for agriculture and in the forests. On the other hand the use of environment-friendly bio fuel in the EU increases day by day. In order to ensure the use of bio fuel instead of all the fossil fuels (petrol and diesel) in the EU transportation, national precautions were started to be used. In Turkey with the cabinet decree No. 2006/11202 the SCT ratio in the delivery of bio diesel produced with domestic agricultural products to refineries and distributors was decreased to zero. In the bio diesel produced from waste oil and non-domestic products, the tax rate would be quite lower that the tax applied to other fuels (Çelikkaya, 2011).

According to Directive 2003/96/EC of EU, another tax applied to energy products is the electric tax. In terms of the electric tax which is one of the highest emission sources, two European countries having the highest electric tax to price ratio are Italy and Turkey. Turkey is a country that applies high taxation to electric consumption. On the other hand, Germany, France and Greece do not apply tax to industrial electricity. Turkey applies 18% VAT, 2% Turkish Radio and Television (TRT) share (over energy price), 1% energy fund and also in the industry 1%, in domestic use 5% municipality consumption tax (over energy sale value). On the other hand Turkey is one of the countries where industrial natural gas

is most expensive and is one of the limited countries that apply tax to industry. Poland and Spain do not apply tax to industrial natural gas (Çelikkaya, 2011; Öz, 2006: 17-18).

3.1.2.2. Pollution (Solid Waste) Tax

Domestic users and industrial plants that are connected to municipal water and sewage networks have to pay "sanitation tax" for their water usage and waste water disposal. According to existing practice municipalities reserve 1% of the taxes they collected to the Ministry of Environment and urbanisation for the struggle against pollution (Environment Law No. 2872 dated 1983, m. 18/b) and 20% in metropolises for the construction and operation of garbage disposal facilities (Law on Municipal Revenues No. 2464 dated 1981, duplicated entry 44). The taxpayers of the sanitation tax are the houses, workplaces and other building users that use solid waste collection and sewage services. The amount of tax is calculated by each municipality according to the water consumed in the houses[7] and according to an annual fixed tariff for workplaces and other buildings, separately. In other words, while commercial and industrial enterprises pay annual fixed taxes according to the facility type and size, houses pay a lump sum price together with the water bill. As the tax/fee is not associated with the amount of waste produced and can absorb only a part of the waste collection and disposal expenses (around 15%), the efficiency of sanitation tax is debated. The tax varies not according to the conduct of taxpayer but according to the kind of building. Therefore it is impossible to decrease the tax by lowering the amount of solid waste (subject of the tax) (Reyhan, 2014:116; Çelikkaya, 2011; Değirmendereli, 2003: 119; Şahin, 1999: 136; OECD, 2008: 167).

3.1.2.3. Transportation (Toll) Taxes and Motor Vehicles Tax

In Turkey there is no toll application in order to eliminate traffic congestion and the environmental damages caused by traffic. The exhaust and greenhouse gases due to the transport sector pose a threat in terms of environment. The transport sector that creates 18% of the CO2 emission due to fuel consumption is at the same time a source of an important and traditional air polluter (NOx, PM). With the Transport Master Plan Strategy prepared in 2005 in accordance with the recommendation of OECD, public transportation and railway and seaway transportation are encouraged. In this context, in large cities urban public transportation projects (such as metro and tramway) have been carried out (OECD, 2008: 64). On the other hand in order to prevent air pollution related to the transportation the use of new motors, exhaust systems and fuels that are compatible with the emission standards of new generation fuel products is increasing day by day.

Following the EU countries, with the Euro 4 emission standards that became compulsory in Turkey in 2009 it is now possible to travel with more environment-friendly vehicles. On the other hand in order to contribute to the prevention of environmental pollution, there are also other economic incentives. If a vehicle at the age of at least 20 scraps, a discount is applied in SCT for new vehicle purchases. Besides, by applying privileged tax ratios for the environment-friendly fuels such as LPG and bio diesel the vehicles that use these fuels are encouraged (Reyhan, 2014:117; Çelikkaya, 2011; OECD, 2008: 64).

