

Natural Dimension of Sustainable Development and Economic and Ecological Integration in the Evaluation of Social Welfare

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Abstract: The evolution of the report needs - resources emphasises the contradiction between the more and more social needs and the natural resources, relatively limited, between the frame and the given planetary space. The dynamics of the contradiction depends on the level of the production factors drawn, level capable to ensure the more or less optimal satisfaction of the consumption needs. The needs for natural resources and for the maintenance of a healthy natural environment must be correlated with the exploitable known reserves, and as a perspective with the probable ones. Starting from the five factors that influence each other in the process of development - the population, the natural resources, the natural environment, the agricultural production, the industrial production and the pollution - the new strategies of the sustainable development aim at finding the adequate criteria to optimise the resources - needs report, as well as the necessary means to achieve this purpose. The economic environment of the future, through the inputs and outputs, must be in a dynamic compatibility with the rural environment, but also with the present and future needs and interests of the generations that evolve and succeed.

Key-Words: Sustainable Development, Natural Environment, Ecological Economy, Sustainability Rules, Substitution of the Natural Capital, Environmental Assessment.

1 Introduction

The sustainable development is conceived in the vision of the reconciliation of economy with the environment, in the sense that the scientific evolutions and the technical and economic ones truly support the general human progress, only that they take place under the condition of the ecological balance maintenance. The sustainable development involves the achievement of the compatibility of four systems: economic, human, environmental and technological, so that, based on the simultaneity of their progress to ensure the satisfaction of the needs of the present, without compromising their own needs.

The theory of the sustainable development starts from the idea according to which under the conditions of amplifying the economic interdependencies, natural or national, social and political, the economic system cannot be seen as only a sum of its subsystems.

The realities confirm the existence of some complex and really dynamic interdependences between the economic environment created by man and the natural environment, between the economic increase factors and the macroeconomic results,

between the operation mechanisms of national/world economy and the economic efficiency etc. Under these conditions, the divergent or asynchronic evolution of a segment of these correlations may generate vast and lasting negative consequences in the entire national/world economic and social system.

2 The exigencies of the sustainable development

In order to prevent the occurrence of such effects, the inputs and outputs of the economic system have to be compatible with the natural environment, as well as the present and future needs/interests of the various generations. In other words, the definition of the manners of optimising the needs-resources report and the assurance of the purpose of the economic system on a long term must start from the need to comply with the exigencies/criteria of natural order, respectively social and human criteria.

The natural dimension of the sustainable development is based on the fact that the

environment is limited from a point of view of the resources output, respectively of the volume and structure of the biological mineral resources etc. which may be drawn into the economic circuit, as well as from the point of view of the capacity of absorption of the residues, the gas emissions of the economic activity, under the conditions of maintaining or increasing the quality of the environment factors. Both limits have a dynamic, evolving feature: the rhythms of the economic growth and the exhaustible feature of some resources make nature become more restrictive for the economic activity; on the other hand, through the waste of the production and consumption activities, through pollution, nature is subjected to some changes which sensibly reduce the regeneration capacity of the environment factors. Under these conditions, the natural environment can no longer be considered as a simple resource reservoir, but as a production factor whose quantitative and qualitative parameters directly influence, on a short term, but on a long term as well, at a national and world level, the actual economic development as well as the standard evolution of life and civilisation.

The promotion of the interests of present and future generations cannot be achieved outside the harmonisation of the economic environment needs with the ones of the natural environment, outside the protection of the natural resources quality and the assurance of a rational report between the resources drawn into the economic circuit and the resource potential.

The need for these interests is justified by the fact that, on the one hand, an even higher standard of material life loses any sense under the conditions of a degraded and polluted environment, and, on the other hand, such an environment negatively influences the quality of the natural resources, including the health state of the population, which is negatively present in the economic growth itself.

The social - human dimension of the sustainable development is obvious, because the "the production for the sake of production" is a non sense, and the concordance of the outputs of the economic system with the present and future expectations of the different generations corresponds with the individual interests as well as the general ones of the consumers and the producers.

