''ENVIRONMENTAL INDICATORS FOR THE ASSESSMENT OF QUALITY OF LIFE''

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ABSTRACT

This paper deals with quality of life in terms of the environment and develops a system of indicators to assess this. An improvement in quality of life is that the main aim of sustainable development and is evaluated by applying various factors and indicators. The environmental dimension is one among the foremost influences on quality of life, and this may be assessed by applying the subsequent groups of indicators: environmental quality, environmentally responsible behavior and consumption of environmental services. These groups are related because responsible behavior incorporates a positive impact on environmental quality and ends up in greater consumption of services provided by the environment. This paper presents the concept of assessing the environmental dimension in quality-of-life measurements and therefore the main assoc1.

Keyword

Quality of life, Evaluation of life style, impact of development on life style.

Introduction

There is a detailed relationship between quality of life and therefore the environment (Diener and Suh, 1997, UNECE, 2009). People's lives are strongly plagued by the health of their physical environment. The impact of pollutants and dangerous substances on people's health is sizeable. Environmental quality also matters intrinsically because most of the people value the wonder and health of the place where they live and care about the depletion of its natural resources (Brajša-Žganec, Merkaš, & Šverko, 2011). Preserving environmental and natural resources is additionally one among the foremost important factors in ensuring the preservation of well-being over time (Van Liere & Dunlap, 1980). Environmental policies have a critical role to play in managing global health priorities, also as improving environmentally responsible behavior and lives (Reto & Garcia-Vega, 2012).

Environmental quality could be a key think about people's well-being because quality of life is strongly littered with the health of the physical environment (Holman and Coan, 2008, Kahn, 2002). More extreme environmental events, like natural disasters (earthquakes, cyclones, floods, droughts and volcanic eruptions) and epidemics can also cause elevated levels of death, injury and disease. within the future, drastic changes within the environment may additionally impair human health through global climate change (Ahmad & Yamano, 2011).

Aside from affecting people's health, the environment also matters intrinsically because many of us attach importance to the wonder and health of the place where they live, and since they care about the degradation of the world and therefore the depletion of natural resources (Balestra and Dottori, 2011, Kahn and Matsusaka, 1997). People also directly enjoy environmental assets and services, like water, clean air, land, forests and access to green spaces, because these allow them to satisfy their basic needs and luxuriate in free time and therefore the company of others (Balestra and Sultan, 2012, Pretty et al., 2005).

Environmental indicators are often grouped on the premise of their relationships with quality of life within the following categories: environmental quality, environmentally responsible behavior and consumption of environmental services. These groups are tightly interrelated because responsible behavior encompasses a positive impact on environmental quality, which ends up in the next consumption of services provided by the environment.

Preserving environmental and natural resources is one amongst the foremost important factors in ensuring the sustainability of well-being over time. However, measuring environmental indicators is difficult: firstly, because the scale of impact of current environmental factors on future well-being is uncertain; and secondly, because there are few comparable indicators that meet agreed standards.

The aim of this paper is to develop a framework for the assessment of environmental indicators relevant to the standard of life and apply this to a comparative assessment of such factors within the Baltic statesiated indicators. These dynamics were investigated and compared in Lithuania and other EU member states, with policy recommendations developed.

The main steps to achieving this aim are to:

•Develop a framework for the assessment of environmental indicators relevant to the standard of life.

•Select indicators for the assessment of environmental quality, environmentally responsible behavior and consumption of environmental services supported the Eurostat database.

•Analyze and compare the trends of environmental indicators within the Baltic states, and compare these with EU-27 averages for the 2004–2011 period.

•Develop and apply an integrated indicator for the assessment of environmental factors relevant to quality of life within the Baltic states.

•Develop policy recommendations supported the analysis provided.

2. Environmental indicators associated with quality of life.

The concept of environmental indicators relevant to quality of life could be a broad one, and a perfect set of criteria would detail the standard of variety of mediums (including soil, water and air) on people's access to environmental services and amenities, still as staring at the impact of hazards on human health and environmentally responsible behavior (Mace, Bell, & Loomis, 1999). Unfortunately, data are scattered and not comparable across countries. For these reasons, the target indicators presented during this paper are limited to only a subset of indicators reported by Eurostat.

In general, objective indicators – like the concentrations and emissions of assorted pollutants – should be combined here with indicators supported people's subjective perceptions of the standard of the environment where they live. As within the case of other subjective data, indicators of satisfaction with environmental quality is also suffering from cultural biases and other limits that would affect cross-country comparisons, so these indicators are excluded from the assessment of environmental indicators of quality of life (Liao, 2009).

The quality of the local living environment encompasses a direct impact on human health and well-being. An unspoiled environment could be a source of satisfaction, improves mental well-being, and allows people to pass though the stresses of standard of living and perform physical activities. Access to resources like green spaces, forests and rivers is an important aspect of quality of life. Economies rely not only on healthy and productive workers, but also on natural resources like water, timber, fisheries, plants and crops (Zheng, 2010). The consumption of environmental services and amenities features a direct impact on quality of life, and conversely, the standard of those services is laid low with human behavior.

