Analytical Assessment of Sustainable Development Concept

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***Abstract* – Generally, sustainability dimension is related to a context, timing and scale. Although the context of sustainability can be various – either general or more specific, the timing is oriented to the long-term, but the scale has a global nature. The main purpose of the paper is to assess analytically the sustainable development concept. This new approach for solving the problems and achieving the goals of sustainable development is related to efficiently applied systems approach that determines necessity to amalgamate political, economical, social and ecological systems of the state into a unified system of sustainable development. The findings of the study show the impact of the effect of ecological footprint and of international experience on possibilities to evaluate sustainable development. Sustainable development concept is open to a variety of interpretations. Comprehensive and comparative approach, exploring sustainable development concept in the light of global processes, leads to an experience of measuring and finding the specific applications of the concept, including land management field.**

***Keywords* – sustainability, sustainable development, ecological footprint, measuring, indicators**

I. INTRODUCTION

Sustainable development concept is discussed, analysed and interpreted frequently in relation to different development theories. Main context of this concept is concerned with economic growth and its limitation, social development and security, environmental protection, and humanly accepted being all around the world. Thus, the sustainable development issues are topical globally and they are becoming more and more important interacting with challenges of 21st century. The necessity for deliberative and new approach ensuring sustainable development was stressed during the discussions of International Union for Conservation of Nature (IUCN) meeting in 2006 [1].

The origin of sustainable development concept emanates from previous century when, within the framework of IUCN, interrelation between human and nature, as well as significance of natural resources for ensuring sustainable quality of life was stressed in 1969. The idea of '*limits to growth*' prevailed in the concept of environmentalism proposed by Club of Rome's in 1970-ies [2]. The necessity for promoting economic growth and managing large economic activities without damaging environment was recognised during the conference, which was organised by UN in Stockholm in 1972 [3]. The study of IUCN named '*World Conservation Strategy*' was published in 1980; the '*Brundtland Report*' was carried out and published by the UN commission in 1987; and the conference on environmental and development issues was organised in Rio in 1992. Many national governments, managing organisations of the economic sectors, leading enterprises and different NGO's included guidelines, principles and liabilities of sustainable development within their strategic planning documents for the forthcoming years.

The content of sustainable development concept was actualised and definition given by mentioned Brundtland Report. In the report, sustainable development is defined as '*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*' [4; 5]. This official definition of sustainable development is recognised as abstract and indefinite. However, many organisations make reference to this definition and widely include it in various documents and publications with different interpretations. For instance, it is used by European Commission in the report on activities of EU in 2005 [6]; by Ministry of Environment of the Republic of Latvia in the Conception of Sustainable Development [7], and in the Sustainable Development Strategy of Latvia until the 2030 [8]. In the Brundtland Report, sustainable development is related to *externalities* – the effect of interaction of both economics and environment [4]. Subsequently this formulation was afforced by UN in the World Summit in 2005. The outcome document of this summit includes the statement that sustainable development is concerned with three major pillars (dimensions) – *economic growth; social progress;* and *environmental protection* [9; 1]. Such a model of sustainable development prescribes interaction of the mentioned three pillars to achieve the balance of correlative matters – *equitability; bearability;* and *viability*.

Exploring various documents and publications, it can be stated that the concept of sustainable development, which is implemented within this framework of the UN, has been broadly criticised by the scientists, experts and officials. Criticism mainly concerned the content and practical usability of the concept. Professor of the University of Kenbridge Adams among other problems points to '*problem of metrics*'. He concludes in the report [1]: '*There is no agreed way of defining the extent to which sustainability is being achieved in any policy programme. Sustainability and sustainable development are effectively ethical concepts, expressing desirable outcomes from economic and social decisions. The term 'sustainable' is therefore applied loosely to policies to express this aspiration, or to imply that the policy choice is 'greener' than it might otherwise be…'.* Thus, the issue of specific criteria and indicators of sustainable development became topical for the purpose to measure and compare the goals and objectives stated in various policy planning documents, programmes, and projects. Otherwise, the theoretical statements on sustainable development and determined priorities will not be related to the implementation of practical decisions.