The achievement of the equality of chances for the generations which coexist and follow in time and space imposes that the strategy of the solution of technical and economic problems according to the present imperatives should not reduce the

possibilities of satisfying the needs of the future generations through the degradation of the environment. The harmonisation of the objective demands of the economic growth with the exigences of the natural environment protection needs, among others, the definition of some mechanisms, of some economic, political, juridical etc. instruments which could stimulate the protection actions of nature.

Among the mentioned criteria, the natural one is essential, because the compatibility of the economic system with the natural one or of both with the technological system results from the human dimension of the economic increase and development, from the necessity of complying with the interests of the future generations, through the protection of the environment, based on the promotion of some techniques and performing and non-polluting technologies.

The economic system is optimal when it supplies the maximum of what people need, fact which means that the entire production, obtained under the conditions of efficient use of the productive potential, should be demanded on the market. The enrolment of all the economic activities, according to the needs of individuals and of the society, implies the achievement of a concordance, of a balance between the interdependent components of the economic system.

A series of contemporary economists consider that the theories of the economic balance, although abstract, constitute a fundamental component of the general economic theory, with great heuristic value, helping us discover the new aspects of the sustainable social and economic increase and development, new regularities of the economic life movement.

According to the Brundtland report (1987), the sustainable development is a new kind of human strategy which answers the current needs, without compromising the possibilities of satisfying the future generations' needs.

In essence, the human-sustainable development is defined by the following more important elements:

1. the permanent and safe compatibility of the man made environment with the natural environment.
2. the equality of chances of the generations which coexist and follow in time and space.
3. The interpretation of the present through the future, under the form of the introduction as a purpose of the sustainable development, of the

ecological safety instead of the profit maximization.

4. the introduction of the compatibility of the national development strategies as a consequence of the stronger interdependences, geo-economically and ecologically.

5. the transfer of the weight centre in ensuring the general welfare, from the quantity and the intensity of the economic growth to its quality.

6. The ecological capital (natural) is in a relation of interdependence and it organically integrates with the man made capital, with the human (cultural) capital, within the global category that is redefining the economic and social objectives and extends the horizon in time and space.

7. The passing to a new strategy with a natural and human face, where the economic development and social objectives are subordinated to the human and the environment's health, in time and space.

Starting from this necessity of achieving these components, the new strategy of the sustainable development aims at monitoring the change of the economic growth type, the pollution control, the creation of an institutional and legal frame that is adequate and efficient, the educational system that can anticipate and perfect the knowledge, the system of economic instrument to prevent, protect and ensure the rare resources, the specific indicators system, which could help appreciate the quality of the human development and life.

The sustainable development needs strategies on short and medium term horizons, but on a long term for the perspective of 20-25 years. In this sense, policies are necessary at a regional, international and global level, at the level of the state and at the local level, with the compatible objectives in time and space, based on criteria which derive from the improvement of the people's conditions of life. At the same time with the basis of these policies, regulation mechanisms must function, with an economic, legal, substitution and informational feature, to ensure the achievement of the objectives set forth.

At any level of discussing the sustainable development, the elaboration of a strategic planning is necessary, with clear objectives to reach, with criteria of appreciation and measurement indicators, with support mechanisms - juridical, economic, cultural – as well as an ecological management of the productive processes on each life cycle.

3 The conceptualisation of the relationship between economy and ecology

The mutual relationships between economy and ecology are the same age as the human society and its economy. In some authors' opinion, ecology and economy represent the two faces of the same coin. The paternity of the notion of "ecology" is attributed to the German biologist Ernst Haeckel who, in 1866, defined ecology as being "the science of reports between organisms and the outside world where we can largely recognise the factors of the fight for existence". According to the famous French Dictionary, "Larousse", the biologists understand through ecology, "the science of the conditions offered by the environment (temperature, humidity, salinity, light, oxygenation etc.), the science of the environment action on the beings living within it, the science of the manner in which the action of the respective beings modify the environment." Ecology studies the correlations of the production, of the process between man and nature, the latter fulfilling an important role, manifested in three ways: a) offers man the materials, the substance he/she processes, transforms and adapts for the satisfaction of multiple needs; b) constitutes a true arsenal of tools for work and energy very useful for man; c) the earth gives the man "locus standi" (lat. For place to stay) and his/her evolving process the space for action.

