
SUSTAINABLE NATURAL ENVIRONMENTHORSKÁ, ELENA
MAGDA RÓBERT**Abstract**

People are using more of the Earth's natural resources than ever before, seriously harming the environment and placing the well-being of future generations at risk. Europe is particularly reliant on imported resources and proposes actions to help societies move towards a more sustainable way of using resources. Managing natural resources is challenging. Many countries with large endowments of valuable natural resources do no better, and often do worse, than less endowed countries. This recurrent fact has been called the "natural resource curse" or the "paradox of plenty". Land utilisation needs to be in accord with sustainability. The root of the problem is population growth, which will be more than 3,5 times bigger in 2050 than it was in 1950.

The required factors of production are used in varying degrees during the production process. These rates depend on the actual activity, because there are labour and capital intensive businesses. In any case, we do not know any production activity which would not demand labour, or would not use a certain amount of space and resources directly or indirectly. In parallel with its improved living standards and technological advancements – which often fly in the face of employment – humanity is consuming an increasing amount of energy and with the development of more and more industries it pollutes and destroys the environment.

Keywords

Sustainability, natural resources, environmental potentials

JEL: F14, F15, Q17, Q18

Fenntartható természeti környezet**Összefoglalás**

Az emberiség nagyobb mértékben használja a föld erőforrásait, mint ezt megelőzően bármikor, súlyosan károsítja a környezetét, kockáztatva ezzel a jövő generációjának jólétét. Európa különösen függ az importált erőforrásoktól és intézkedéseket javasol a társadalmaknak egy még fenntarthatóbb erőforrás felhasználásra. A természeti erőforrások kezelése kihívást jelent. Számos ország, melyek adottságai és erőforrásai kedvezőbbek, nem jobbak, sőt gyakran rosszabbak, mint a kevésbé ellátott országok. Ez a visszatérő tény már úgynevezett „természeti erőforrások átok”, vagy a „bőség paradoxona”. A földhasználatnak összefüggésben kell lenni a fenntarthatósággal. A probléma gyökere a népességnövekedés, amely 3,5-szer nagyobb lesz 2050-ben, mint volt 1950-ben.

A szükséges termelési tényezőket különböző mértékben használják a termelés során. Ezek az arányok függenek az aktuális tevékenységtől, melyek lehetnek munka és tőke-intenzívek is. Mindenesetre nem ismerünk olyan termelő tevékenységet, amely nem igényel munkaerőt, vagy nincsen szüksége valamekkora területre és erőforrásra közvetve, vagy közvetlenül. Ezzel párhuzamosan az életszínvonal és a technológiai fejlesztése – amik gyakran szemben állnak a foglalkoztatással -, melynek hatására az emberiség egyre több

áramot fogyaszt és a fejlesztések több és több iparágban szennyeznek és lerombolják a környezetet.

Kulcsszavak: fenntarthatóság, természeti erőforrások, környezeti potenciálok

JEL: F14, F15, Q17, Q18

Introduction

The population of the Earth grew rapidly in the past century, which presents new problems to solve for the current and future generations. (Figure 1)

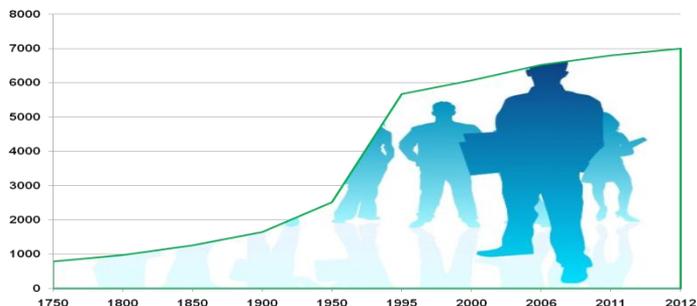


Figure 1: The development of the population of the Earth between 1750 and 2012

Source: own construction based on data from the Hungarian Central Statistical Office

