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ENVIRONMENT AND QAULITY OF LIFE

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Abstract. The paper deals with environmental indicators having impact on quality of life. The system of indicators was developed to assessment environmental indicators of quality of life. The paper defines the concept of quality of life and various dimensions of quality of life. The environmental dimension is one of the major issues affecting the quality of life. The environmental indicators reflecting the quality of life encompass the following categories of indicators: environmental quality, environmentally responsible behaviour and consumption of environmental services provided. The system of indicators for assessment of quality of life in terms of environment presents the interrelations between indicators. The environmentally responsible behaviour has positive impact on environmental quality providing on other hand for higher consumption of services provided by environment. The dynamics of environmental indicators of quality of life were analysed in Lithuania and comparative assessment with EU-27 average was performed.

Keywords: quality of life, environmental quality, environmentally responsible behaviour, consumption of environmental services provided, assessment.

JEL classification: I31, I38, O57, Q53, Q57.

1. Introduction

The environment plays a crucial role in people's physical, mental and social well-being. Despite significant improvements, major differences in environmental quality and human health remain between and within European countries. The complex relationships between environmental factors and human health, taking into account multiple pathways and interactions, should be seen in a broader spatial, socio-economic and cultural context. The degradation of the environment, through air pollution, noise, chemicals, poor quality water and loss of natural areas, combined with lifestyle changes, may be contributing to substantial increases in rates of obesity, diabetes, diseases of the cardiovascular and nervous systems and cancer – all of which are major public health problems for Europe's population.

There is direct relationship between quality of life and environment (Diener and Eunkok, 1997). People's lives are strongly affected by the healthiness of their physical environment. The impact of pollutants, hazardous substances on people's health is sizeable. Environmental quality also matters intrinsically, as most people value the beauty and healthiness of the place where they live, and care about the depletion of its natural resources (Brajša-Zganec *et al*., 2011). Preserving environmental and natural resources is also one of the most important challenges for ensuring the sustainability of well-being over time (Van Liere, Dunlap, 1980). Environmental policies have a critical role to play in dealing with global health priorities and in improving people's environmentally responsible behavior and also lives (Reto, Garcia-Vega, 2012).

Environmental quality is a key dimension of people's well-being, as quality of life is strongly affected by a healthy physical environment (Kahn, 2002; Holman and Coan, 2008; Ahmad, Yamano, 2011).

Besides affecting people's health, the environment also matters intrinsically as many people attach importance to the beauty and the healthiness of the place where they live, and because they care about the degradation of the planet and the depletion of natural resources (Balestra and Dottori, 2011; Kahn, Matsusaka, 1997). People also directly benefit from environmental assets and services, such as water, clear air, lands, forests, and access to green spaces, as they allow them to satisfy basic

needs and to enjoy free time and the company of others (Pretty *et al.*, 2005; Balestra, Sultan, 2011).

Preserving environmental and natural resources is one of the most important challenges for ensuring the sustainability of well-being over time. However, measuring of environmental indicators is difficult; first, because the size of the impacts of current environmental trends on future well-being is uncertain; second, because there are few comparable indicators that meet agreed standards.

The aim of this paper is to develop a framework for assessment of environmental indicators relevant to quality of life and to apply this framework for comparative assessment of environment indicators of quality of life in Baltic States.

The main tasks to achieve this aim:

– To select indicators for assessment of environmental quality, environmentally responsible behaviour and consumption of environmental services provided based on EUROSTAT database;
– To analyse and compare the trends of environmental indicators in Lithuania and compare with EU-27 average after Lithuanian EU accession in 2004;
– To develop policy recommendations based on analysis provided.

2. Environmental indicators of quality of life

Measuring the well-being of populations has been a concern of statisticians for some time, but has gained particular attention from politicians, the media and the public over recent years. In the EU, discussions about shifting the focus away from Gross Domestic Product (GDP) as the single measure for societal progress were kick-started in 2007 with the "Beyond GDP" conference and followed by the European Commission “GDP and beyond – Measuring progress in a changing world” communication and a study commissioned by Eurostat to explore the feasibility of a policy-relevant set of well-being indicators.