During the long period from the history of society, people have considered that their domination over nature represents an distinctive essential sign of the technical and socioeconomic progress, failing to notice or to take into account the fact that man's domination over nature and its forces had many times a destructive, sometimes fatal feature.

The perspectives of exhausting the natural resources, the energy and raw material crisis, the accentuation of degradation processes of some important components of the environment, the occurrence of some ecological deregulations and unbalances, have raised to science, especially to the ecological and economic branches, but also to practice, the problem of the economy and society report, on the one hand, and the natural environment, on the other hand.

The eco-system is going through a dangerous and profound ecological crisis, accentuated by the anti-ecological behaviour of the economic and social agents. These phenomena justify through their negative effects, especially the fact that

economy and ecology form a complex system (the economic-ecological system) and that it must become an ecological economy. This truth was understood by specialists over three decades ago, demonstrating the more acute necessity of passing from the anti-rational administration of the natural environment to a rational one.

The building of the ecological economy represents, in our opinion, the unique rational and efficient alternative to the "industrial economy". The movement, the function and the evolution of this economy are governed by the economic laws, as well as the nature's objective laws.

In this context, the features, the defining coordinates of the ecological economy, may be considered the following:

- The ecological economy is a constituting form in the advanced countries of the world. At a planetary scale it represents the current form of economy as a necessity and a future form of economy as a reality.

- The normal function and the natural evolution of the ecological economy is governed by the system of economic laws and by the nature's law system, as well as by the interaction between them.

- This type of economy shall leave a smaller and smaller space for the manifestation of the antagonism between man and nature's forces. Due to the new behaviour of the ecological company, one shall aim not at the maximisation of the profit at any cost, but to the maximisation of the managerial satisfaction within which a special significance shall have the ecological component.

- The methods of the ecological economy shall be, intensive, of a high profitability because it aims at the quality of the environment as well as at the preservation of resources.

- The performances of the ecological economy shall be measured mainly through the economic efficiency and through the ecological efficiency. Such an economy shall be oriented and shall reorient its business, turning it away from the industries which through their nature massively pollute or consume the finite resources.

- The function and the natural evolution of the ecological economy is confronting with some new problems, ignored by the industrial economy and, especially for this reason, becoming more acute at the moment. We refer, mainly, to the bearing of costs related to the prevention or the annulment of certain negative consequences, following the technologies used for certain types of products. Secondly, we must take into account the effective costs of using in production the substances and the forces of nature, which, nowadays, are not

accounted and are not included in the costs of the actual production, but are considered externalities. Thirdly, it is about the costs related to the use of goods in the process of final consumption, which turn into waste, in general, and into nonrecyclable things, especially. All these external costs must be internalised.

- The ecological economy represents an assembly of systems, with a higher degree of complexity than the industrial economy, and a higher degree of vulnerability, due to the amplification of the uncertainties and ecological risks caused by the unfolding of the economic activities and of economic globalisation. Besides the numerous entrepreneurial risks, the economic agents are confronting on a more extended scale with the so-called pure risks – risks which are situated beyond the control of those who are involved in this activity and are related exclusively to the vulnerability of the systems.

- The ecological economy is by excellence a human economy, because it aims at the protection of man through the protection of nature, of which he/she is a part.

Regarding the definition of the sustainable development, there is the opinion according to which the environment is a critical natural capital, but essential from the point of view of consumption, as well as of ensuring the conditions for the productive flow unfolding. Because of this, the negative effects on the environment may be seen as an erosion of capital, fact which reduces the volume, the structure and the quality of its services.