Environmental quality	Exposure of urban population to air pollution through particulate matter, $\mu g/m^3$	Exposure of urban population to air pollution by ozone, $\mu g/m^3$ per day	Biochemical oxygen demand in rivers, mg/l	Average carbon dioxide emissions per kilometre from new passenger cars, gCO_2/km	Mu was gen per kg
Environmentally responsible behaviour	Resource productivity, EUR/kg	Energy productivity in EUR/kg of oil equivalent	The share of renewables in final energy, %	Sewage sludge production and disposal, thousand tonnes	Rec rate pacl was
Consumption of environmental services	Sufficiency of sites designated under the EU Habitats Directive, %	Protected terrestrial areas, %	Total fresh water abstraction per capita, m^3/capita	Total inland fishery products per capita, tonnes of live weight	Tot of f and woc lanc capi ha/c

Table 1 presents environmental indicators that are relevant to the standard of life.

Table 1. Environmental indicators relevant to quality of life.

Environmental indicators relevant to quality of life are often assessed by using the subsequent groups: environmental quality, environmentally responsible behavior and consumption of environmental services. These groups are related because responsible behavior encompasses a positive impact on environmental quality, which ends up in higher consumption of services provided by the environment.

3. Indicators of environmental quality.

Indicators of environmental quality encompass variety of environmental mediums (such as soil, water and air). However, a scarcity of relevant data for a few of those mediums and evidence of sizeable effects from air pollutants on human health means most attention has been paid to air-pollution indicators. Objective measurements of air quality during this paper take into consideration only concentrations of PM10 and ground-level ozone. Another important indicator of air quality selected during this study relates to CO2 emissions from transport because this sector poses a serious problem for sustainable development within the EU. Such emissions have constantly grown with improvements in living standards, and therefore the use of more efficient cars can help to cut back gas (GHG) emissions within the transport sector.

Access to scrub water is key for human well-being. Managing water to satisfy that require could be a major – and growing – challenge in many parts of the globe, and plenty of people suffer from an inadequate quantity and quality of water. Despite significant progress in EU member states in reducing pollution from fixed sources like industrial and municipal waste-water treatment plants, diffuse pollution from agriculture and concrete run-off remains a challenge and enhancements in freshwater quality aren't always easy to discern. Biochemical oxygen demand is that the main indicator of water quality in rivers.

EU society has grown wealthier and created more and more rubbish. during this region alone we throw away 3 billion tones of waste annually – with some 90 million tones of it hazardous. This amounts to about 6 tones of solid waste for each man, woman and child, in step with Eurostat statistics. it's clear that treating and removing all this material without harming the environment becomes a serious headache. the most indicator of environmental quality during this area is municipal waste generated per capita, which indicates the speed of its accumulation and also the size of the matter in EU member states.

Raises altogether these selected indicators cause negative effects on environmental quality and quality of life.

Up to 50% of the population living in urban areas may are exposed to levels of ozone that exceed the EU's target value. The fraction of PM10 particles thought to be most poisonous is a smaller amount than 2.5 µm across and is termed PM2.5. Epidemiological studies conducted over the past 20 years have reported significant associations between short-term and long-term exposure to increased ambient PM concentrations and increased morbidity (such as cardiovascular and respiratory diseases) and (premature) mortality (Goldberg et al., 2001). PM10 particles are readily inhalable and, due to their small size, don't seem to be filtered and reach the upper a part of the airways and lungs (Arruti, Fernández-Olmo, & Irabien, 2010). Those smaller than 2.5 µm penetrate deep into the underside of the lungs, where they will get into the bloodstream – thus allowing many chemicals that are harmful to human health to succeed in internal organs and cause a large range of illnesses, including cancer, brain damage and harm to fetuses. Fine material (PM2.5) within the air has been estimated to cut back anticipation within the EU by over 8 months (Dockery, 2001, Katsouyanni et al., 2001). Although it's commonly assumed that there's no threshold below which the health effects of PM are unlikely to occur, the update of the WHO Air Quality Guidelines for PM proposed that benchmarks should be established to minimize the danger of adverse effects from both short-and long-term exposure to PM (WHO, 2004). These values are set at 20 µg/m3 as an annual mean and 50 µg/m3 as a daily mean for PM10, with corresponding values of 10 µg/m3 and 25 µg/m3 for PM2.5.

The ozone-exposure indicator for the urban population shows the population-weighted concentration of ozone to which the urban population is potentially exposed. The principle metric for assessing the consequences of this gas on human health is, in line with WHO recommendations, the daily maximum 8-h mean. Ozone effects should be assessed over a full year. Current evidence is insufficient to deduce grade below which ozone has no effect on mortality. However, for practical reasons it's recommended that an exposure parameter is taken into account that's the sum of the surplus of daily maximum 8-h means over the cut-off of 70 ¼ g/m3 (35 ppb) calculated for all days in an exceedingly year.

CO_2 emissions are the most think about global climate change. Particularly significant problems are associated with transport pollution, which has been constantly increasing within the EU.