This study focuses on analysis of sustainable development concept and its detailed interpretation. The research *hypothesis*: sustainable development concept is related to political economic context and global nature primarily, and its analytical assessment leads to understanding various interpretations and finding the specific applications of the concept. Thus, the *aim* of the study is to make analytical assessment of sustainable development concept to identify its nature, possibilities of measuring and application in the land management field. The following *tasks* are addressed to achieve the set aim: 1) explore the effect of ecological footprint; 2) gain a cross-border experience on possibilities to measure sustainable development; 3) find out the sustainability dimension in the land management field.

The *methodology* of this study is closely related to the tasks that are set to achieve the aim of the research, thus historical and logical approach, comparative analysis and synthesis methods are employed.

II. Results and Discussion

1. Influence of society upgrowth to sustainable development

Practical usability of sustainable development concept, and its interpretation and extrapolation is not unambiguous, therefore it runs into diverse problems, including political ones. Sustainable development cannot be an end in itself, but it has to be directed towards enhancing of common public benefits globally. Main worldwide development problems are related to satisfaction of primary needs of increasing population in the conditions of economic globalisation, when the land resources decrease, environmental degradation intensifies, and the amount of consumed natural resources exceeds the potential of renewables' usage gradually.

Development of society creates *externalities* that influence the environment in an integrated way. This influence may be seen as *ecological footprint* (EF). EF reflects the biologically productive land and sea area needed for provision of resources that one global inhabitant uses on the average when acquiring necessary goods and services. Global hectare is a measure unit of EF. This unit is calculated taking into account the utilised resources during the year and productive areas of lands and waters needed for production of these resources [10].

The influence of global economy on the environment and natural resources is reflected in the model in Fig.1.

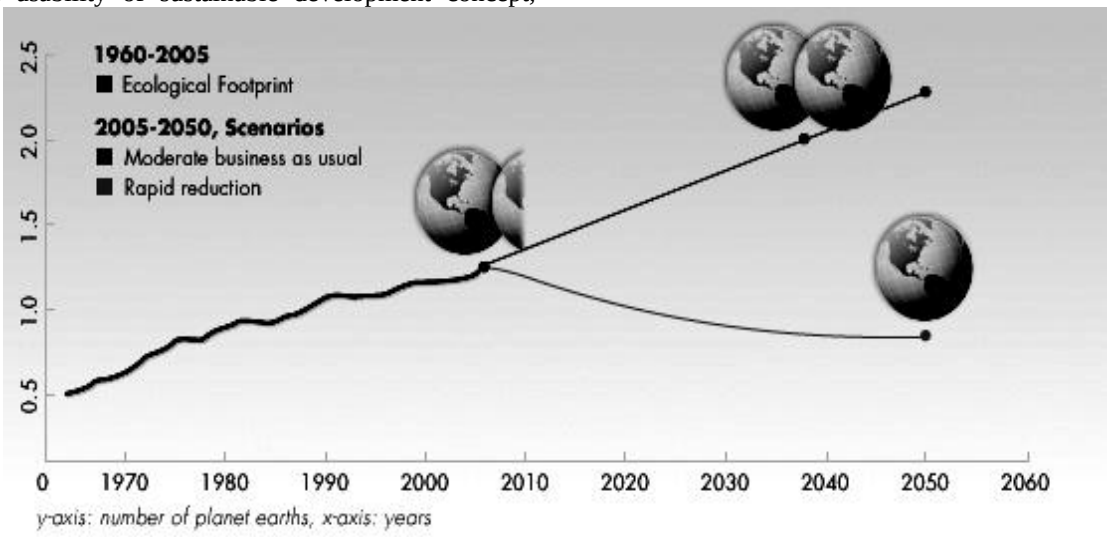

Fig.1. World's EF and possible scenarios of its growth
Source: Global Footprint Network [11]

Fig.1 shows explicitly upturned growing trend of EF with insignificant deviations from linear function. Regular increase of consumption of natural resources led to the area of 1.25 globes that was needed to revive the utilised natural resources in 2010. There will be the need for the area of entire 2 globes, if the intensity of use of renewable natural resources is not reduced by 2040. The model of previous changes gives more detailed notion of the composition of EF.