4 The natural environment - basis for the sustainable development

We can ask the question, here, which are the reasons for which the natural environment can be considered the fundamental factor for the sustainable development? We may understand the following arguments in this matter:

Firstly, the multifunctional feature of the environment is justified by its main functions: as a supplier of raw materials and energy necessary for economy; as an owner of the capacity of assimilation of waste, as a supplier of a large number of services and ecological functions. Due to these specific functions, the natural capital cannot be substituted (totally) through the real capital, it needing to be preserved. Moreover, the technical capital is not dependent on the natural capital, in many cases consuming it.

Secondly, the natural capital contributes to the maintenance of the resistance capacity of economy, especially for the less diverse economies from the developing countries. A rich healthy and natural environment offers alternative opportunities of economic growth in crisis situations (ecological agriculture, rural tourism etc.).

Thirdly, taking into account the features of the natural capital, this is differentiated from the technical one through the irreversibility of its variation, in the sense that there are superior thresholds (from the point of view of the loading capacity), or inferior thresholds (minimum stock) from where the irreversible phenomena start showing. This thing makes the interactions between the environment and economy have uncertain effects on a long term.

The environment and the natural resources constitute the main components of the economic system operation. These represent the natural basis of the economic activities, which may favour or limit the development of society. To the extent to which we consider man as a part of the natural environment, we may consider as immediate and determining needs in the development of society, the following:

- the thorough knowledge of the natural environment and of the interactions between the social and economic system and the natural systems, we cannot conceive the economic growth and the sustainable development only through the increase of the quantity of goods per capita, but through the correlation of these quantities with a series of real, rational requirements, in such a way that the consequences of a negative impact on the natural resources should be avoided or maintained within the minimum limits;

- the rational use of the maximum saving capacity of the natural resources, the avoidance of waste in their management, this leading to the achievement from the same quantity of raw material and energy of a larger volume of utilities and added values;

- the prevention and the fight against the degradation of the natural environment provoked by man, as well as of the one caused by nature (adoption of non-polluting technologies and the equipment of the processes generating pollution with installations against it, the revaluation of the useful substances existing in waste coming from the production and consumption activity, the neutralisation of the negative effects of the non-recoverable residues, the achievement and the implementation of some non-polluting means of transportation, the training and the education of the

citizens in the sense of understanding the natural environment as a vital factor of economic and social activities etc.).

The sustainable development proposes more rules of sustainability based on the maintenance of a minimum level of natural capital:

- a natural resource has multiple functions: economic, biologic, recreational, the technical progress cannot be applied in a unitary manner to all these functions. We must define a critical natural capital which has to be subjected to some minimum norms of salvation, thus determining a threshold of using this capital, for the purpose of preserving a certain natural stock;

- the use of natural renewable resources must not be larger than the usual renewal rate of the respective resource;

- the exhaustible resources must be treated permanently through they replacement by the renewable resources;

- the gas emissions must be inferior to the assimilation capacity of these into the environment;

- the reason for this precaution must be a priority in adopting the different decisions of investing in order not to affect the quality of the future generations' life. This principles is more important as the scale of potential dangers to which the natural capital is subjected is larger and larger. In the case of the sustainable development concept, the environment and of the natural resources problematic is found over the redefinition and redetermination of their real content, under the conditions of the natural systems evolution.

The concept of sustainable development has made the society admit the importance of the quality of the natural environment and of the services offered by it. Through the awareness of the benefits of the environment, the sustainable development has reflected a better understanding of the functions fulfilled by nature, which may be classified as follows:

- a. function which contribute directly to the quality of life. The environment offers people satisfactions through the fact that they appreciate and enjoy the beauty of the landscape, as an essential element of the recreational activity and indirectly through the television, film, radio;

