Sustainable development – indicators

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Abstract: Most governments are already trying, or should do so in the near future, to start the way towards sustainable development. The reason why the way is so difficult is the fact that the quantitative measures of it – the suitable indicators to show the measure of the development in the desirable direction – are missing. The information is of irreplaceable importance in the process of transition towards sustainability. All institutions as well as individuals need information, whether their decisions and behaviour is contributing to sustainability or not, and this information has to motivate them, at the same time, to the change of behaviour.

Key words: alternative economic indicators, economic indicators, role of indicators

Even if most countries already try to approach sustainable development, the way is not easy (UN 1987). The problem is that it is difficult to measure the reached progress. It is often underlined that the reached GDP and the data on the pollution level are not sufficient signals of the stage of sustainability reached by the individual countries. Therefore, there are developed different indicators which should better serve the purpose. An indicator is a feature obtained by the continual measuring, recording and the subsequent evaluation of the phenomena (Long 2001).

INDICATORS OF SUSTAINABILITY

It is important that the indicators fulfil certain criteria, namely:

– Importance – it is always necessary to ask the question what is the importance of an indicator, whether it is only specific or can serve the whole sustainability context.
– Representativeness – it has to be certain what phenomenon the indicator represents and what analyses should be performed.
– Uniqueness – it has to regard unique, new data, each indicator has to be specific and original.
– Measurability – it has to be technologically possible to get the necessary data without an enormous effort.
– Costs and yield – the costs of getting the data have to be balanced to the obtained yield.
– Negative impacts minimising – obtaining the data has to bring about a minimum impact on nature.
– Correctness – the indicators have to be correct and without errors, and that in every phase of the data obtaining and processing. Nevertheless, it is never possible to state that they are completely correct, as it is always necessary to count with a minor error.
– Reliability – the data have to be based on several independent measurements or got by several different methods.
– Comparability – the data should be comparable in the long run.
– Transparency – the data and indicators obtained have to be transparent, it has to be clear what methods and in which way were utilised.
– Understandability – the final data have to be easily understood, unanimous and clear.
– Timing – it is important that the data and information are to the disposal at the proper time
– Utilisation – it is important that the data and information can be practically utilised.

To simplify, the indicators have to be useful for the potential users and it has to be possible to read from them the relevant information, e.g. on the strengths and weaknesses of the given locality.

The indicators are formed for different sectors and areas. From another viewpoint, they can be divided according to the aggregation level. On the lowest level, the data are obtained by a simple monitoring or statistical research. Other indicators are obtained by the aggregation of the obtained data (CEC 2005).

The indicators can be divided into the key and aggregated ones. Key indicators should supply simple information on the selected kea phenomena. They should be simple so that the issuing information is understandable for the general public and so that they can be quickly computed with minimum costs. E.g.

one of the U.N. Committee for Sustainable Development indicators regards the mortality of children up to 5 years, which is completely clear to everybody. The aggregated indicators combine a series of facts into one indicator with the aim to supply a complex picture. An example can be the Human Development Index. While for the key indicators, the proper choice of the indicator is important, at the aggregated indicators; important are the choice of the variables and also the properly selected weights of them.

The role of indicators in the process of sustainable development implementation

The paragraph 40.4 of the Agenda 21 states: "The commonly utilised indicators, as GDP or the data on the individual natural resources and the pollution level, do not indicate sufficiently, to which extent the way towards sustainability has been started. There are not utilised the methods of evaluating the interaction among the development in the individual areas, like environment, population growth, social and economic questions. These methods are not to the disposal yet. It is necessary to create the indicators of sustainable development, so that the base for decision-making on all levels is created and reaching of the integrated environment systems sustainability is supported."

To be usable, the indicators have to fulfil many conditions. Above all, they should be easily understandable and unanimous, with a certain level of testimony in the given relationships. They have to be correct, reliable and representative. The units of their expression have to be simple and generally recognised. The indicators have to be useful for their potential users and they have to contain the important and understandable information. Even if they are usually highly aggregated, their construction should be transparent. They have to be comparable on the international level, i.e. they have to be computed and expressed in a standard way.