In Table 2, the dynamics of urban population exposure to air by PM10 particulate matter and ozone, and people of average greenhouse gas emissions per kilometer from new passenger cars within the Baltic States and also the EU-27 average are presented.

Table 2. Dynamics of environmental quality indicators within the Baltic states and averages for the EU.

	2004	2005	2006	2007	2008	2009	2010	2011
Exposure of urban population to PM_{10}, $\mu g/m^3$								
EU average (27 countries)	27	28	30	28	26	26	26	27
Estonia	18	21	23	19	11	13	14	13
Latvia	23	24	23	24	24	20	24	23
Lithuania	23	23	20	21	19	23	27	23
Exposure of urban population to air pollution by ozone, $\mu g/m^3$								
EU average (27 countries)	3491	3677	4478	3611	3580	3648	3368	3706
Estonia	1299	1321	4331	2308	1381	1668	5467	2402
Latvia	1030	1308	1758	:	1354	1260	1213	1806
Lithuania	2909	5048	4621	1891	3653	2110	1416	3057
EU average (27 countries)	513	515	521	522	519	509	505	500
Estonia	449	436	399	449	391	337	303	298
Latvia	311	311	412	378	332	334	304	350
Lithuania	367	377	391	401	408	361	381	442

Biochemical oxygen demand in rivers, mg/l								
EU average (27 countries)	2.55	2,19	3.76	4.41	3.82	–	3.22	
Estonia	2.19	2.50	2.30	2.17	2.00	–	1.50	
Latvia	1.98	1.68	1.44	1.52	1.48	–	1.33	
Lithuania	2.90	2.80	2.90	2.50	2.70	–	2.80	
Carbon dioxide emissions from new passenger cars in EU, gCO_2/km								
EU average (27 countries)	160	159.0	159.0	158.7	153.6	145.7	140.3	135.7
Estonia	179	183.7	182.7	181.6	177.4	170.3	162	156.9
Latvia	192.4	187.2	183.1	183.5	180.6	176.9	162	154.4
Lithuania	187.5	186.3	163.4	176.5	170.1	166	150.9	144.4
Municipal waste per capita, kg								
EU average (27 countries)	513	515	521	522	519	509	505	500

Organic matter, measured as biochemical oxygen demand (BOD) and total ammonium, could be a key indicator of the oxygen content of water bodies. Concentrations of those parameters normally increase as a results of organic pollution caused by discharges from waste-water treatment plants, industrial effluent and agricultural run-off. Severe organic pollution may result in rapid deoxygenation of river water, a high concentration of ammonium and therefore the disappearance of fish and aquatic invertebrates. the foremost important sources of organic waste load are: household waste wa-

ter, industries like the paper and food-processing sectors; and silage effluent and manure from agriculture. The dynamics of biochemical oxygen demand in rivers within the Baltic states and also the EU average are presented in Table 2.
The EU's Sixth Environment Action Programmed identifies waste prevention and management collectively of 4 top priorities. the first objective is to decouple waste generation from economic activity so EU growth will not result in increasingly more rubbish – and there are signs that this can be commencing to happen. The region is reaching to significantly cut the quantity of rubbish generated through new waste-prevention initiatives, better use of resources, and encouragement of a shift towards more sustainable consumption patterns. The dynamics of municipal waste generated per capita within the Baltic states and also the average for the EU-27 countries are presented in Table 2.

As may be seen from the knowledge provided in Table 2, the exposure of the urban population in Lithuania to pollution by material was stable during the 2004–2011 period. Compared with the EU-27 average, it are often noted that exposure to pollution was lower for the entire period investigated, but it had been over WHO Air Quality Guidelines for PM10, which are set at 20 µg/m3 as an annual mean.

Between 2001 and 2011, 14–65% of the urban population within the EU-27 countries were exposed to ambient ozone concentrations that exceeded the EU target value set for the protection of human health (120 µg O3/m3 as a daily maximum 8-hourly average, to not be exceeded quite 25 times a yr, averaged over 3 years and to be achieved where possible by 2010). The 65% figure was recorded in 2003, which was the record year. There was no discernible trend over the amount until 2004. In Lithuania, the exposure of the urban population to pollution by ozone was less than the EU-27 average over the entire period investigated, but also significantly beyond the EU target value.

As shown by the data provided in Table 2, oxygen-demanding matter measured as BOD in European rivers decreased within the EU-27 by 55% (from 4.9 mg O2/l to 2.2 mg/l) from 1992 to 2010. The decrease is due mainly to improved sewage treatment resulting from implementation of the Urban Waste Water Treatment Directive and national legislation. The economic downturn of the 1990s in Central and Eastern European countries also contributed to the present fall because there was a decline in heavily polluting manufacturing industries. In recent years, however, downward trends in BOD across Europe have leveled off. this means that either further improvement in wastewater treatment is required, that other sources of organic pollution – like from agriculture – require greater attention, or both. In Lithuania, BOD was stable within the 2004–2010 period. it had been slightly above the EU-27 average and therefore the level in Latvia.