The world population has grown tremendously over the past two hundred years. In 1999, the world population passed the six billion mark. Latest official current world population estimate, for mid-year 2011, is estimated at 7,021,836,029. (Rosemberg, 2012) The figure shows that the increase of population began to surge in the 1950s. This growth rate is also unbroken nowadays. While in 1900 mankind needed 0.4 Earth, in 2050 2.4 Earths will be required and taking the current tendency as a basis it will mean a population of 9-9.5 billion people in 2050. (Dinya, 2010)

One of the lessons to learn from the energy crisis that exploded at the beginning of the 1970s is that the traditional, mainly fossil energy resources are limited; therefore their utilization requires particularly high rationalization. Efforts must be made to recognize and utilize renewable energy resources and to constantly improve the balance of trade. Competition also makes it extremely important to manage energy resources properly and to increase energy efficiency. International competitiveness means – among other things – how a country is able to hold out in the global competition with its available energy resources and goods. (Bozsik, 2004)

Most people are not aware of how fast we are consuming our natural resources. We are producing waste much faster than we can recycle them.

Currently our world is using much more resources than sustainability permits. Consequently, the present economic system can operate only with significant surplus resources. If these resources are depleted, the economy may get into serious trouble. 87% of the consumed resources are fossil energy resources, thus – in our opinion – their decrease is the principal risk. Nowadays one of the greatest challenges for each and every country – including Hungary – is how to replace these energy resources in a way that the environment is damaged to the slightest possible extent and thus to ensure sustainability.

Interpretation of the concept of sustainability is basically two schools developed.

1. Sustainable development include economical critical limiting factors (Stagoff, 1988)
2. Formulate competing and complementary objectives, and emphasizes economic, social and ecological sustainability (UNDP, 1994, Carvalho, 2001)

Thermodynamic and ecological point of view, the so-called throughput is the cause of environmental degradation as shown (Boulding, 1993), (Daly, 1993) and (Georgescu-Roegen, 1993) works have also shown. More need and use in regenerative capacity of natural resources than they can in the ecosystem.

That is why it is very important to examine and deal with the question of how to replace coal and hydrocarbons (what is the required expenditure, when, at what pace and in what proportion, and by what direct and indirect land utilization alternatives?) that are available in a limited amount, i.e. the problem of scarcity exists.

Putting rural Hungary at an advantage relies on the improvement of the economy of rural areas and the implementation of sustainability. Halting the negative processes experienced in the disadvantageous areas requires new and complex rural and settlement strategies that will result in competitive agricultural structures and the employment of the undereducated workforce – even if only to a limited extent – will be possible.

Materials and methods

In this paper we analyse sustainable natural environment. We analysed scientific and special literatures that present the requirements, models and research results. Analysed statistical data from Hungarian Statistical Office, and empirical surveys.

Results

Sustainability

The expression “sustainability” first appeared in professional literature in the early 1980s. Building a Sustainable Society by Lester was published in 1981. He argued that there must be harmony among such phenomena as population growth, the financial expectations of a society, the utilisation of natural resources, and environment pollution which must be minimised.

According to the United Nations World Commission on Environment and Development the concept of sustainable development is as follows: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

When analysing sustainable development different levels (global, regional, and local) and dimensions (natural environment, society, economy) of sustainability must be differentiated (Csete L, 2005). In the current situation local programmes proved to be the most viable and successful therefore only as a result of the combination of regional and local sustainability can the global level evolve. (Table 1)

Table 1: The levels and dimensions of sustainability

		Global	Regional	Local
		Levels of sustainability		
Society	Areas of sustainability			
Economy				
Natural environment				

Source: Csete L., 2005.

The responsibility of the state can by no means be denied in sensitive areas connected to public property (natural environment, culture, social security, human rights, etc.). (Buday-Sántha, 2002) argues for sustainability: “The current distorted economic logic that places subsystems over the whole should be substituted by a society and economy that are intrinsically embedded in nature.”

Sustainable development can be achieved through the separation of different levels. Globalised companies are capable of controlling nation states and their governments in the management of their own development strategy and policy. It is in everybody’s interest to end this in the long run therefore changes must be initiated.

Countries can achieve resounding success where the development of sustainability indicators can be implemented in the shortest possible time and where data can be collected at national level so that they can be analysed by local leaders.