Quality of life is a complex, multi-faceted construct that requires multiple approaches from different theoretical perspectives. The objective approach supposes to use the objective indicators that reflect different aspects of quality of life that can be measured by using secondary data, available mainly from official governmental data collections. This approach is widely used in different studies as it has major advantages. Quality of life research in Lithuania is not well developed yet. Recently the interest on this topic has been growing (Rybakovas, 2012, 2011; Rakauskiene and Servetkiene, 2011; Tvaronaviciene, 2011). Most empirical studies in Lithuania paid most attention just to the objective component of quality of life. The quality of life according (Rakauskiene and Servetkiene, 2011) can be measured by indicators covering the following 3 main dimesnions:

– Health, environment and demographics;
– The material conditions of life;
– Education, culture, moral and etical and spiritual values.

The environmental indicators of quality of life are included in the first dimension of quality of life covering health, environmnet and demographic conditions.

The ideal set of objective environmental indicators relevant to quality of life would inform about quality of a number of environmental media (soil, water, air), on people access to environmental services and amenities and environmentally responsible behavior as well (Mace *et al*., 1999). The objective environmental indicators of quality of life presented in this paper are limited to only a subset of indicators reported by EUROSTAT databases.

The quality of local living environment has a direct impact on human health and well-being. An unspoiled environment is a source of satisfaction, improves mental well-being, allows people to recover from the stress of everyday life and to perform physical activity (Zheng, 2010; Liao, 2009).

Consumption of environmental services and amenities provided has direct impact on quality of life. From the other side the quality of environment and environmental services and amenities provided is affected by human behaviour. The environmentally responsible is the main driver of environmental quality of environmental services provided (Osbaldiston, Sheldon, 2003; Thogersen, 2006). In Table 1 the environmental indicators relevant to quality of life is being presented.

Therefore the environmental indicators reflecting the quality of life can be assessed by applying the following groups of indicators: environmental quality, environmentally responsible behaviour and consumption of environmental services. These groups of indicators are related as the environmentally responsible behaviour has positive impact on environmental quality providing on other hand for higher consumption of services provided by environment.

The selected indicators are being developed and publicly published in EUROSTAT databases. These environmental indicators relevant to quality of life are available for all EU member states and the proposed framework can be applied for monitoring success of EU member states in implementing environmental policies providing for the increase of quality of life in terms of environment.

3. Environmental quality indicators

The environmental quality indicators encompass a number of environmental media (*e.g.* soil, water, air).

Nearly 75% of European citizens live in urban areas, and this is expected to increase to 80% by 2020. Under the 6th Environmental Action Programme, the Thematic Strategy on the urban environment highlights the consequences for human health of the environmental challenges facing cities, the quality of life of urban citizens and the performance of cities. It aims to improve the urban environment, to make it more attractive and healthier to live, work and invest in, while trying to reduce the adverse environmental impacts on the wider environment.

Much progress has been achieved through dedicated approaches to improving the quality of the environment and reducing particular burdens on human health – but many threats remain. The predominant drive for material well-being has played a major role in the biological and ecological disturbances witnessed today. Preserving and extending the benefits provided by the environment for human health and well-being will require continuous effort to improve the quality of the environment. Furthermore, these efforts need to be complemented by other measures, including significant changes in lifestyle and human behaviour, as well as consumption patterns.

Particulate matter and ground-level ozone, are now generally recognised as the two pollutants that most significantly affect human health. Long-term and peak exposures to these pollutants range in severity of impact, from impairing the respiratory system to premature death. In recent years, up to 40% of Europe's urban population may have been exposed to ambient concentrations of coarse PM (PM_{10}) above the EU limit set to protect human health. Up to 50% of the population living in urban areas may have been exposed to levels of ozone that exceed the EU target value. The fraction of the PM_{10} which are thought to be the most poisonous are less than 2.5 micrometers across and are called $PM_{2.5}$. Epidemiological studies conducted over the past twenty years have reported significant associations between short-term and long-term exposure to increased ambient PM concentrations and increased morbidity (*e. g.* cardiovascular and respiratory diseases) and (premature) mortality. PM_{10} are readily inhalable and because of their small size are not filtered and reach the upper part of the airways and lungs. Those smaller than 2.5 μm penetrate deep into the bottom of the lung, where they can move to the blood stream, thus allowing many chemicals harmful to human health to reach many internal organs and causing a wide range of illness and mortality including cancer, brain damage and damage to the fetus. Fine particulate matter ($PM_{2.5}$) in air has been estimated to reduce life expectancy in the EU by more than eight months.

In the period 2001-2011, 14-65% of the urban population in EU-27 was exposed to ambient ozone concentrations exceeding the EU target value set for the protection of human health (120 microgram O_3/m^3 daily maximum 8-hourly average, not to be exceeded more than 25 times a calendar year, averaged over three years and to be achieved where possible by 2010). The 65% of the urban population exposed to ambient ozone concentrations over the EU target value was recorded in 2003, which was the record year. There was no discernible trend over the period until 2004

The objective measure of air quality used in this paper takes into account PM10 and ground ozone concentrations only.