Table 2 shows that municipal waste generated by capita increased in Lithuania until 2008. The country's municipal waste per capita was 442 kg in 2010, a rise from 367 kg in 2005. it absolutely was below the EU-27 average (500 kg/capita) in 2010. In 2008, there was a major reduction, but a brand new increasing trend followed after the financial condition.

Compared to the EU-27 average, the Baltic states are performing better with reference to all environmental quality indicators except dioxide emissions per kilometer from new passenger cars.

4. Indicators of environmentally responsible behavior.

Environmentally responsible behavior is related to resource and energy savings, the employment of renewable energy sources rather than fossil fuels, waste recycling and proper waste-water management and disposal. the most indicators for this that were selected supported Eurostat data therefore include resource and energy productivity, the share of renewable in final energy consumption, the recycling rate for packaging waste, and sewage sludge production and disposal per capita. These indicators have a right away impact on quality of life because they're the most drivers of environmental quality. a rise in these indicators is therefore the required trend, and therefore the Baltic states will be compared, with higher values indicating the best-performing country.

Resource productivity is GDP divided by domestic material consumption (DMC). DMC measures the overall amount of materials directly employed by an economy. it's defined because the annual quantity of raw materials extracted from the domestic territory of the focal economy, plus all physical imports and minus all physical exports. it's important to notice that the term "consumption" as employed in DMC denotes apparent consumption and not final consumption. DMC doesn't include upstream flows associated with imports and exports of raw materials, and products originating outside of the focal economy. When examining resource productivity trends over time in an exceedingly single region, the GDP that ought to be used is in units of euros in chain-linked volumes to the reference year 2005 at 2005 exchange rates. If comparisons of resource productivity between countries are made, then the GDP in purchasing power standards should be used. Energy productivity is a very important indicator that's assessed by dividing GDP by primary energy consumption, and indicates a country's efficiency in energy use.

An increased use of renewables may be a priority in EU energy and environmental policy. More use of those results in a discount in GHG emissions and security of the energy supply because renewables are local and domestic energy-supply sources.

Table 3 presents the dynamics of resource and energy productivity and also the share of renewables in final energy consumption within the Baltic states, and averages for the EU.

	2004	2005	2006	2007	2008	2009	2010	2011
Resource productivity in the EU, EUR/kg								
EU average (27 countries)	1.39	1.4	1.42	1.43	1.46	1.57	1.65	1.6
Estonia	0.35	0.39	0.39	0.35	0.38	0.36	0.38	0.42
Latvia	0.31	0.3	0.31	0.32	0.37	0.39	0.34	0.32
Lithuania	0.49	0.51	0.55	0.51	0.49	0.62	0.57	0.56
Energy productivity in EUR/kg of oil equivalent								
EU (27 countries)	6	6.1	6.3	6.5	6.6	6.7	6.6	–
Estonia	1.8	2	2.3	2.2	2.2	2.1	1.8	–
Latvia	2.7	2.9	3.1	3.3	3.3	2.9	2.7	–
Lithuania	2.1	2.4	2.6	2.7	2.7	2.5	3.2	–

The share of renewables in final energy consumption, %								
EU average (27 countries)	8.1	8.5	9.0	9.7	10.4	11.6	12.5	13.0
Estonia	18.4	17.5	16.1	17.1	18.9	23.0	24.6	25.9
Latvia	32.8	32.3	31.1	29.6	29.8	34.3	32.5	33.1
Lithuania	17.3	17.0	17.0	16.7	18.0	20.0	19.8	20.3
Sewage sludge production and disposal per capita, kg								
EU average (27 countries)	18	18	20	20	22		22	
Estonia	22	22	20	21	17		16	
Latvia	16	13	10	10	10		11	
Lithuania	19	19	21	23	16		15	
Recycling rates for packaging waste, %								
EU (27 countries)	54.0	54.6	56.9	59.2	60.5	62.5	63.3	63.6
Estonia	33.5	40.3	45.7	49.6	43.5	57.2	56.1	62.9
Latvia	45.6	47	42.2	39.6	46.8	44.9	48.9	50.9
Lithuania	32.7	32.5	37	42.9	51.7	57.7	60.4	62.2

Table 3. Dynamics of indicators for environmentally responsible behaviour within the Baltic states and averages for the EU.

Waste-water treatment and therefore the quality of both drinking and bathing water have

improved significantly in Europe over the past 20 years, but continued efforts are needed to further improve the standard of water resources. The bioaccumulation of mercury and a few persistent organic pollutants, for instance, may be high enough to boost health concerns in vulnerable population groups like pregnant women. The residual of waste-water treatment is sewage sludge.
being disposed of through agricultural uses (Table 3).

Between 1990 and 1995, the number 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. Recycling is that the main policy measure to cut back the negative impact of waste accumulated. Table 3 presents the dynamics of recycling rates for packaging waste within the EU.