At present, a high worldwide attention is paid to the information and indicators of sustainability. After the Stockholm Conference in 1972, the interest shifted from the area of environment also to other interconnected areas of the Sustainable Development (SD) – social, economic and institutional. From the initiative of this conference, the United Nations Environmental Program (UNEP) was established, which covers three areas: environment monitoring, supplying data for decision-making in agreement with the environment protection, formulation and evaluation of policy decisions. Together with the U.N. agencies, as is the World Health Organisation (WHO), the Food

and Agriculture Organisation (FAO) or the World Meteorology Organisation (WMO), there operates also the Global Environmental Monitoring System (GEMS). Besides the UNEP and the specialised U.N. agencies, also the regional organisations started collecting information on environment. For example, in the frame of the EC, the Geneva Convention on Atmosphere Pollution overreaching the borders of the individual states was signed in 1979 (Gore 2000).

After the U.N. Conference on Environment and Development in Rio de Janeiro in 1992, the main initiative in the information for SD was taken over by the U.N. Committee for Sustainable Development. In 1995, it published the list of approximately 130 indicator structured on the base of the scheme "pressure – situation – answer" chapters of the Agenda 21. Human activities, the non-sustainable patterns of production and consumption represent here the driving forces influencing environment and expressing in some cases a sufficient pressure to evoke the answer. This might be in the form of new legal or economic measures. These indicators were divided into the social, economic, environmental and institutional ones and were aimed at the utilisation on the national level of decision-making.

The indicators are also developed by the international organisations outside the U.N. system It regards namely the EU, whose statistical bureau EUROSTAT also monitors the area of environment. The OECD introduced environmental indicators structured according to the frame "influence – situation – answer" and it is further developing them (State of the World Report 2009).

The development of indicators is supported also by some international NGOs – e.g. the International Union for Nature Protection (IUCN) is aimed mainly at the indicators of biodiversity, the World Resources Institute (WRI) is also one of the recognised centres of the indicators development. It publishes the World Resources Publication every second year, which includes probably the most complex set of the sustainability indicators. Also the World Bank publishes its prestigious yearbook World Development Report and so does the UNDP (the Human Development Report).

Also on the individual states level, an attention is paid to the development of indicators. Some of the OECD members, including Canada, France, the Netherlands, Australia or Norway have elaborated their national systems of indicators. Also the development countries governments, namely in the countries realising their dependence on natural resources, become interested in utilising the indicators for the planning purposes. The WRI cooperates on pilot projects with the governments of Indonesia, Costa Rica or China.

Nevertheless, developing countries are stressing the difference of their economic and social conditions as well as the lack of the reliable data and they are afraid of the conditional foreign support in improvement of the indicators in the selected areas important for reaching the SD.

Therefore, the indicators can be elaborated on the global as well as on all lower levels. Then they differ not only by the level of aggregation, but also according to the ways of the data collecting and processing which reflect the specific conditions of the given area as well as the possibilities of utilisation in decision-making and planning. The indicators are usually defined for the area of environment, divided into its individual segments, and the economic, social and institutional sphere.

Evaluation of the present indicators on the example of economic indicators on the national and international level

– Integration of environment and decision-making on the political, planning and management level;
– Securing of the efficient legal and regulation frame;
– Efficient utilisation of the economic tools and the market;
– Creating the systems for complex environmental and economic evaluation.

Simultaneously, the Agenda 21 expresses the opinion that the commonly used indicators, like the GDP or the pollution level, cannot evaluate either the relations between the environment and development, or the relations of development and environment in the individual sectors. Nevertheless, these indicators are still commonly used and the GDP or GNP level is still regarded as the economic success indicator. However, it cannot certify clearly on the direction or quality of this development regarding the set aim – sustainable development, and that notwithstanding the fact that the economic and accounting definition of product mentions sustainability. It defines the product as the maximum volume which the recipient can consume in the given period without decreasing the future period consumption (CEC 2009).

The main reasons against using GDP or its growth rate issue from the following:
– *GDP reflects only the economic activities connected with financial flows.* Therefore, it fails in the cases when the activities in question do not enter the market or cannot be evaluated in monetary units, therefore, it does not cover the prevalent part of the household activities, family or community activities.

In developed countries, many of these traditionally unpaid activities are performed by the new sectors of services the incomes of which enter GDP. In developing countries, they are performed mainly by women in households and their result is not reflected in the National Accounts.