Assessing the changes of EF worldwide during the period of time from 1960 to 2005 [12], it is recognised that the world population utilised nearly 60% of total amount of Earth's biological capacity at the beginning of 1960-ties. It means that during the same time for producing of consumed goods and services by world's population, approximately 45% of the produced renewable natural resources remained unused, and thus left for the needs of future generations. The situation changed substantially in 2005, when the Earth's biological capacity was exceeded for about 30%. Considering the growth of the volume of consumed goods and services, the parity of demand and supply was achieved – green horizontal line in the model, in the late 1980-ies, so it sustained for 35 years.

During the following years the Earth's biological capacity and revivability of natural resources was behind the amount of consumed resources during the year, thus the world's population more and more lived at the costs of next generations. This also means that the population of world's poorest countries has fewer possibilities to get access to food, drinking water and other necessary means of existence. The

world's EF came to 17.5 billions of gha, so – 2.7 ha per world's inhabitant on average, but the reviveability of natural resources, and thus the supply of the resources, covers the EF, which doid not exceed 2.1 gha in 2005. It clearly demonstrates the renunciative attitude of world's politicians to the idea of sustainable development and its implementation in practice for their own merits. These issues are discussed at various conferences, but the danger of natural calamities increases annually, thus the strain increases among the people in different parts of the world.

To maintain the balance of demand and supply of the natural resources, the scientists of Riga Technical University proposed possible solutions on the basis of estimations [10]:

a) the world's population *has to reduce* an amount of consumed goods and services by at least 23.2%, taking into account the level of consumption in 2005;
b) the Earth's biological capacity *has to be increased* by 28.6%.

Possible solutions for the purpose of preservation of the reviveability of natural resources should consider the global nature of sustainable development problems, as well as point at the necessity for the individuals to refuse a considerable proportion of satisfaction of their needs. Increasing the Earth's biological capacity means remarkable enlargement of productive territories: land and water, which contribute to formation of renewable natural resources. However, this enlargement most probably will occur because of both the efficient usage of the resources (labour, technology, etc.) and effective growth of each country. It will facilitate solving of sustainable development problems to a certain extent.

Unfortunately, assessing the changes of EF worldwide from the Living Planet Report 2010 [13], it is recognised that in 2007, the most recent year for which the data are available, humanity used the equivalent of 1.5 globes to support its activities. In other words, now it takes a year and six months for the Earth to absorb the CO_2 emissions and regenerate the renewable resources that people use during one year. Carbon dioxide is the major driver to ecological overdraft. Admittedly, the people are indolent to change their habits and limit their needs. However, wilful disability of the humans to discover competitive replacement of petroleum products during many decades can be seen as the major technological backwardness.

Professor Adams mentioned above is just one of the scientists, who propose the necessity of a new approach to the purpose of implementation of sustainable development. Scientists of Riga Technical University offer a new definition as particular solution of the global problems – overexploitation of natural resources and elimination of Earth's biological capacity in the framework of national dimension [10]. Thus, according to this new approach, *'sustainable development'* is defined as *'stable way of development of socially economic system, which keeps the balance among consumed goods within the system and the increase of biological resources in the corresponding period of time, when exchange between the end products and resources exists on the basis of ecologically appropriate prices'*. Such exposition of sustainable development issue is aimed at the achievement, assessment and comparison of set indicators for a particular period of time. Thus, sustainability is related with self-dependence of economic operation and freedom in the specific legal environment. Foreign trade of the natural resources can influence sustainable development of the appropriate country substantially because of possible benefits that may come from comparative advantages. However, cross-border transactions often promote well-being growth of one country at the costs of another country. Hence the above stated ecologically appropriate prices are related to the prices of exchanged resources that are compatible with the economically and ecologically grounded costs, which are necessary for the biological renewal of the resources in the appropriate country.