- b. functions which contribute indirectly to the quality of life. The poor natural environments contribute to the increase of stress and illnesses. The pollution of the air and water directly affect the human health, which leads to the reduction of the joy of life and of the work capacity, in order to achieve the economic progress;

c. functions which directly contribute to the gross internal product through the environment sector. The environment sector generates expenses for the protection and the prevention of its degradation, as well as the incomes and workplaces. To the extent to which the environment expenses are less efficient for the GIP than other foreseen expenses, the economic growth is slower than in other cases;

d. functions which directly contribute to the economic activity through the environment inputs. The natural environment supplies gross raw materials and energy under the form of oil, coal, natural gas, wood fuel and minerals. The capacity of the environment agents to receive these inputs, to absorb and to transform the losses into benefits represents an additional resource;

e. function which contribute to the support systems for life, in general. Although some ecological services are accordingly defined, like the functions of the rainforests of protection against the waters and of air purification, they are often ignored by the economic analysis of the environment. Other services, which often are difficult to characterise in economic terms, have a fundamental importance, because without them, the economies cannot operate correctly. For instance, the ozone layer regulates the level of radiation reaching the Earth. The oceans and seas are part from the carbon cycle and from the hydrological cycle of life.

The more developed the economy of a country, when the other production factors remain relatively constant, the more rapid is the exhaustion of the natural resources and the higher the level of pollution. The type and the level of the exhaustion of resources and of the pollution depend on the sectorial structure of economy; the economies depend very much on agriculture and other industries of the primary sector, tend to suffer more from a rapid exhaustion of the resources and less from the industrial pollution.

Moreover, moving towards a new vision of the sustainable development, one must notice the older debate between the economists –ecologists and the economists - traditionalists which is based on the problem of the report between the technical (productive) capital and the natural capital. The problem of complementarity of the two types of capital appears - as generally stated by the environmentalists, or of the sustainability of the types of capital - as considered by the classical economists. From the point of view of the theory, all the production factors may substitute one another but the practical substitution is problematic,

because it is debatable to the extent to which some components of the natural capital may be substituted in reality with the technological capital.

5 Social welfare issues readjusting the environmental assessment of the gross domestic product

The assessing methods of interaction between different environmental sector parameters and those of human development are imperfectly applied or in a poor manner.

Sustainable development by definition must be based on actual capital rents, in other words, what is available for current consumption, without diminishing the value of capital, natural resources, thus incorporating the effects of degradation and depreciation, and optimizing its economic and environmental function (for example, for biological resources, it is essential to reach optimal economic exploitation, which is reaching their maximum biological production in terms of sustainability).

The sustainable development indicators must take into account mainly the integrity of environmental elements and structures, as well the diversity of species and ecosystems. More specifically, some authors consider as a primary measurement of sustainable development should include:

- a. indicators to signal society pressure on the environment (contamination, resources use);
- b. environmental condition indicators (biodiversity, ecological integrity).

Both categories of indicators should compare actual flows with sustainable flows. Although previous considerations seem obvious, the core problem is that the process of considering the sustainable flows is not involved in the creation of sustainability indicators process. One way or another, they should be defined by policy makers at governmental level having the specialists advise. Either way, a more accurate definition of what it is considered as sustainable it is fundamental for sustainable development indicators creation, despite the difficulties involved by their accuracy.

To the extent that the notion of sustainable development would be equivalent to ecological sustainability (this is the fundamental condition of economic development), it is possible to compose groups of sustainability indicators, both predictive and retrospective type.

Although that is clear that there is not a single sustainable future - that is no universal model of sustainable development - and because the

indicators do not fully cover the quantitative and qualitative objectives, the real evolution of human system in relation to environmental system is perceived more clearly using dynamic simulation models. This way we can accurately assess the future values of selected variables, both socio-economic type, and environmental type, and we can predict the acceptability level of a sustainable development model, defined by these variables.

In this respect, researches have been done in order to make the concept of sustainable development an operational concept using dynamic economic-ecological models.

The level and scientific dimension of *economical and environmental integration* in the context of sustainable development are relatively imprecise, but researchers view on such integration can be designed in a coherent manner only if full integration of economic and ecological processes is done.

Gross domestic product (GDP) as a way to reflect the economic progress, has some shortcomings regarding socio-economic and environmental aspects.