However it is impossible to claim that a similar favourable development have been experienced in the tax policy. The motor vehicles in Turkey pay annual motor vehicle tax. This tax that started to be applied with the Motor Vehicle Tax Law No. 197 dated 18.02.1963 has a characteristic of a special wealth tax. With the change in the aforementioned law with the Law No. 5035 dated 25.12.2003 the tax started to be collected according to motor cylinder volume and age, instead of the weight of vehicles. The purpose why motor cylinder volume is grounded is that with an increase in motor volume the fuel consumption and the toxic gas spread to the environment would increase. This, in turn, creates an incentive for buying smaller vehicles and transforms the motor vehicle tax into an environmental tax. However, the fact that

[7] As of 1/1/2018 sanitation tax is calculated according to the level of water consumption and is 32 kurus per m3 in metropolitan municipalities and 24 kurus in other municipalities (General Communique on the Law of municipal Revenues (Serial No: 50), 2017).

the tax paid decreases with an increase in the age of vehicle contrasts with the environmental purposes concerned as older vehicles cause more gas emission (pollution) due to their technologies. Therefore the tax subject is not designed to prevent environmental pollution. While higher taxes are collected from the vehicles that do not pollute the environment and do not cause noise pollution, from those vehicles that are old and more than 10 years old, that pollute the environment, that create noise pollution lower taxes are collected (Çelikkaya, 2011; OECD, 2008: 147; Çiftlikli, 1993: 51).

3.1.2.4. Other Taxes, Charges and Financial Supports

Some countries in Europe use value added tax as a medium in the precautions taken for the protection of environment. However, the subject of the value added tax in Turkey is not regulated in order to serve environmental purposes. Energy products and transportation services are subject to standard or increased rates. Only in maritime transportation vehicles a value added tax exemption is applied in order to encourage marine transportation (please refer to VAT Law, article 13/a-b).

Some other taxes and fees applied in Turkey affect the environment indirectly. However these are insufficient as are. Some of them are aircraft noise fee, permission fee for oil exploration and operation and hunting fee. In addition to these, there are also fiscal aids. These aids include the purchase of environmental equipment and exemption for environmental R&D and investments from import duties and value added tax. Besides, there are also interest support for investment credits of pollution refinement and reduction facilities and a fiscal aid in the form of 50% discount in energy tariffs (Çelikkaya, 2011; OECD, 2008: 168-169).

3.2. Subsidies

Other fiscal instrument is the subsidy. Externality related subsidies are the payments made to those who suffer from negative externalities. These payments are aids that would increase the consumption of goods which, in case of use, would decrease the loss of those negatively affected from externalities (Kargı and Yüksel, 2010: 195-196).

Subsidies are used for the application of clean technologies and for increasing the effect of environmental taxes. In various countries in the EU, subsidy/incentive methods are utilised for environmental technology investments and R&D expenditures. Furthermore, in the EU, for the formation of waste treatment by local administrations, for the protection of environment, for the development of forests and for supporting agriculture subsidies are utilised (Mutlu, 2006: 17). In other terms, subsidies is a part of policies applied for increasing the total social welfare (Holtermann, 1976:9).

3.3. Fees

Another public economy solution for environmental externalities is the fees. As is known, the most important difference between fees and taxes is that fees correspond to a certain economic transaction. In terms of environmental economics, quid pro quo is a public application in order to prevent environmental damages. The fees collected according to the level of damage brought to the environment bases of the "Pay as you pollute" principle (Kargı and Yüksel, 2010: 196). Environmental fees may be applied as emission fees, product fess and user fees (Mutlu, 2006: 16-17; Acar, 2006: 226).

3.4. Pollution Permits

Another method that ensures the same cost minimization allocation under a tax system is the pollution permits which is also known as tradeable pollution rights. Under a tradeable permit system an acceptable level of pollution is determined and is distributed among firms as permits. Those firms which could attain lower level of emission than the right allocated to them can sell the rest of the permit to other firms or use them in other parts of their firms in order to balance over emission (Stavins, 1998:4; Gottinger, 1994:9; Kargı and Yüksel, 2010:196).