2. Measuring sustainable development

Joint UNECE/OECD/Eurostat Working Group on Statistics for Sustainable Development was established in 2005. The aim of the working group was to identify usable concepts and experience that would help national governments and international organisations to develop the indicator sets of sustainable development. Working group prepared the report '*Measuring sustainable development*' in 2008 [14]. The report is concerned with the conceptual framework for evaluation of sustainable development on the basis of capital approach. It includes identified indicator sets that are embraced into data systems of 22 countries, and comes forward with a small set of indicators for the purpose of making cross-border comparisons (form small set to core set) as research proposal. 27 indicators, which were common only to 10 indicator sets, were selected as a result of the analysis.

Assessing the results of the analysis, which are included into the report, it can be concluded that the identified indicator sets and selected official social economic indicators could be used for cross-border comparisons. However, it has to be admitted that the official data of the surveyed countries are determined using different methodologies and context. Similarly, the insight of sustainable development issues is distinctive to the creators of particular indicators. Thus, the objective detection and usage of available indicators for cross-border comparisons need preliminary studies. Furthermore, as stated in the report – 'the number of national sustainable development indicators in the countries, for which comparative analysis was possible, ranged from 12 to 187 with component indicators taken into account. In some cases, the indicators were found embedded in national policy frameworks and in others in separate indicator reports' [14]. France has the least number of indicators – 12. Inspecting data about the Baltic countries, it is recognised that Lithuania has 75 indicators, Estonia – 95, but Latvia has the most – 187(!) indicators. In general, it increases data administration costs and diminishes the efficiency of data usage.

It can be concluded that the approach to measuring of sustainable development is being seen as formal and over distinctive in the global context. Therefore, it would be more proper to conclude a mutual agreement on sustainable development concept and use a unified methodology and indicators according to the context of the study that should be enforced by binding document, in the same way as it was done establishing the system of national accounts by the UN in 1993.

Standing apart from specific indicators that characterise sustainable development in the report [14], the most common sustainable development *indicator themes* and *number of indicator sets* that were found[1] (given in brackets) in policy-based sets have been selected:

- management of natural resources (24);
- climate change and energy (21);
- sustainable consumption and production (20);
- public health (19);
- social inclusion (19);
- education (19);
- socio-economic development (18);
- transport (16);
- good governance (16);
- global dimension of sustainable development (16);
- research & development, innovation (15).

The above mentioned indicator themes represent three dimensions of sustainable development that are included into the model of 'Brundtland Report'. Thus, these indicator themes should form the interaction of measurable indicators for the purpose to achieve the preferable balance for assessment and implementation of sustainable development. Examining the indicator themes, it is obvious that *institutional issues* have a meaningful role in achieving the necessary balance.

European Commission maintains the statistics for monitoring the EU sustainable development strategy. Sustainable development indicators are available in an online database and published in a report by *Eurostat* every two years [15]. These indicators are presented in 10 themes. *Eurostat* provides data of more than 100 indicators, currently 11 have been identified as *headline indicators*. They are intended to give an *overall picture* of whether the EU has achieved progress in sustainable development in terms of the objectives and targets defined in the strategy. For a more complete picture it is necessary to look at the progress of all indicators within a theme [15].

The evaluation of the progress since 2000 based on the headline indicators shows a rather *mixed picture*. Comparing the indicator themes of the *Eurostat* [15] and the report [14], it can be concluded that *Eurostat* provides data about 'demographic changes', but does not provide data on 'education' and 'R&D, innovation'. Monitoring report of the EU sustainable development strategy of 2009 shows the progress towards sustainable development in the EU. Thus, changes between 2000 and 2008 look rather favourable for 'GDP per capita' (socio-economic development theme) and 'resource productivity' (sustainable consumption and production theme). These two indicators are interconnected, thus 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. It is important to note that the term "consumption" as used in DMC denotes *apparent consumption* and not final consumption. DMC does not include upstream flows related to imports and exports of raw materials and products originating outside of the focal economy. Although the changes show that the use of resources in terms of DMC is growing at a slower annual rate than GDP, these indicator themes do not reflect how much natural resources have left over, and what is revivability capacity of these resources.