As are often seen from the data provided in Table 3, the best-performing country in terms of indicators for environmentally responsible behavior is Estonia. Latvia is distinguished by a high share of renewable within the country's final energy consumption. Comparing energy- and resource-productivity indicators within the Baltic States with the typical for the EU-27, it may be noted that levels within the former are significantly lower, although trends are positive. Recycling rates for packaging waste in 2010 were highest in Lithuania among the Baltic States, although in 2004 the country was within the worst position among EU member states.

While the quantity of sludge generated per inhabitant depends on many factors and is therefore fairly variable across countries, the character of this sludge – being rich in nutrients, but also often loaded with high concentrations of pollutants like heavy metals – has led countries to hunt different pathways for its disposal, as illustrated in Table 3. Quite two-thirds of sewage sludge were composted in Estonia. Otherwise, alternative styles of disposal could also be wont to reduce or eliminate the spread of pollutants on agricultural or gardening land, including incineration and landfill.

Compared with the EU-27 average concerning environmentally responsible behavior, the Baltic states are performing better only in terms of the utilization of renewable energy sources, while all other indicators are behind.

5. Indicators for the consumption of environmental services.

Almost 75% of European citizens sleep in urban areas, a figure that's expected to extend to 80% by 2020. Under the 6th EAP, the “thematic strategy” on the urban environment highlights the results for human health of environmental challenges facing cities, additionally because the quality of lifetime of urban citizens and therefore the performance of cities. The aim is to boost the urban environment and make it more attractive and healthier to measure, work, and invest in while trying to scale back adverse impacts on the broader environment. the standard of life and also the health of urban dwellers depend strongly on the standard of the urban environment, which functions during a complex system of interactions with social, economic, and cultural factors.

The main indicators for the consumption of environmental services and amenities provided are selected supported data provided by Eurostat. These include an index of the sufficiency of websites designated under the EU Habitats Directive, the proportion of terrestrial area protected, total freshwater abstraction per capita, inland fishery products per capita, and area of forests and another wooded land per capita. a rise within these indicators shows an increase in the use of services provided by the environment, with a right away positive impact on the standard of life.

The index of sufficiency for member states measures the extent to which their proposals for Sites of Community Importance adequately cover the species and habitats listed in Annexes I and II to the habitats directive. A figure of 100% indicates the sufficiency of proposals for all Annex I terrestrial habitat types and Annex II terrestrial species of Community interest occurring in member states' territories. this is often a very important indicator of the standard of life linked to biodiversity-protection measures.

The dynamics of the sufficiency of web sites designated under the EU Habitats Directive and guarded terrestrial areas for Baltic states, yet as EU-27 averages, are presented in Table 4.

Water is important always, moreover as being an imperative resource for the economy and playing a fundamental part within the climate-regulation cycle. There are considerable differences in amounts of freshwater abstracted per inhabitant in each of the EU member states. This partly reflects the resources available, but abstraction practices also depend upon the climate and a country's industrial and agricultural structure.

Fish represent a natural, biological, mobile (sometimes over long distances) and natural resource. except for fish farming, fish within the wild are generally not owned until they need been caught – although some lakes and stretches of rivers is also privately owned. Fish stocks still be considered a resource provided by the environment for human needs. Catches of fishery products include items taken for all purposes (commercial, industrial, recreational, and subsistence) by every type and classes of fishing units operating in inland, inshore, offshore, and high-seas fishing areas. The catch is often expressed in live weight and derived through the appliance of conversion factors to the landed or product weight. As such, catch statistics exclude quantities that are caught and brought from the water (that is, before processing) but which, for a spread of reasons, aren't kept.

The main function of forests in Europe has traditionally been for wood production. However, the recreational and tourism functions of those resources have become more important in many of the region's countries – particularly their benefits for economic development, health and well-being, and quality of life.

The dynamics of total freshwater abstraction, inland fishery products, and area of forests per capita within the Baltic states and EU

Averages are presented in Table 4.

	2004	2005	2006	2007	2008	2009	2010
Sufficiency of sites designated under the EU Habitats Directive, %							
EU average (27 countries)	80	80	83	84	84	–	89
Estonia	84	84	84	84	84	–	98
Latvia	88	88	89	89	89	–	95
Lithuania	61	61	61	61	61	–	66
Protected terrestrial area, %							
EU average (27 countries)	14	14	14	14	14	14	14
Estonia	16	16	16	17	17	17	17
Latvia	11	11	11	11	11	11	11
Lithuania	10	10	10	10	10	13	14

Total fresh water abstraction per capita, m^3/capita							
EU average (27 countries)	620	612	613	587	587	–	577
Estonia	1295	1171	1160	1366	1197	–	1036
Latvia	99	103	91	93	93	–	93
Lithuania	951	690	611	670	673	–	720
Total inland fishery products, tonnes of live weight/capita							
EU average (27 countries)	0.9	0.9	0.8	0.8	0.8		0.8
Estonia	2.0	2.1	2.8	2.6	2.5		2.8
Latvia	0.4	0.4	0.4	0.4	0.4		0.4
Lithuania	1.3	1.1	1.1	1.6	1.5		1.5
Total area of forests and other wooded land per capita							
EU average (27 countries)	0.35	0.36	–	–	–	–	0.35
Estonia	1.72	1.69	–	–	–	–	1.76
Latvia	1.46	1.47	–	–	–	–	1.62
Lithuania	0.62	0.64	–	–	–	–	0.72

Table 4. Dynamics of indicators for the consumption of services provided by the environment within the Baltic states and averages for the EU.