It is necessary to set up organisations – with government participation – which supervise, instruct, and organise according to the principles of sustainability.

As a matter of fact the long-term principles of sustainable development very often unfold in regional and local programmes, which may be organised, regulated, and supervised by the authorities of a given level. There it is possible to mobilize, persuade, and educate people so that they can be susceptible to sustainable development.

The population retaining ability of settlements and regions is of extreme importance as the fluctuations either in the positive or negative direction may reduce the possibility of long-term sustainability. The population retaining ability is closely linked to population carrying capacity which operates in a satisfactory way only if labour demand and labour supply are in harmony with each other i.e. job creation and employment is based on local conditions (natural resources, labour supply, and already existing services) and traditions. The lack of all this resulted in a large scale migration in the 1980s and it may occur again. (Tikász-Pető, 2007)

Theoretical research is also necessary for the successful implementation of sustainable development. An international research group achieved great success in this field in the Rockefeller Foundation’s Study and Conference Center in Bellagio, Italy. The principles (Bellagio Principles) can be used as guidelines for the whole of the assessment process including the choice and design of indicators, their interpretation and communication of the result. On the basis of (Szlávik-Csete M., 2004) the main notions of the principles are as follows:

- Principle 1: Establishing a vision of sustainable development and setting strategic objectives.
- Principles 2-5: Overall system approach, holistic perspective, changes in time and space, focus on current priority issues.
- Principles 6-8: Openness, efficient communication, extensive participation.
- Principles 9-10: Continuous assessment, recognition of trends, changes initiated on the basis of new knowledge.

It may be a principle that people seeking to work closely with nature must adapt to nature and existing natural resources with the slightest possible utilisation of import resources. Biological diversity must be retained and the possibilities to area utilisation, landscape management, land use and sustainable agriculture, as well as natural industries should be examined.

The decline of polluting activities could greatly boost the implementation of the principles of sustainability. Despite the decline of industrial activities and the relative backwardness of a region the existing production is only partly sustainable. Our opinion is that sustainability can be measured against the following criteria:

- management of natural resources;
- biological and operational structure harmonised with its environment, degree of intensity;
- minimized use of chemicals and artificial inputs;
- retained biodiversity;
- the responsibility of sustainable development at a global scale.

Experts and researchers active in this field derive the notion of eco-regions (sustainable islands, “bio villages”, “eco-villages”, “sustainable regions”) explicitly from ecological principles and define their underlying conditions, which are the following:

- From the point of view of basic needs self-directed self-sufficiency, which is independent of the opportunities offered from outside the community, and whose quality is superior to its competitors.
- Complexity and variety is the key to economic self-reliance.
- The continued presence of duality is an important driving force which promotes the development of new patterns and structures.

According to Marselek sustainable regions must comply with the following criteria:

- Regional borders must be based on cultural, administrative, economic and political context.
- Local resources should be preferred.
- The possibilities offered by clusters must be taken advantage of. Clusters in Hungary are not well developed yet, they are in a developmental stage (Marselek, 2003).
- A healthy balance must be kept with other regions with a low-volume flow of goods. A strongly restricted use of materials and energy should be realised.
- People must be motivated. The development of eco-regions is a bottom-up approach rather than a centrally controlled strategy.

The local program of sustainable development (Local Agenda 21 – „LA 21”) aims to create harmony at local and micro-region level in the natural environment-economy-society triangle in a way that it serves the long-term principles of sustainability. Local Agenda 21 is a program which is building and operating a complex system and is based on the strict interpretation of sustainable development that renders it possible to exchange natural capital into economic capital within very strict limits taking the circumstances of the biosphere into consideration and that considers natural resources as a human-social needs satisfying factor (Szlávik – Csete M., 2004).

“LA 21” is not the same as an environmental program but the natural environment enjoys priority in the program focussing on the achievement of an economically optimal level of externalities. The population of our world is growing exponentially and the

energy use per capita is increasing. The main principle and driving force of the economy is the fastest possible economic growth the result of which is a deteriorating environment and increasing load (Kerekes – Kiss, 2001).