– *GDP does not differentiate among the activities from the positive or negative viewpoints, so that its increase is caused both by the positive and negative activities, as well as by the activities aimed at removing the eventual negative impacts.* Therefore, if an activity causes environment damage, the costs of its removal increase further the GDP, even if the net contribution is zero or even negative. The same impact is that of the health care costs which need not be spent if the health of the population is not endangered by the environment deterioration.

– *At computing GDP, it is supposed that natural resources are of no financial value and are unlimited.* The result is a dangerous distortion of the way we measure and consider natural resources. The human-made assets are evaluated as the productive capital and this approach can reveal if the level of their utilisation is or is not on the sustainable level. Natural resources are not evaluated in the same way; therefore, their decrease is not reflected in the present product decrease which would include the decrease of the future production potential. The given country could then cut down all its forests and to add the profits from the sale of timber to the income side of the National Accounts without including the loss of its natural assets to the negative side of it. Namely countries with a low product depend in the creation of employment, income and foreign trade on their natural resources. They are then connected to the SNA and micro-economic analyses.

The base of this problem is the wrong prerequisite that natural resources are that extensive and unlimited that they are of no marginal value (Cihelková 2012). The reality, however, is that whether they enter the market or not, they contribute considerably to the economic prosperity and are therefore economic assets (Cosbey et al. 2004).

Another reason lays in the understanding of natural resources as free gifts of the nature, which are not the result of investments the costs of which should be written off. However, the value of natural resources does not lay in the investment costs, but in the present value of their potential output. Therefore, their depreciation should be registered in accounting as it is regarding other forms of tangible capital. By detracting depreciation from the GDP, we get the

NDP, which in the economic theory is the measure of the "sustainable product". It is defined as the income or product which can be reached without limits at the constant capital level, i.e. the sum determined for consumption after deducting the sum of capital reproduction. However, the NDP is not the measure of sustainability from the environment viewpoint, as it does not consider the depreciation of natural capital. This non-precise measuring of sustainable product then further deepens the contradiction between the economic and environmental goals and it can be dangerous namely for the poor countries where a great part of the production is based just on these resources. Their rapid utilisation leads to the high GDP growth rates which are regarded as the economic success, which, however, can be only a temporary and illusionary one. The utilisation of a wrong indicator can then lead to the implementation of unsuitable policies and the mistaken evaluation of their success.

– *The further GDP criticism is derived from the fact that it does not include anything people value, if it is not connected with financial flows.* It regards namely the elements of welfare like free time, health, low criminality, wellbeing, natural beauties or the results of activities not entering the market.

Therefore, even if the GDP supplies a certain image of the national and international economic development, it is completely insufficient for evaluating the sustainability of the society development and it has to be revised in this connection (IMF 2009).

In this, an important role is played by the U.N. Statistical Bureau, as the System of National Accounts (SNA) which represents the standard model taken over by most countries. The SNA is more complete regarding natural resources accounting than most of the national government systems. It also includes the renewable and non-renewable tangible assets accounts, which record the initial and final state of stocks as well as the resources of their increase and decrease. The criterion for including into the SNA is the existence of the private owner of assets and their commercial utilisation, so that their value could be set. Natural resources in public ownership are excluded from the system, as the SNA operates with the market economy and the value of natural assets outside the market cannot be set (UNCTAD 2009).

The revised SNA from 1993 set an independent integrated Environmental and Economic Satellite Accounts. Also the methodology of the integrated economic and environmental accounting has been elaborated. This system can be gradually incorporated in the individual states without the necessity to make the immediate international harmonisation. Its aim is not replacing of the existing data system, but supplying a possibility to integrate the present accounting in the area of natural resources and environment and the SNA into the new complex data system. One of the outcomes should be an alternative indicator – the "green GDP"– which should consider natural resources and other environment factors (IPCC 2007).

Notwithstanding these changes, the GDP and the derived indicators remain the main indicators used on the national level as well as in the international statistics. It is, however, obvious, that until more national statistical offices are able to introduce the integrated environmental and economic accounting, the base of the GDP or GNP accounting will not be changed. And only this can lead the economic policy to sustainability (Gallagher et al. 2002).