The neglected socio-economic issues refers to the lack of the distribution quantifying and to the disregarding factors not directly capitalized in the economic system, such as tourism, family farms works, foreign diseconomies and other concepts regarding quality of life.

The environmental aspects not reflected in the GDP are added to the economic and social aspects. Effectively, the reality of our total socio-economic system is much wider than the GDP can reflect. The total economy has two sectors which correspond to a measurable activity - the formal economy - and an unquantifiable - the complementary economy. The first includes, first of all, a non-commercial activity that corresponds to the public (state) sector and, second of all, a commercial activity that is working by the principles of a free market. The complementary economy contains a commercial part through an irregular sector, while the other part is not commercial and it belongs to a social economy of a natural (domestic) kind.

It is obvious that an indicator like the GDP, which is not taking into consideration the social economy and focuses on the final economy, reflects the reality only relatively. What the GDP is measuring is what is "economic" without considering other criteria that influence the actions of individuals and groups. The economy treats goods by their market value and not by what they represent themselves.

The private economy is based on the public economy and both are based on the social economy, and in the end both are going to press together on the natural environment. In the opinion of many authors, the symbolic half of the productive system of an industrial society, of which only a single part is registered into the economic statistics reflected by the GDP, is based on a social economy (work equity) and on an economy facilitated by the natural environment, which is not officially taking into consideration in monetary terms. This way, the non-monetary economies subsidize the monetary sectors that are reflected into the GDP, with labour force or absorbed environmental costs, and transferring major risks to future generations.

The current problems of the human society are complex and the economic theories have to respond with new ideas and instruments. In the age of globalization, the basics of economy can't take the risk of not considering the real relations deriving from the current type of economic development.

The GDP is a limited indicator regarding the expression of different socioeconomic concepts, like wealth or progress, which are relatively ambiguous. It is a known fact that generating wealth and obtaining an income growth, even if they allow the increase of consumption and the living standard, don't generate beyond debate, a growth of the social welfare, if an adequate distribution of the wealth and income is not guaranteed.

A first improvement in this matter would be the adjustment of the main economic indicator – the GDP. This indicator, as an instrument, is not the cause of the produced deficiencies, but it leads to taking irrational decisions. Because such an approach of the GDP doesn't reflect the truth economically speaking, its correction, meaning the reflection of degradation of the natural capital and the pressure of the economic system on nature can be considered an abstract action and with little credibility.

Despite these facts, the product or the sustainable rent could be defined and quantified in a more realistic form, from an environmental point of view, if three categories of corrections had been achieved:

- the devaluation of the natural and cultural capital as a result of human intervention;
- the inclusion of the environmental degradation in the protection expenses, in order to be able to control the environment contamination and to cover the compensation expenses;

- the degradation of the environment as a result of the permanent social pressure or residual pressure.

First correction mentioned here achieves quantification of the future rent, which is synonymous to the new direction for sustainable development. Regarding the following two corrections, it should be kept in mind that if environmental costs are included and accounted for properly, the current welfare is more accurately measured.

Anyway, to correct properly the gross domestic product in environmental terms is only a rational approach in the direction of sustainable development and social welfare. Besides offering information on natural capital depreciation, degradation costs included in GDP may provide more accurate information on the functioning of economic system.

The way the protection costs and other social costs derived from inadequate production and consumption processes are treated has a particular relevance. There are five categories of costs:

- External costs of production and consumption overall economic growth (environmental costs, costs of pollution damage compensation);
- External costs of spatial concentration, centralization of production and associated urbanization;
- Costs for protection against increased risk and uncertainties of industrial system;
- Other derivatives costs of the transport (car accidents, congestion);
- Derived costs from consumer patterns and urban practice, as poor working conditions;

Irrespective of the effective exploitation possibilities of the environmental assets and goods generated of these, it is possible to achieve quantification of adjusted NDP, if, in addition to global capital depreciation, protection spending to fight against natural environmental degradation is included. Irrespective of economic assessments accuracy the relationship between damages and environmental costs is clear, which is more accurate in the estimates done by developed countries.