It is important to acknowledge that sustainable development is not the opposite of growth in the economy. Responsible management presupposes the assessment of the supply of both private and public goods as well as a yield-based estimation of the value of these services which considers both the external expenditures and the yields.

In order to keep up the level of quality of life and liveability it is expedient to use solutions and appropriate financial incentives that are not only cost efficient and economical but also environmentally friendly and contribute towards the improvement of the living and health conditions (i.e. clean, fresh air) of local people as a further positive externality and beside they should also create jobs for local professionals and thus enliven the local economy (Csete, 2009). A liveable settlement is the centre of local sustainability.

Sustainability-system approach

The problems of sustainable development are rooted in the system. It is impossible to provide adequate answers to local challenges without being thoroughly familiar with the wider environment and global processes.

Changes can be permanent only when a sustainable economy has successfully been created. A sustainable economy can mobilize new resources thus it allows the widening of resources. The state must meet the real needs of people. “The Earth is capable of satisfying all needs but it cannot satisfy all greed.” Today there is ample food for everyone and if it was divided into equal shares, everyone could have enough food. Despite this fact 900 million people starve on a daily basis and 2 billion people are chronically malnourished. About 18 million people die of hunger related illnesses.

It can be declared that as soon as environmental pollution reaches a serious level due to production and consumption, it will generate direct negative consequences on the conditions of production (expenses) as well as on the level of consumption (decreasing welfare). Therefore, for its own best interest the state must strive to create economic regulations that support the sustainability of the interconnected system between people and nature and between the economy and the natural environment.

(Wackrenagel-Rees, 2001) state that: The analysis of the ecological footprint is a calculation tool that enables us to estimate the level of resources-consumption and waste processing needs of a given community or economy expressed in fertile land area.

Figure 2 depicts an economy with its own “metabolism”. It is like an animal grazing out in a pasture. The economy must “consume” resources then all this energy must pass through to the environment again. Thus the question arises: how large a pasture is required to support and sustain the economy – to provide all of its food and nourishment and also to manage its wastes? In other words: how much land is needed to sustain a given economy at its given living standard?



2. Figure Ecological footprint

Source: Wackernagel-Rees, 2000. 12p.

Each human being and society occupies certain area of the surface of the Earth only by creating goods that are necessary for their sustenance and by having nature decompose the waste created during this process. The ecological footprint measures the size of this area. It is expedient to compare ecological footprint with biological capacity (available land area). The difference between the ecological footprint and biological capacity is called the ecological deficit which refers to the proportion of our current activity transferred to the next generations.

Currently the situation is discouraging in this respect. Equilibrium would require 1.4 Earth and this indicator is growing at an alarming rate (it has already been noted that according to some estimates approximately 2.4 Earth would be necessary by 2050 considering current rates of development). Consumers could alleviate this by making conscious choices but this environment awareness is still in its infancy.

(Gebhardt, 2006) integrated all the factors that according to his surveys carried out in Germany significantly influence sustainable consumption into one model. According to this model there are four significant groups of factors.

1. External factors: place of purchase of eco-foods, eco-products purchased and in demand.
2. Financial factors: income status, proportion of purchased eco food products, their observed additional price.
3. Cognitive and individual factors: motives behind choosing eco products, sensitivity to risk taking, health consciousness in choosing food products, as well as familiarity with and trust in the authenticity of the product.
4. Social effects: the influence of the opinion leaders, effects of the immediate environment, child protection with the help of eco-food.

The necessity of a new developmental paradigm was recognised by the mid-1980s. The UN considered the second and the third developmental decade a failure because they

were unable to break the vicious cycle of poverty which characterise the world's least developing and poorest countries.

(Heltai, 2006) claims: Beside all this the "result" of the World Bank and IMF policies based on conditional loans was that the already impoverished countries were pushed into even greater levels of debt. Thus the enormous debts, slow economic growth, and the rapidly increasing poverty amplified human suffering, which had already been present in those countries. The criticism of traditional, dominant development paradigm became general: in all parts of development and in all types of sciences.