Another important air quality indicator selected in this study is related with CO_2 emissions in transport as the transport sector is one of the major

Table 1. The environmental indicators relevant to quality of life (source: compiled by author)

Dimensions	Indicators				
Environmental quality	Urban population exposure to air pollution by particulate matter, micrograms per cubic metre	Urban population exposure to air pollution by ozone, micrograms per cubic metre day	Biochemical oxygen demand in rivers, mg/l	Average carbon dioxide emissions per km from new passenger car, gCO_2/km	Municipal waste generated per capita, kg
Environmentally responsible behaviour	Resource productivity, EUR/kg	The dynamics of energy productivity in EUR per kg of oil equivalent	The share of renewables in final energy, %	Sewage sludge production and disposal, thousand t	Recycling rates for packaging waste, %
Consumption of environmental services	Sufficiency of sites designated under the EU Habitats directive, %	Protected terrestrial areas, %	Total fresh water abstraction per capita, m^3 per capita	Total inland fishery products per capita, kg live weights	Total area of forests and other wooded land per capita, ha/capita

emissions from transport sector were constantly growing with increase of living standards and the use of more efficient cars can provide for GHG emission reduction in transport sector.

Access to clean water is fundamental to human well-being. Managing water to meet that need is a major – and growing – challenge in many parts of the world. Many people are suffering from inadequate quantity and quality of water. Despite significant progress in EU member states in reducing water pollution, from fixed sources such as industrial and municipal wastewater treatment plants, diffuse pollution from agriculture and urban run-offs remains a challenge and improvements in freshwater quality are not always easy to discern. The biochemical oxygen demand in rivers is the main indicator showing the water quality in rivers.

The main indicator of environmental quality in land area is municipal waste generated per capita indicating the waste accumulation rate and the problem in EU member states.

Increase in all these selected indicators represents negative trends in terms of environmental quality and has negative impact on quality of life.

Up to 50 % of the population living in urban areas may have been exposed to levels of ozone that exceed the EU target value. The fraction of the PM_{10} which are thought to be the most poisonous are less than 2.5 micrometres across and are called $PM_{2.5}$. (Goldberg *et al*. 2001; Arruti *et al*. 2010; Dockery 2001; Katsouysnni *et al*. 2002).

The urban population exposure to ozone indicator shows the population-weighted concentration of ozone to which the urban population is potentially exposed.

CO_2 emissions are the main problem of climate change. Especially big problems are related with transport pollution which has been constantly increasing in EU.

In Table 2 the dynamics of urban population exposure to air by particulate matter $PM_{10\ and}$ by ozone and dynamics of average carbon dioxide emissions per km from new passenger cars in Lithuania and EU-27 average is presented.

Organic matter, measured as Biochemical Oxygen Demand (BOD) and total ammonium, are key indicators of the oxygen content of water bodies. The most important sources of organic waste load are: household wastewater; industries such as paper industries or food processing industries; and silage effluents and manure from agriculture. In Table 2 the dynamics of biochemical oxygen demand in rivers in Lithuania and EU average and is presented.

EU society has grown wealthier it has created more and more rubbish. Each year in the European Union alone we throw away 3 billion tonnes of waste - some 90 million tonnes of it hazardous. This amounts to about 6 tonnes of solid waste for every man, woman and child, according to Eurostat statistics. It is clear that treating and disposing of all this material - without harming the environment - becomes a major headache. Between 1990 and 1995, the amount of waste generated in Europe increased by 10%. Most of what we throw away is either burnt in incinerators, or dumped into landfill sites (67%). But both these methods create environmental damage. Landfilling not only takes up more and more valuable land space, it also causes air, water and soil pollution, discharging carbon dioxide (CO_2) and methane (CH_4) into the atmosphere and chemicals and pesticides into the earth and groundwater. This, in turn, is harmful to human health, as well as to plants and animals. The EU's Sixth Environment Action Programme identifies waste prevention and management as one of four top priorities. Its primary objective is to decouple waste generation from economic activity, so that EU growth will no longer lead to more and more rubbish, and there are signs that this is beginning to happen. The EU is aiming for a significant cut in the amount of rubbish generated, through new waste prevention initiatives, better use of resources, and encouraging a shift to more sustainable consumption patterns.