Alternative economic indicators on the national and international level

In the endeavour to overcome the shortcomings of the GDP type indicators, many authors tried to create and define alternative (macro)economic indicators which would incorporate environmental criteria into the evaluation of the socio-economic process and which would inform about fulfilling of the sustainability criteria of the society development. These are the indicators, which either make corrections to the already existing indicators of the GDP and GNP, or which issue from a completely new concept or differ from the traditional GDP both by their structure and the utilised units of expression.

Most of these concepts issue from the basic question: If the creation of material wealth damages environment and does not respect the sustainability demands, can it be automatically regarded as a progress? The GDP criticism has already shown that this is not possible. It labelled the GDP as a mere monetary aggregate which makes no difference among the positive and negative types of economic activities and also indicated that GDP can grow even under the conditions when fewer resources are utilised and less pollution and other negative impacts created. This can be registered by the so-called Environment Impact Coefficient of GDP (EIC). This coefficient is described as the change of the environmental impact caused by the GDP increase by one unit. If every further unit of GDP uses fewer resources than in the previous year, the coefficient will probably decrease. If the equivalent GDP growth causes a higher level of environment consumption, it will be constant or growing. The

total impact of the economy on environment can then be expresses as the difference between the EIC change and the growth rate of GDP change – if the EIC decreases more quickly that the GDP grows, the total environmental impact is decreasing and vice versa. Therefore, this coefficient can record the fact that even if the GDP is growing, it need not mean an environment deterioration, resources depletion and the continual trend of non-sustainability (Garver and Podhora 2008).

The present patterns of economic growth cause, however, a further deterioration of global problems, including the environmental ones. On one hand because, in many cases, the EIC is still growing (i.e. every year one unit of GDP causes further environmental burden), and also because in the countries where the EIC decreases, the decrease is not quick enough to overbalance the GDP growth. Nevertheless, both trends can be turned. Technological changes in production processes and the changes in consumption can initiate more considerable changes in GDP, so that it can be imagined that the EIC decrease might overbalance any GDP growth. In such a case, economic growth could be accompanied by a lower or decreasing impact on environment in consequence of the proposed environment protection policies.

Another approach aiming at the introduction of the environmental factor into the accounting system characterising economic results of the society can be based on excluding all data included in the system, which are of the character of environmental costs, from the main macro-economic aggregate – GDP or GNP. The aim is to get its environmentally corrected version. The same approach can be used also for the aggregate of national income, when we get the environmentally corrected national income (NI).

The mentioned corrections regard three groups of environmental costs:

(1) The protective or defensive expenditures. If the production process causes damages and losses of environment, then the measures aiming at their alleviation or prevention do not represent any "added value". These costs do not increase the value of products, neither the value nor the quality of environment. They only conserve a certain level of the environment quality and should therefore be deducted.

(2) Any other damages to environment decreasing welfare, which were not alleviated by the defensive expenditures, i.e. they might have been caused e.g. by the neglected pollution. Also this should be evaluated and deducted from the current GDP.

(3) Also the depreciations expressing the use of natural and human capital should be deducted, as the aim of the corrected indicator is to measure the possibilities of the product creation in future, i.e. its sustainability. Therefore, the depletion and damages to the resources of the economy should be regarded as a form of capital consumption. If no new investments occur, the environmental damage decreases the possibilities of the future product creation. Depreciations therefore represent the cots preventing the losses and damages to natural capital in future.

In the complexity, this regards the costs determined by the necessity of fulfilling certain claims of the production and consumption process towards the social and environmental conditions of the society. From the time viewpoint, these costs can be divided into:

– *Ex ante costs, i.*e. the costs of the preventive protection which should prevent the future pollution, environment damages and losses and the damages and losses caused by it.

– *Ex post costs,* i.e. costs of the damages and losses compensation and alleviation. The basic categories of these costs in relation to the SNA are on one hand the costs of the compensation of the damages and losses caused in consequence of environment damages in the social and economic sphere, and the ecosystem losses in consequence of the environmentally demanding activities of the society.

In both cases, it is necessary that the evaluation of the damages and losses is made in monetary units. They are not evaluated directly, but the costs for the renovation and sustaining of the demanded environment quality, eventually of the damages and losses prevention in future are calculated. By deduction of these costs from the basic macro-economic aggregate (GDP or GNP), we get its environmentally corrected version which does not supply a real picture of economic activities and their impact on environment, but which is able to catch the structural deformations of the economy and its unsustainable trends.