As shown in Table 4, Estonia is distinguished by having high indicators for the consumption of environmental services. Particularly high levels are often seen for freshwater abstraction, inland fishery products per capita, and its protected terrestrial area. Lithuania has fairly low indicators for the consumption of environmental services compared with the opposite Baltic states, but the country is distinguished through positive trends for these indicators.

Concerning the consumption of environmental services, the Baltic States are performing better in the majority indicators.

Other important indicators include access to green areas and satisfaction with the standard of the local environment, but these aren't provided by Eurostat databases. Additionally to the target data and indicators presented above, subjective data on environmental quality therefore also provide critical information on environmental conditions. This indicator sheds light on people's subjective appreciation of the environment within which they live, and relies on the subsequent two questions: “In the town or area where you reside, are you satisfied or dissatisfied with the air quality?” Since the sample is tiny and also the data set suffers from other methodological limitations, evidence from this indicator must be in love caution.

Another subjective indicator concerning access to green areas refers to the share of individuals who have “very many reasons” or “many reasons” to complain about the dearth of access to recreational or green zones, as measured on a four-item scale. Access to green spaces is crucial for the standard of life because an unspoiled environment could be a source of satisfaction (Milligan, Gatrell, & Bingley, 2004), improves mental well-being (Brown & Grant, 2007), and allows people to get over the strain of way of life (Mace et al., 1999) and perform physical activity. Cross-sectional studies found that levels of physical activity are higher and obesity lower in areas with more greenery (Ellaway, Macintyre, & Bonnefoy, 2005). Because the samples are small and therefore the data set suffers from other methodological limitations, the evidence from this indicator also should be crazy caution.

6. Integrated index of quality of life in terms of the environment.

To compare countries in terms of environmental indicators associated with the standard of life, integrated indices were developed for Lithuania, Latvia, and Estonia.

The integrated index IE of quality of life-related to the environmental dimension is often assessed by applying the subsequent formula:

$$I_E = \sum_i a_i I_i; \qquad (1)$$

where Ii is that the integrated index of environmental indicators; ai is that the weights of integrated indexes of environmental indicators (), and IDV is that the integrated index of quality of life-related to the environmental dimension.

As in our case, we've three groups of indicators, so Eq. (1) is presented within the following way:

$$I_E = a_1 I_{EQ} + a_2 I_{ER} + a_3 I_{CE}; \qquad (2)$$

where IEQ is that the integrated index of environmental quality; IER is that the integrated index of environmentally responsible behavior; ICE is an integrated index for the consumption of environmental services, and a1, a2, and a3 are the weights of the integrated indicators .

Each of those integrated indicators consists of 5 indicators and are developed by applying the formula:

$$I_n = \sum_{i=1}^{n} w_i \cdot Q_{in} \text{ here : } \sum_{i=1}^{n} w_i = 1; \qquad (3)$$

where In is that the integrated index of an environmental indicator at time n, Qin is that the index of the environmental indicator I at time n; and wi is that the weight of indicator I;

The index of environmental indicator i is obtained by using the subsequent formula if a rise in indicators is that the desirable trend:

$$Q_{in} = q_{ni} / q_{oi}; \qquad (4)$$

Where Qin is that the index of the environmental indicator I at time n; qi is that the value of environmental indicator I at a time for a particular country, and qoi is that the value of environmental indicator I at time n for the EU-27 average.

If a rise in indicators is an undesirable trend, inverted indicators should be calculated as within the case of environmental quality indicators:

$$Q_{in} = 1/\left(q_{ni}/q_{oi}\right) \quad (5)$$

Table 5 presents the dynamics for the integrated indices of quality of life relevant to the environment for the Baltic states. These were obtained by normalizing all indicators supported EU average data (Eq. (4)). All indicators and integrated indices are treated equally, so weights haven't been applied within the assessment of integrated indices for quality of life. More research and surveys by experts are needed to define the weights of indicators in integrated indices.

	2004	2005	2006	2007	2008	2009	2010	2011
Environmental quality indicators								
Exposure of urban population to PM_{10} index								
Estonia	1.49	1.33	1.30	1.47	2.38	2.00	1.87	2.08
Latvia	1.18	1.16	1.30	1.16	1.09	1.30	1.09	1.18
Lithuania	1.18	1.22	1.49	1.33	1.37	1.14	0.96	1.18
Exposure of urban population to air pollution by ozone index								
Estonia	2.70	2.78	0.83	1.56	2.56	2.17	0.62	1.54
Latvia	3.33	2.85	2.56	2.04	2.63	2.83	2.78	2.04
Lithuania	1.20	0.73	0.97	1.92	0.98	1.72	2.38	1.22
Biochemical oxygen demand in rivers index								
Estonia	1.16	0.88	1.64	2.04	1.92	–	2.17	–
Latvia	1.28	1.32	2.63	2.94	2.56	–	2.44	–
Lithuania	0.88	0.78	1.27	1.75	1.41	–	1.16	–