In Table 2 the dynamics of municipal waste generated pet capita in Lithuania and EU-27 average is presented.

As one can see from information provided in Table 2 in Lithuania the urban population exposure to air pollution by particulate matter was stable during 2004-2011 periods. Comparing with EU-27 average one can notice that in Lithuania urban population expose to air pollution was lower during all investigate period however it was higher than WHO Air Quality Guidelines for PM_{10} which are set at 20 μg/m3 as an annual mean.

In the period 2001-2011, 14-65% of the urban population in EU-27 was exposed to ambient ozone concentrations exceeding the EU target value set for the protection of human health (120 microgram O_3/m^3 daily maximum 8-hourly average, not to be exceeded more than 25 times a calendar year, averaged over three years and to be achieved where possible by 2010). In Lithuania urban population exposure to air pollution by ozone was lower than EU 27 during all investigated period however it is also significantly higher than EU target value.

Table 2. Dynamics of Environmental quality indicators in Lithuania and EU-average (source: compiled by author)

	2004	2005	2006	2007	2008	2009	2010
Urban population exposure to PM_{10}, micrograms per cubic metre							
EU-27	27	28	30	28	26	26	26
Lithua-nia	23	23	20	21	19	23	27
Urban population exposure to air pollution by ozone, micrograms per cubic metre							
EU -27	3491	3677	4478	3611	3580	3648	3368
Lithua-nia	2909	5048	4621	1891	3653	2110	1416
Dynamic of biochemical oxygen demand in rivers, mg/l							
EU-27	2.6	2.2	3.8	4.4	3.8	-	3.2
Lithua-nia	2.9	2.8	2.9	2.5	2.7	-	2,8
Carbon dioxide emissions per km from new passenger cars in EU, gCO_2/km							
EU -27	160	159	159	159	154	146	140
Lithua-nia	188	186	163	177	170	166	151
Municipal waste per capita, kg							
EU -27	513	515	521	522	519	509	505
Lithuania	367	377	391	401	408	361	381

As on see from information provided in Table 2 in European rivers, the oxygen demanding substances measured as BOD have decreased in EU-27 by 55% (from 4.9 mg/l to 2.2 mg O_2/l) from 1992 to 2010. The decrease is due mainly to improved sewage treatment resulting from the implementation of the Urban Wastewater Treatment Directive and national legislations. The economic downturn of the 1990s in central and eastern European countries also contributed to this fall, as there was a decline in heavily polluting manufacturing industries. In recent years, however, the downward trends in BOD across Europe have generally levelled. This suggests that either further improvement in wastewater treatment is required or that other sources of organic pollution, for example from agriculture, require greater attention, or both. In Lithuania BOD have been stable during 2004-2010. It is a slightly higher than in EU-27 average.

As one can see from information provided in Table 2 the municipal waste generated by capita was increasing in Lithuania until 2008. 1n Lithuania municipal waste per capita makes 442 kg in 2010 and has increased since 2005 (367 kg/capita). It was lower than EU-27 average (500 kg/capita) in 2010. In 2008 significant reduction has been noticed however the new trends of increase are followed after economic crisis.

As regards to quality of environment comparing with EU-27 average Lithuania was are performing better in almost all environmental quality indicators since 2004 except carbon dioxide emissions per km from new passenger cars.

4. Environmentally responsible behaviour indicators

Environmentally responsible behaviour is associated with resource and energy savings, use of renewable energy sources instead of fossil fuels, waste recycling and proper wastewater management and disposal. Therefore the main indicators of environmentally responsible behaviour in EU were selected based on EUROSTAT data include resource and energy productivity, the share of renewables in final energy consumption, packaging waste recycling rate and sewage sludge production and disposal per capita indicators. These indicators have direct positive impact on quality of life as they are the main drivers of environmental quality indicators. Therefore the increase of these indicators is the desired trend.

Resource productivity is GDP divided by domestic material consumption (DMC). DMC measures the total amount of materials directly used by an economy. It is defined as the annual quantity of raw materials extracted from the domestic territory of the focal economy, plus all physical imports minus all physical exports. If comparisons of resource productivity between countries are made then the GDP in purchasing power standards should be used. Energy productivity is important indicator assessed by dividing GDP by primary energy consumption. It indicates energy use efficiency in the country.

The increase use of renewables is the priority in energy and environmental policy in EU. The increase of use of renewables provides for GHG emission reduction and security of energy supply as renewables are local and domestic energy supply sources.

In Table 3 the dynamics of resource and energy productivity and the share of renewables in final energy consumption in Baltic States and EU average are presented.