A certain shortcoming of this procedure is the ambiguity of defining the notion of "defensive expenditures" or "environmental costs". A weak point of this approach is also the methodology of evaluating the environmental damages and losses through the real costs of social labour, which do not reflect, however, the scarcity, quality or renewability of the resources these activities are influencing.

Another approach is creating of the so-called satellite environmental accounts. As it has been already stated, the main actor of the satellite accounts method is the U.N. Statistical Office. It issues from the generally known insufficiency of the

methodology of registering economic results of the society through the SNA, which cannot analyse and evaluate all aspects of the socio-economic activities. However, since their incorporation into the basic current accounts could influence the quality of the main indicators, the so-called satellite accounts were created, the aim of which is to supplement the main indicators by the information not hitherto incorporated, but important from the sustainable development concept viewpoint. The satellite accounts are aimed at the sphere of science, research, health care, education etc., and as the classical SNA operates with the data on the society activities without regard to their consequences, a similar satellite account was created also for the environment sphere (Living Planet 2007).

In connection to environment, two main shortcomings of the conventional SNA are underlined: On one hand, it is unable to cover the mutual relationships between the activities of the society and environmental impacts they are causing, and consequently neither the impacts on the society welfare and the level of living, on the other hand, it is neither able to record the problem of the natural resources depletion. At the evaluation of the SNA indicators, it therefore cannot be recognised which activities led to their growth and whether they in consequence caused the environment degradation and the social costs increase.

The satellite environmental account should, together with the SNA, become a source of information for the identification of the environmental demands of the individual activities as well as the society as a whole and they should enable analyses and forecasts of the future economic development for the needs of the SD concept of the society. The items of the satellite environmental account could be registered as material and financial flows, but also by the verbal description of the phenomena we are not able to quantify. Its results can be presented as a set of the partial indicators supplementing the main economic indicators of the current accounts, or as an aggregated indicator transforming the aggregates of GDP or the disponible national income, enabling above all the international comparison of the individual economies impact on the environment. A set of individual indicators is probably more suitable, as the aggregation of such an amount of different information would distort the final result, as all of them have to be expressed in the same, i.e. monetary units.

From the above mentioned, it follows that the realisation of this approach is demanding with regard to the information background. That is also obviously the reason of the fact that, even if this method is well elaborated theoretically, it was implemented in practice only in few countries and in several partial spheres (e.g. in the sphere of refuse) (JPAC 2010).

However, alternative indicators need not be based on the GDP or issue from the SNA; neither have they to be expressed in monetary units. The choice of indicators depends on the utilised definition of sustainability.

CONCLUSION

Sustainability can be also defined as sustaining of the environmental capacities, i.e. sustaining the ability of the environment or biosphere to fulfil its three basic functions enabling the human economic activity: biosphere supplies us with natural resources, accepts and assimilates our refuse and supplies us with environmental services. These environmental capacities and their utilisation have to be measured in physical units, as the pollution elements per 1 cubic meter of the air, the area of forests, the area and quality of soils etc. If then we want to measure the economy performance with regard to environment, these units are very suitable – if the pollution concentration in the atmosphere increases, the forest area decreases, the land area diminishes and their fertility decreases, we can state that the performance of the economy with regard to environment has decreased and the economy is getting away from sustainability. In such a case, the monetary evaluation is not necessary, the physical indicators of the environmental capacity are sufficient. The knowledge of each individual indicator can help us to aim the policy towards fulfilling of the sustainability aims.

In the endeavour to supply a complex evaluation of the economy performance, it would be possible to use one or two basic indicators, which could compete with the GDP. It would also be possible to compose from many physical indicators several environmental indices, which would overcome the disadvantage of the mutual incompatibility of the individual data. It would also be possible to compose a unified environmental index, in which the individual indicators would be given different weights.

However, the opinion prevails that the performance of economy cannot be measured by a single indicator only, but by a whole scale of indicators each of which will show in its own units one side of the important problem. By evaluating the individual indicators and understanding their mutual interrelations, it would then be possible to form an opinion on the problematic and to propose the relevant political measures leading to its efficient solution.

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