Biochemical oxygen demand in rivers index								
Estonia	1.16	0.88	1.64	2.04	1.92	–	2.17	–
Latvia	1.28	1.32	2.63	2.94	2.56	–	2.44	–
Lithuania	0.88	0.78	1.27	1.75	1.41	–	1.16	–
Carbon dioxide emissions per kilometre from new passenger cars index								
Estonia	0.89	0.87	0.87	0.88	0.87	0.85	0.86	0.87
Latvia	0.83	0.85	0.87	0.86	0.85	0.83	0.86	0.88
Lithuania	0.85	0.85	0.97	0.90	0.90	0.88	0.93	0.94
Municipal waste per capita index								
Estonia	1.13	1.18	1.30	1.16	1.33	1.51	1.67	1.67
Latvia	1.63	1.63	1.26	1.39	1.56	1.52	1.67	1.43
Lithuania	1.22	1.37	1.33	1.12	1.27	1.41	1.33	1.14
Environmental quality index								
Estonia	7.37	7.04	5.94	7.11	9.06	–	7.19	–

Environmental quality index								
Estonia	7.37	7.04	5.94	7.11	9.06	–	7.19	–
Latvia	8.25	7.81	8.62	8.36	8.69	–	8.84	–
Lithuania	5.33	4.95	6.03	7.02	5.93	–	6.76	–
Environmentally responsible behaviour indicators								
Resource productivity index								
Estonia	0.25	0.27	0.28	0.25	0.26	0.23	0.23	0.26
Latvia	0.22	0.21	0.22	0.22	0.25	0.25	0.21	0.20
Lithuania	0.35	0.36	0.39	0.36	0.33	0.40	0.35	0.35
Energy productivity index								
Estonia	0.30	0.32	0.36	0.34	0.33	0.31	0.27	–
Latvia	0.45	0.47	0.49	0.51	0.50	0.43	0.41	–
Lithuania	0.35	0.39	0.41	0.42	0.41	0.37	0.49	–
Estonia	2.27	2.00	1.79	1.76	1.82	1.98	1.97	1.99
Latvia	4.05	3.80	3.50	3.05	2.87	2.96	2.60	2.55
Lithuania	2.14	2.0	1.89	1.72	1.73	1.72	1.58	1.56
Sewage sludge production and disposal per capita index								
Estonia	1.22	1.22	1.00	1.05	0.77	–	0.72	–
Latvia	0.89	0.72	0.50	0.50	0.45	–	0.50	–
Lithuania	1.05	1.05	1.05	1.15	0.73	–	0.68	–
Recycling rates for packaging waste index								
Estonia	0.62	0.73	0.80	0.83	0.72	0.92	0.89	0.98
Latvia	0.84	0.86	0.74	0.67	0.77	0.72	0.77	0.80
Lithuania	0.61	0.60	0.65	0.72	0.85	0.92	0.95	0.98

Environmentally responsible behaviour index								
Estonia	4.66	4.54	4.23	4.26	3.90	–	4.08	–
Latvia	6.45	6.06	5.45	4.95	4.84	–	4.49	–
Lithuania	4.47	4.40	4.39	4.40	4.05	–	4.05	–
Consumption of environmental services indicators								
Sufficiency of sites designated under the EU Habitats index								
Estonia	1.05	1.05	1.01	1.00	1.00	–	1.10	–
Latvia	1.10	1.10	1.07	1.06	1.06	–	1.07	–
Lithuania	0.76	0.76	0.73	0.72	0.73	–	0.74	–
Protected terrestrial area index								
Estonia	1.14	1.14	1.14	1.21	1.21	1.21	1.21	–
Latvia	0.79	0.79	0.79	0.79	0.79	0.79	0.79	–
Lithuania	0.71	0.71	0.71	0.71	0.71	0.92	1.00	–
Total inland fishery products per capita index								
Estonia	2.22	2.33	3.50	3.30	3.10	–	3.50	–
Latvia	0.44	0.44	0.50	0.50	0.50	–	0.50	–
Lithuania	1.44	1.22	1.38	2.00	1.88	–	1.88	–
Total area of forests and other wooded land per capita index								
Estonia	4.91	4.69	–	–	–	–	3.03	–
Latvia	4.17	4.08	–	–	–	–	4.63	–
Lithuania	1.77	1.71	–	–	–	–	2.06	
Consumption of environmental services index								
Estonia	11.4	11.1	–	–	–	–	10.6	–
Latvia	6.66	6.58	–	–	–	–	7.15	–
Lithuania	6.21	5.53	–	–	–	–	9.37	

Integrated environmental index of quality of life								
Estonia	23.4	22.7	–	–	–	–	21.9	–
Latvia	21.4	20.5	–	–	–	–	20.5	–
Lithuania	16.0	14.9	–	–	–	–	20.2	–

Table 5. The dynamics of integrated indices for quality of life relevant to the environment within the Baltic States.