(Mészáros, 2011) introduces the new economic paradigm recommended for developed countries. This is the so called "no growth" concept whose career began with a book published in 2006 by the French economist Latouche. The new economic paradigm may result in the ecological sustainability of our planet as well as in the formation of more just societies in the long run. The author notes in a somewhat sarcastic style: "If someone believes that there may be infinite growth in a finite planet, they may be out of their right mind, or they may be economists". There were conferences held on this topic in Paris (2008) and in Barcelona (2010).

According to (Szesztay, 2006) the main components of capital stock are as follows:

- natural (natural, ecological) capital;
- human capital;
- social capital;
- infrastructural (artificial) capital;
- financial capital.

During the past two centuries the role of financial capital became dominant – which stems from the exchangeability of the other forms of capital – and the accumulation of financial capital came to be paramount. It was forgotten, therefore, that its exchangeability into physical indicators or human-social productivity has certain limits

GDP on its own can be misleading. Other indicators should be used e.g. ISEW (Index of Sustainable Economic Welfare), which indicates sustainable material welfare. This indicator takes the quality of life into account. Another example may be HDI (Human Development Index), which is considerably more complex than GDP on its own.

According to some authors a general phenomenon of overconsumption is observable to which, it seems, there is no denial, and unnecessary goods are purchased because of commercials and advertisements. In order to decrease senseless purchasing commercials should be forced back. The reduction of transportation of goods and passengers seems also to be indispensable. Goods should be created and consumed locally. Responsibility, governance, and right to dispose of assets should be placed at the lowest possible local level. Decisions should be made there since the consequences are felt there (Náray-Szabó, 2005).

What principles must be taken into account in order to achieve changes? We have collected the main ideas which are as follows:

- Answers to local challenges cannot be given without being thoroughly familiar with the wider environment and global trends.
- Sustainable development integrates all elements of the natural environment, economy, and society.
- Sustainable development is nothing else but careful management of resources, which enables future development as well.
- The precautionary principle (pl. gene technology) must be kept.

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- Former cultures of production should not be forgotten so that we can get back to our roots.
 - Local resources should be utilized.
 - Diversity must be preserved (e.g. biodiversity).
 - Material values should also be preserved. Drinking water, fresh air, a cultural landscape, unpolluted environment are all necessary for our existence, their value cannot be expressed in terms of money.
 - Natural resources should be utilized and preserved at the same time.
 - Decision should be made at local levels.
 - Sustainable development should be a varied system made up of organisational and economic units. An economy is made up of small economic units connected to individuals and their communities. The structure consisting of a large number of micro elements is able to function as a macro system.

Necessary legal conditions

Within the framework of Cohesion Policy there are three new EU forms of funding to help local sustainability, which are the following:

JESSICA (Joint European Support for Sustainable Investment in City Areas), which supports sustainable urban investment and development and regeneration through financial engineering mechanisms and or the development of projects.

JEREMIE (Joint European Resources for Micro to Medium Enterprises) provides financing for a micro- and medium-sized enterprises. The main purpose is not only to make small enterprises more competitive but also to achieve it in a sustainable manner.

JASPERS (Joint Assistance in Supporting Projects in European Regions) provides technical knowledge and resources for authorities as well as the regions targeted by the new Convergence Objective between 2007 and 2013. The objective is to improve submitted projects both quantitatively and qualitatively.

Considering the theme of local sustainability is a qualitatively new approach towards natural environment and natural resources. It can be briefly defined as: a liveable settlement is sustainable. The questionnaire survey carried out at local governments and among the civilian population proved that there exist lack of knowledge and poor initiative.

On the basis of Valentin and Spangenberg the Prism of Sustainability can provide a foundation for research on sustainability (Figure 3).

The model contains the four imperatives of sustainability. It also proves that sustainability cannot be simplified and restricted to the environmental imperative as it represents only one segment of the whole theme. It is unimaginable to scrutinize sustainability without including the economy where players can retain their competitiveness on the basis of sustainable rational activities. This requires an institutional structure which enables society to operate in a democratic form thus achieving sustainability in this respect as well.