The 'good governance' theme contains *no headline indicator* as no indicator was judged to be sufficiently robust and policy-relevant to provide a comprehensive overview of the good governance concept.

III. Conclusion

The concept of well-being has much potential for measuring sustainable development if it is broadened beyond its traditional scope of economics, as it has been stressed in the report. Thus, for measuring sustainable development, well-being is seen as function of consumption in the broadest sense possible that include the enjoyment of any good or service, including things provided by nature like forests, water or beauty of landscape. Assessing current approaches to measuring sustainable development, it can be concluded that well-being of inhabitants is understood differently, and the concept of sustainable development is interpreted differently in different countries.

Sustainability refers to the *future-oriented changes*, therefore, there is a necessity to achieve in future what lacks or is not achieved today, including positive changes in the minds of the people. The challenges of sustainable development have to be solved through mutual agreements among participating countries about particular objectives on the *global scale*.

The tendency of EF growth points out to the fact that there are no potentialities of GDP growth without assessment of both the resources, which are needed for ensuring it, and the following probable increase of the consumption level in the future. Obviously, it is essential to reduce rapidly the consumption of the resources, and consequently of EF. Thus, unreasonable consumption must be eliminated and the level of consumption should be controlled. Both the growth of GDP and the level of well-being of population have to be achievable taking care about the renewability of necessary resources in adequate extent and quality. Respectively, saving and reasonable usage of natural resources has become of particular importance. For instance, innovative knowledge based and sustainable technologies play a significant role, when prospecting the alternative substitute to petroleum products.

Various research papers are concerned with studies analysing how much biodiversity costs. Thus, it is a recognised opinion that the ecosystems whose goods and services are consumed directly may be evaluated in monetary terms. However, such systems form the smallest part, because studies have shown that the major part of ecosystems' goods and services, which are provided by 'ecological chains', are not directly used in consumption. Thus, considering also the tendency for EF growth, it can be reasonably assumed that the value of Earth's ecosystems and biodiversity is at least double the value that is produced by world's economics.

Official statistical data of national data systems have to be selected using unified methodology and indicators. Availability of these data has to be provided by single database, for instance, *Eurostat* database. Thus, it would be possible to

[1] Themes that appeared in 10 or more indicator sets [14]

develop the indicator sets according to unified criteria or indicator themes that would contribute to unambiguous cross-border comparisons of particular data and assessments of sustainable development.

The findings of the study expose a political economic context and global nature of the sustainable development concept. Many interpretations and applications of this concept are aimed at solving the problems based on both the political willingness and decision making issues. Land management can be seen as context for application of sustainable development concept. Therefore, determination of the unified criteria and indicator system would form the necessary preconditions for sustainable use of land resources, balancing spatial development on the one hand, and preservation and reviveability of natural resources on the other hand.

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Armands Auziņš, Jānis Vanags. Ilgtspējīgas attīstības jēdziena analītisks izvērtējums