Wastewater treatment and the quality of both drinking and bathing water have improved significantly in Europe over the past 20 years. The residual of wastewater treatment is sewage sludge.

Between 1990 and 1995, the amount of waste generated in Europe increased by 10%. Most of

Table 3. Dynamics of environmentally responsible behavior indicators in Baltic States and EU-average (source: compiled by author)

	2004	2005	2006	2007	2008	2009	2010
Resource productivity in EU, EUR/kg							
EU-27	1.39	1.4	1.42	1.43	1.46	1.57	1.65
Lithuania	0.49	0.51	0.55	0.51	0.49	0.62	0.57
Energy productivity in EUR per kg of oil equivalent							
EU -27	6	6.1	6.3	6.5	6.6	6.7	6.6
Lithuania	2.1	2.4	2.6	2.7	2.7	2.5	3.2
The share of renewables in final energy consumption, %							
EU -27	8.1	8.5	9.0	9.7	10.4	11.6	12.5
Lithuania	17.3	17.0	17.0	16.7	18.0	20.0	19.8
Sewage sludge production and disposal per capita, kg							
EU-27	18	18	20	20	22		22
Lithuania	19	19	21	23	16		15
Recycling rates for packaging waste, %							
EU-27	54.0	54.6	56.9	59.2	60.5	62.5	63.3
Lithuania	32.7	32.5	37	42.9	51.7	57.7	60.4

what we throw away is either burnt in incinerators, or dumped into landfill sites (67%). But both these methods create environmental damage. The recycling of waste is the main policy measure to reduce negative impact of waste accumulated. In Table 3 the dynamics of recycling rates of packaging waste in EU is presented.

As one can see from information provided in Table 3 in terms of environmentally responsible behavior indicators the best performing country is Estonia. Latvia distinguishes with high share of renewables in final energy consumption. Comparing energy and resource productivity indicators in Baltic States and EU 27 average one can notice that energy and resources productivity in Baltic States are significantly lower than EU-27 average though the trends in Baltic States are positive. The recycling rates of packaging waste in 2010 were highest in Lithuania though in 2004 country was in the worst position between in EU member states.

While the amount of sludge generated per inhabitant depends on many factors and hence is quite variable across countries, the nature of this sludge – rich in nutrients, but also often loaded with high concentrations of pollutants such as heavy metals – has led countries to seek different pathways for its disposal, as illustrated in Table 3. More than two thirds of sewage sludge was composted in Estonia. Otherwise, alternative forms of disposal may be used to reduce or eliminate the spread of pollutants on agricultural or gardening land; these include incineration and landfill.

As regards to environmentally responsible behaviour comparing with EU-27 average the Lithuania is performing better just in terms of use of renewable energy sources and all other indicators are behind EU-27 average level.

5. Consumption of environmental services indicators

The main indicators of consumption of environmental services and amenities provided are selected based on data provided by EUROSTAT and includes index of sufficiency of sites designated under the EU Habitats directive, the share of protected terrestrial area, total fresh water abstraction per capita, total inland fishery products per capita and total area of forests and other wooded land per capita. The increase of these indicators indicates the increase of use of services provided by environment having direct positive impact on quality of life.

In Table 4 the dynamics of sufficiency of sites designated under the EU Habitats directive and protected terrestrial area is presented Baltic States EU-27 average.

Water is essential for life, it is an indispensable resource for the economy, and also plays a fundamental role in the climate regulation cycle. There are considerable differences in the per inhabitant amounts of freshwater abstracted within each of the EU Member States, in part reflecting the resources available, but also abstraction practices depending on climate as well as on the industrial and agricultural structure of the country.

Fish are a natural, biological, mobile (sometimes over long distances) and renewable resource. Aside from fish farming, fish in the wild are generally not owned until they have been caught; although some lakes and stretches of rivers may be privately owned. Fish stocks continue to be regarded as a natural resource provided by environment for human needs.