3.5. Direct Controls

The public economy instrument for the resolution of the problem of environmental externalities that is not market based is the direct controls which is also known as standards. The standards of command and control regulations encompasses environmental limitations, tasks and even prohibitions on the activities causing environmental pollution. In general, despite the relative cost of this load, command and control regulations have the tendency to load the pollution control to the firms. To apply the same target for all firms may be costly and in some cases it may be anti-productive application. While standards may create efficient limitations to pollution emissions, they force firms to relative high costs in the process. If it is compared with market based instruments, it may be claimed that standards may ensure a higher rate of attainment of the targets in a shorter span of time. However, compared to the instruments such as taxes, fees etc. the inability of standards to generate income is accepted as a disadvantage and standards are found to be more costly (Stavins, 1998:2; Barde, 1994:8; Kargı and Yüksel, 2010:197).

CONCLUSION

Today environmental problems have made various precautions obligatory, and some policies that give priority and weight to the integration of environment-economy that is in accordance with the perception of sustainable development have been developed. In international summits and protocols the importance of the subject has been discussed and Turkey has carried out various regulations and applications on the subject. Among global goods, the environmental problems whose externalities are the highest and that may cause damages which in turn may affect future generations, go beyond the limit that can be solved with market regulations or individual efforts of countries. The elements such as the procurement of the solution of environment problems and sustainable development intensify the need for the regulatory effects of environmental taxes. Environmental taxes are one of the most important tools of fiscal policy for the internalisation of "negative externalities".

Maybe the most favourable side of environmental taxes is that they are collected on the basis of the hazardous wastes or the energy products used, not on the basis of profits or prices. Therefore, compared to current taxes, the adoption and application of environmental taxes are quite easier by the taxpayers. Bearing the cost of pollution by the polluter; that is the "make the polluter pay" the cost, is quite in accordance with the principles of justice and efficiency.

Turkey participated to the United Nations Framework Convention on Climate Change (UNFCCC) that prescribes the reduction of greenhouse gases and started the procedure to become a party to Kyoto Protocol. Accordingly she banned the high sulphur containing coal usage in domestic heating and natural gas usage in urban areas has been extended. Besides, the use of renewable energy sources (particularly wind, bio-fuel and solar systems) have been encouraged. In order to reduce the motor vehicles' emission, leaded fuel usage was banned and some quality standards are employed for the fuels. As aforementioned, in various fields regulations have been made and promotions have been realised in order to prevent environmental pollution. All these are crucial steps taken for the prevention of environmental pollution. However, similar development has not been observed effectively in terms of tax policy. It is seen that the taxes in this field do not serve to the protection of environment but instead they serve as a source of income. Therefore the next step to be taken should be to make a comprehensive green tax reform without an expectation of income. With the green tax reform to be made, funds would be obtained that are necessary for the protection of environment on the one hand, and on the other hand by lowering the tax incidence on labour, efficiency in the allocation of resources would be attained.

Besides, in many developed countries, in the taxation of motor vehicles that are accepted as the most hazardous factor to the environment, carbon emission is started to be accepted as a basis of taxation. It is impossible for Turkey to be unconcerned with this development. Therefore it is inevitable that the Motor Vehicle Tax Law would be revised in the near future and the tax assessment would be arranged

according to carbon emission. Apart from these, some new taxes may be levied on some polluter goods and inputs (such as detergents, batteries, pesticides, artificial fertilizers, chlorofluorocarbons). In terms of preventing environmental pollution and participation to the costs of pollution, accommodation tax may be added to the Law on Municipal Revenues. Furthermore as stated in Turkey National Environmental Strategy Action Plan (NEAP), increases in estate and land taxes of the enterprises that pollute the environment, noise pollution preventive precautions are crucial suggestions to be taken into consideration during the green tax reform to be made.

In Turkish tax system new regulations are needed in order the preferences to be in favour of the environment. These regulations should serve to the prevention of environmental pollution, should protect not only the environment but also the natural resources. It should also prevent the over-use of them; the recycling and reuse of the materials and materials should be ensured. A new tax or fiscal mechanism, or a new incentive practice should be determined. In the combat with environmental problems in Turkey, it is also important to develop the environment consciousness in order the policies applied to have the expected results and to be efficient enough.

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