One of the clearest manifestations of the economic and ecological integration trend refers to the definition of sustainable development economic indicators, in which quantification the elements regarding the environmental cost must be found.

In this context, we believe the net domestic product (NDP) may become a more relevant

indicator for the quality of life and social welfare, if the next relations were used for calculating:

$$(1) \text{NDP}_2 = \text{NDP}_1 - \text{Natural capital depreciation}$$

$$(2) \text{NDP}_3 = \text{NDP}_2 - \text{Protection spending regarding the natural environment}$$

For both calculating methods major difficulties in attaching proper environmental corrections to GDP also occur. Despite the development of economic evaluation techniques, some aspects which cannot have a monetary "translation" persist, because of the ecological processes nature (irreversibility, ecosystem functions, biological cycles).

The question here is whether it would be possible to speak of an environmentally adjusted GDP, without an economic assessment of environment. The answer is more complex because the monetary assessment is not absolutely determined. Although it is clear that protection spending assessment is fundamental to calculate the environmental losses, when it comes to natural capital depreciation assessing, a different type of calculation is required. Just as the depreciation of equipment, once it is consumed, when it is replaced, its current cost is considered. Similarly, to calculate the depreciation of natural capital, to know the value of lost environmental good or service is not so important, but its replacement cost, and this cost should reflect the reality.

Anyhow, at least at the first level, we can consider potential environmental costs that should be subtracted from GDP value, to obtain "green" GDP:

- cost of environmental protection measures made by public and private sector;
- environmental cost of production as well as consumption activities in the public and private sector;
- cost of environmental damages removal caused by capital goods waste;
- cost of human health environmental effects and more.

An arguable issue that results from these considerations is whether the final expenses made by public sector and common households are the only ones to be removed while the protection expenses incurred by companies must not be withdrawn, given that they are intermediate expenses.

If environmental adjustment of the NDP tends to reach welfare assessment, all environmental expenditures must be reflected, regardless of the

legal personality of the representative delegated to execute it. If an economic process causes environmental damages, not just any corrective or preventive measure is a contribution to the value added, and it is not logically feasible to be removed (as there is no welfare growth). Although there are many controversies on this issue, because a simple deduction of the “green” NDP would disregard generating a share of the value added in the current industry, the major argument to backup this thesis is that to a certain point, a share of the final demand could be considered a protection cost against welfare and health deterioration (e.g. food consumption could be considered a cost of sustaining life more than an increase in welfare).

Furthermore, a more accurate approximation of welfare should take into account not only the costs of preservation, but also the costs of social protection and compensation which can actually be harder to be identified and assessed, compared to the environmental considerations.

The cost of environmental damages triggered by wastes and their deduction from the GDP expression is a very interesting topic. If economic processes can be corrected in order to obtain a final environmental situation, equivalent to an initial situation (meaning leaving the environment in its original state without taking into account the economic activity), all expenses involved, must be deducted as they do not add value and do not become welfare growth.

Thus, along the protection costs and social costs, it is necessary to deduct *equivalent costs to any residual or permanent degradation that occurs in the environment*. It could even reach an absurd situation, such as it would be possible to consider economic growth as a damaging factor to the environment.

The procedures to correct the GDP offered by specialists start from definition of environmental functions using a physical model, that defines the supply and demand curve, and that, eventually estimates the measures evaluated. These procedures however, are not enough to make the environmental-adjusted rent to be synonymous to the sustainable rent.

6 Conclusion

Perfecting GDP means a greater environmental accuracy in order to measure economic growth, but at the same time, it is a rational approximation of the sustainable rent concept, that allows development orientation, and finally, achieving long term social welfare.

Taking into account the multi-dimensional sustainable development, we can conclude that the most adequate formula to quantify this phenomenon is an integrated reference framework, for different environmental and human dimensions (human and physical indices).

If we accept that future generations will not be compensated for the loss of natural capital, considering that this is not perfectly substituted through human capital, a primary function of sustainability must quantify itself, in physical-environmental terms, because the monetary expression is not fully comprehensive.

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