Traditionally the main function of forests in Europe has been wood production. However, the recreation and tourism functions of forests and

Table 4. Dynamics of indicators of consumption of environmental services provided by environment in Lithuania and EU-average

	2004	2005	2006	2007	2008	2009	2010
Sufficiency of sites designated under the EU Habitats directive, %							
EU -27	80	80	83	84	84	-	89
Lithuania	61	61	61	61	61	-	66
Protected terrestrial area, %							
EU-27	14	14	14	14	14	14	14
Lithuania	10	10	10	10	10	13	14
Total fresh water abstraction per capita, m³ per capita							
EU-27	620	612	613	587	587	-	577
Lithuania	951	690	611	670	673	-	720
Total inland fishery products, tones live weights/capita							
EU-27	0.9	0.9	0.8	0.8	0.8		0.8
Lithuania	1.3	1.1	1.1	1.6	1.5		1.5
Total area of forests and other wooded land per capita							
EU-27	0.35	0.36	-	-	-	-	0.35
Lithuania	0.62	0.64	-	-	-	-	0.72

woodlands are becoming more important in many European countries. In particular their benefits for economic development, health and well-being and quality of life.

Therefore the main indicators representing consumption of environmental services in EU member states are related with biodiversity and sufficiency of sites designated under the EU Habits directive, protected terrestrial areas, fresh water abstraction, fishery products consumption and the area of forests.

In Table 4 the dynamics of total fresh water abstraction and total inland fishery products and of total area of forests per capita in Lithuania and EU-average is presented.

As one see from information provided in Table 4 Lithuania has quite low indicators of consumption of environmental services comparing with EU average. However Lithuania distinguishes by very positive trends of these indicators.

Lithuania needs to strengthen environmnetl policies to promote resource and energy efficiency, CO_2 emission reduction in transport sector, waste recycling, sewage sludge disposal and protection of sites designated under the EU Habits directive as these environmental issues are the most problematic for Lithuania comparing with other EU member states.

There are other important indicators as access to green areas and satisfaction with the quality of the local environment however there are not provided by EUROSTAT databases and are excluded form ananlysis conducted in the paper.

There are also subjective indicators of quality of life relevant to environment. For example, indicator of access to green areas. Access to green spaces is essential for quality of life, as an unspoiled environment is a source of satisfaction (Milligan *et al*. 2004), improves mental well-being (Brown, Grant 2007), allows people to recover from the stress of everyday life (Mace *et al*. 1999) and to perform physical activity. Cross-sectional studies find that levels of physical activity are higher and obesity is lower in areas with higher levels of greenery (Ellaway *et al.* 2005). Since the samples are small and the dataset suffers from other methodological limitations, these indicators were skipped from the following study.

6. Conclusions

1. The set of indicators presented summarises information about major dimensions of environmental indicators relevant to quality of life: quality of environment, environmentally responsible behavior and services provided by environment.
2. The indicators framework can be easy applied for monitoring housing dimension of quality of life in EU as include the main environmental indicators developed and openly published by EUROSTAT.
3. The developed indicators framework allows comparing EU member states in their achievements of increasing quality of life in terms of environmental indicators and is good tool for monitoring success of implemented environmental policies.
4. The quality of environment is assessed by the following indicators: PM10 and ground ozone concentrations, the bioxemical oxygen demand in rivers and municipal waste per capita.
5. Environmentally responsible behavior have significant impact on environmental quality therefore several important indicators were selected to assess the environmentally responsible be-

havior: resources and energy savings, increase use of renewable energy sources, sewage sludge disposal and packaging waste recycling. They correspond to environmental quality indicators addressed in the paper (atmospheric emissions, water pollution and generation of waste).

6. Consumption of services provided by environment has significant impact on quality of life and is also related with environmental quality indicators as air, water and land pollution by waste has negative impact on environmental services and amenities such as forests area, sufficiency of sites designated under EU Habitats directive, fresh water abstraction and inland fishery products per capita.
7. Lithuania has very positive trends in terms of all indicators development since 2004.
8. In terms of environmental quality indicators Lithuania has lower indicators of urban population exposure to PM and ozone and municipal waste per capita and bioxemical oxygen demand comparing with EU-27 average however country has higher indicators of carbon dioxide emissions per km
9. In terms of environmentally responsible behavior indicators Lithuania has very low indicators of resources and energy productivity, sewage sludge disposal per capita and recycling rates of packaging waste comparing with EU-27 average but country distinguishes with quite high indicators of renewable energy consumption.
10. In terms of consumption of environmental services Lithuania has quite high indicators of fresh water abstraction per capita, total inland fishery products and total area of forests and wooded land per capita comparing with EU-27 average however country has quite low indicators of sufficiency sites designated under the EU Habits directive and protected terrestrial areas.
11. The environmental policies needs to be further developed in Lithuania to promote resource and energy efficiency, CO_2 emission reduction in transport sector, waste recycling, sewage sludge disposal and protection of sites designated under the EU Habits directive as these environmental issues are one lacking behind other EU member states and the most problematic for Lithuania.

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