The dynamics of integrated indices of quality of life relevant to the environment within the Baltic states are presented in Table 5. These were calculated by applying the information in Tables 2 and three and also the formulas presented above. As a rise in indices may be a desirable trend, with the next index representing the next quality of life, the indices of environmental quality indicators were assessed in an inverted form because Eurostat data for this is often presented within the variety of negative indicators (such because the exposure of the urban population to pollution, biochemical oxygen demand and municipal waste per capita).

From the knowledge in Table 5, the best integrated index of quality of life in terms of the environment was attained by Estonia in 2010. Lithuania and Latvia had very similar integrated indices, but the event trends of those indices since 2004 were diverse. Lithuania is distinguished from the opposite Baltic states by having very positive trends in terms of the event of all indicators and also all-time low greenhouse gas emissions per kilometer from new passenger cars, moreover as fairly high productivity indicators for energy and resources. within the 2004–2010 period, the integrated environmental index of quality of life increased significantly in Lithuania. At the identical time, these indices have declined in Estonia and Latvia. Policies implemented in Lithuania since EU accession has therefore had a positive impact on improvements in quality of life in terms of the environment.

Concerning the standard of the environment, the simplest in 2010 was in Latvia – mainly as results of low indicators for the exposure of the urban population to ozone and biochemical oxygen demand in rivers. In terms of indicators for environmentally responsible behavior, the best-performing country was also Latvia, mainly because high energy production rates and an oversized share of renewable in energy consumption were associated with a high share of hydropower in electricity generation. The best-performing country in terms of consumption of environmental services was Estonia, mainly due to a high level of freshwater abstraction and inland fishery rates per capita. The high level of consumption of environmental services in Estonia gave the county the very best integrated environmental index.

7. Conclusions

1. The set of indicators presented during this paper summarizes information about major aspects of environmental quality and their impact on quality of life. These indicators relevant to quality of life are: quality of environment, environmentally responsible behavior and services provided by the environment.

2. The environmental quality indicators encompass some environmental mediums (such as soil, water, air and waste). However, thanks to the shortage of relevant data for a few of those and evidence of sizeable effects from air pollutants on human health, most attention has been paid to pollution indicators associated with environmental quality. the target measure of air quality employed in this paper takes into consideration PM10 and ground ozone concentrations only. Biochemical oxygen demand in rivers was selected as a water-quality indicator and municipal waste per capita was selected as an indicator to assess environmental quality in terms of waste generated.

3. Lifestyle and environmentally responsible behavior have a big impact on environmental quality, so several important indicators were selected to assess the patterns with relevance these that might result in savings in resources and energy and increase the utilization of renewable energy sources, sewage sludge disposal and packaging waste recycling. The symptoms of environmentally responsible behavior select-

ed within the paper correspond to environmental quality indicators addressed within the study (namely, atmospheric emissions, pollution and also the generation of waste).

4. The consumption of services provided by the environment contains a significant impact on quality of life and is additionally associated with environmental quality indicators like air, water and land pollution by waste contains a negative impact on environmental services and amenities like forest area, sufficiency of web sites designated under the EU Habitats Directive, water abstraction and inland fishery products per capita.

5. Integrated environmental indicators relevant to the standard of life were calculated for the Baltic States on the idea of objective data provided by Euro stat databases. The indications were normalized using EU-averaged data and indices were obtained for the standard of the environment, environmentally responsible behavior and services provided by the environment. These were summed to get an integrated environmental indicator for quality of life.

6. The analysis of integrated environmental indices for the Baltic States indicated that Estonia had the best integrated index in 2010. Lithuania and Latvia had very similar integrated indices in 2010, but the trends in terms of development of those indices were diverse.

7. With relevancy the standard of the environment, the simplest situation was revealed in Latvia in 2010, mainly thanks to low indicators for exposure of the urban population to ozone and biochemical oxygen demand in rivers.

8. With reference to indicators for environmentally responsible behavior, the best-performing country was again Latvia, mainly because high energy productivity rates and an oversized share of renewable in final energy consumption were associated with a high share of hydropower in electricity generation.

9. With relation to the consumption of environmental services, the best-performing country was Estonia, mainly due to high H2O abstraction rates and total inland fishery rates per capita. The high rates of indicators for the consumption of environmental services in Estonia gave it the best integrated environmental index.

10. Lithuania is distinguished from the opposite Baltic States by very positive trends in terms of the event of all indicators and by all-time low indicator for CO2 emissions per kilometer from new passenger cars and fairly high energy and resource productivity indicators.

11. In the 2004–2010 periods, the integrated environmental index of quality of life increased significantly in Lithuania, but declined in Estonia and Latvia. The policies implemented in Lithuania since EU accessions have therefore had a positive impact on growth in quality of life in terms of the environment.

12. The objective data on environmental quality have to be combined with data on people's subjective perceptions of local environmental quality to produce a more detailed picture of both the determinants of satisfaction with the standard of natural assets and also the socio-economic distribution of environmental impacts. More may be achieved by developing and coordinating activities during this field.

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