Ilgtspējīgas attīstības jēdziens bieži tiek apspriests, analizēts un interpretēts saistībā ar dažādām attīstības teorijām. ANO komisija 1987.gadā publicēja „Bruntlandes ziņojumu", kurā "ilgtspējīga attīstība" ir definēta kā "attīstība, kura apmierina šodienas vajadzības, neierobežojot nākamo paaudžu iespējas viņu vajadzību apmierināšanā". Šajā ziņojumā "ilgtspējīga attīstība" tiek saistīta ar blakusefektiem – ekonomisko procesu un apkārtējās vides mijiedarbības efektiem. Tādējādi ilgtspējīga attīstība ietver trīs galvenos pīlārus jeb dimensijas – ekonomisko izaugsmi, sociālo drošību un vides aizsardzību. Šāds ilgtspējīgas attīstības modelis raksturo minētās trīs dimensijas, lai nodrošinātu līdzsvaru starp savstarpēji atkarīgām substancēm – taisnīgumu, paciešamību un dzīvotspēju. Tomēr daudzu valstu attiecīgo politiku pamatnostādnēs atšķirīgi noteikti sasniedzamie mērķi (izpildāmie rādītāji), lai rezultatīvi varētu novērtēt ilgtspējīgas attīstības modelī ietverto substanču līdzsvarotību. Izvērtējot pašreizējās pieejas ilgtspējīgas attīstības noteikšanā (izmērīšanā), var secināt, ka iedzīvotāju labklājība tiek izprasta dažādi un ilgtspējīgas attīstības jēdziens dažādās valstīs tiek lietots daudzās interpretācijās. Jauna pieeja problēmu risināšanā un ilgtspējīgas attīstības mērķu sasniegšanā ir saistāma ar efektīvi piemērotu sistēmisku pieeju, kas nosaka nepieciešamību apvienot valsts politisko, ekonomisko, sociālo un ekoloģisko sistēmu vienotā ilgtspējīgas attīstības sistēmā. Pētījuma secinājumi atklāj ekoloģijas ietekmi uz apkārtējo vidi un starptautisko pieredzi ilgtspējīgas attīstības novērtēšanā. Visaptveroša un uz salīdzinājumiem balstīta pieeja ilgtspējīgas attīstības koncepcijas izpētē, ņemot vērā globālos procesus, parāda jēdziena vērtēšanas (izmērīšanas) un specifiskas pielietošanas pieredzi, tai skaitā zemes pārvaldības jomā. Zemes pārvaldību var uzskatīt par jomu ilgtspējīgas attīstības jēdziena pielietojamībai. Tādējādi vienotu kritēriju un rādītāju sistēmas noteikšana veidotu zemes resursu ilgtspējīgas izmantošanas priekšnoteikumus, līdzsvarojot telpisko attīstību un dabas resursu saglabāšanu un spēju atjaunoties.

Армандс Аузиньш, Янис Ванагс. Аналитическая оценка концепции устойчивого развития

Концепция устойчивого развития часто обсуждается, анализируется и интерпретируется в контексте различных теорий развития. Комиссия ООН в 1987 году опубликовала "Рапорт Брунтландеса", в котором "устойчивое развитие" определено как "развитие, которое удовлетворяет потребности сегодняшнего дня, неограничивая возможности будущих поколений в удовлетварение их потребностей". В этом сообщении "устойчивое развитие" связывается с поборочными эффектами – явлениями взаимодействия экономических процессов и окружающей среды. Таким образом, устойчивое развитие заключает в себе трехи главные столпа или размерности – экономический рост, социальная безопасность и охрана окружающей среды. Такая модель устойчивого развития характеризует указанные три размерности, чтобы обеспечить равновесие между взаимными, но зависимыми субстанциями – справедливостью, умеренностью и жизнеспособностью. Тем не менее, в соответствующих основных постановлениях многих стран различно определены достижимые цели (исполнимые показатели), что помогло бы результативно определить уравновешенность субстанций, которые включены в модель устойчивого развития. Оценивая теперешние подходы для определения (измерения) устойчивого развития, можно сделать вывод, что благосостояние населения понимается по-разному, и концепция устойчивого развития в настоящее время используются в различных странах в множество интерпретациях. Новый подход к решению проблем и целей устойчивого развития объясняется эффективным применением системного подхода к определению необходимости консолидации их политических, экономических, социальных и экологических рамок для устойчивого развития в одной системе. Результаты исследования показывают воздействие екологического следа на окружающую среду и международного опыта в оценке устойчивого развития. Комплексный и сравнительный подход для оценки концепции устойчивого развития, в связи с глобальными процессами, показывает опыт оценки (измерения) концепции и опыт специфического её применения, в том числе в сфере управления земельными ресурсами. Управление земельными ресурсами можно рассматривать как область применения концепции устойчивого развития. Таким образом, определение системы общих критериев и показателей способствовало бы к созданию условий для устойчивого использования земельных ресурсов, а также сбалансированного территориального развития и сохранения природных ресурсов и их способность к регенерации.