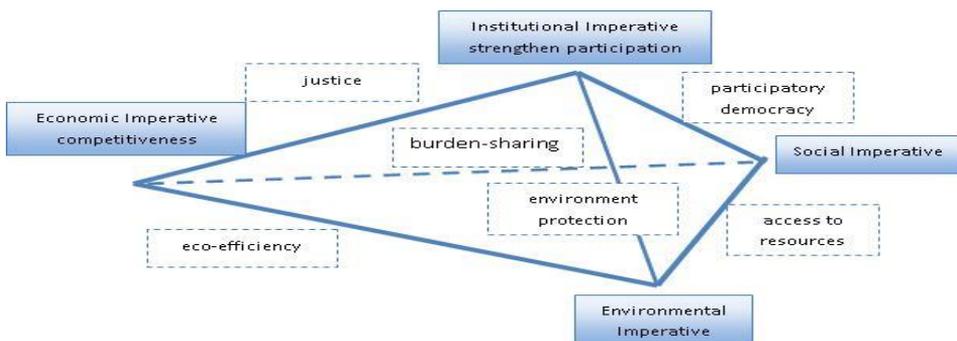


Figure 3. Prism of Sustainability

Forrás: Valentin – Spangenberg, 2000. 381-392p

Measuring sustainability

These indicators must characterise sustainable settlements (regions, countries), and their producibility is indispensable. For this very reason the data collection system of the Hungarian Central Statistical Office should be adjusted! Considering the works of (Szlávik – Csete, M., 2004), and (Marselek, 2003) the indicators for sustainability could be as follows:

1. Natural-environmental indicators:

- emission of greenhouse gases,
- production and use of substances that damage the ozone layer,
- division of ozone-depleting substances according by chemical type,
- urban air pollution
- proportion of agricultural activity and that of organic farming, use of artificial fertilizers and pesticides in the region,
- parks, arboretums, built gardens,
- proportion of forested areas and their utilization,
- intensity of water consumption,
- climatic characteristics of the region
- biochemical oxygen need of rivers,
- water quality of spas,
- biodiversity and the number of protected species.

2. Economic indicators:

- GDP per capita,
- the share of investment in GDP,
- added value in economic sectors,
- rate of inflation,
- rate of foreign investment,
- financial sustainability of local governments,
- state of local and regional self-sufficiency
- characteristics of enterprises in the region,
- communication infrastructure (telephone, Internet),
- regional R&D expenditure,
- use of materials,
- energy consumption in the economic sectors,
- energy consumption and intensity,

- comparison of energy indicators with other regions,
- power generation,
- municipal solid waste collection and disposal,
- waste production of the individual economic sectors,
- amount and disposal of toxic waste,
- amount and disposal of radioactive waste,
- number of passengers in different means of transportation,
- forwarding of goods by different means of transportation,
- environmental protection expenditures of industry as a percentage of GDP (regional).

3. Social indicators:

- income inequalities,
- rate of unemployment,
- rate of social expenditure and its value per capita,
- women's wages relative to men's
- indicators of child welfare,
- food consumption per capita and within this energy from fats,
- mortality rates for the most common diseases,
- life expectancy at birth,
- rate of population at areas with sewerage and waste water treatment system,
- expenditure on health care,
- vaccinating children against diseases,
- rate of participants in different levels of education,
- number of rooms per person,
- rate of adults and children in families,
- rate of reported crime,
- state of Roma population,
- extent of population growth or decline,
- net migration rate.

The local indicators of sustainability provide possibilities for communities to recognise their own potentials. There are approximately seventy eco-settlements in Sweden but the number of eco-villages is growing in Scotland, Germany, and Italy.

Summary

These days everybody in the world is seeking possibilities to get out of the crisis – let it be an economically strong developed country or an economically fragile developing country. The crises has reached our Europe as well just like it has reached almost all of the countries in the world before we were able to prepare for it, so we do not have any other chances but to find the solutions through bioenergetics, education, environmental industry and research. However, it is typical that we can find only forecasts and estimations instead of definite strategies. Without specific goals and definite strategies we will be hopeless, futureless, and defeated.

Our research shows that the green economy and the employment connected to it would mean an outstanding possibility for Europe to improve its competitiveness. The practical connection of this could contribute to achieving some of the main targets set by the European Union namely the Roma integration program and the increase of the rate of alternative (green) energy.

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