

**Is Sustainable Development Sustainable?
Or
The Discourse on Future Applied to the Present**

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Abstract

This study claims that the concept of sustainability is threatened by being closed into generalities and void promises. Insofar as this concept is satisfied to urge the linear convergence of the environment and economic development, it will hardly be able to grasp the tendencies of modernity. There is a need to differentiate between strong and weak sustainability, because weak sustainability may only repeat existing tendencies at most. The study attempts to approach the concept of strong sustainability, pin down its criteria, shed light on the pertaining normative measures, and show that weak sustainability is only a subsidiary case of strong sustainability.

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Creation of the “paradigm” of sustainable development: development as the correction of growth?

The normative syntagm is usually connected to the *Brundtland Report* in 1987,¹ which strongly underlined time horizons in one’s relation to nature, primarily in the light of economy. The *Report*’s authors projected norms which harmonized “the needs of the present without compromising the ability of future generations to meet their own

¹ Of the many interpretations see Paul Ekins, “Making Development Sustainable”, In *Global Ecology*, ed. Wolfgang Sachs, (London: Zed Books, 1993), 91-103. On historical antecedents see: Sarah Lumley, Patrick Armstrong, “Some of the Nineteenth Century Origins of the Sustainability Concept”, *Environment, Development and Sustainability* 6 (2004): 367–78.

needs.”¹ Besides the transformation of the perceptions of present/future relations, that is, the emphasis on generational justice, the relation of economic growth and “sustainable development” was also particularly referred to. The *Report* ambitiously anticipated the new age of economic growth, which was to be characterized by the fact that it would be sustainable, both in its “social and environmental aspects”. The interpretation of the report’s conclusions clearly proved the intention to create barriers which would limit the destruction of the environment; it also became clear that these barriers were not meant as absolute, but *relative*.

That is to say, the operationalization of these relative barriers is paramount from the point of view of “sustainable development”. It was clear that economical aspects could not be avoided, as long as the report claimed the institutionalization of economic growth and the harmonization of development. If growth is simplified, at least in a reductive way, to quantity, and development is perceived in the light of quality,² it will seem that the concept of sustainable development refers to the happy dialectics of quality and quantity. The concept of sustainable development intends to cover the widest dimensions, insofar as it aims at a global-strategic influence, touching on all aspects of social-ecological dynamics. Still, how can we explain the new sign of the era of economic growth? Growth and development equally presume the access to (renewable and non-renewable) resources. Why was there any need for referring to novelty in economic growth?

First of all, the concept of sustainability has its contradictions. Solow already pointed out that insofar as sustainability is a “moral obligation”, then it is a general, and not a particular obligation. It is not

¹ *Ibid.*, 43.

² I accept the argument of the economist Herman Daly who has proved a sensibility to ecological questions for decades, and who connects growth to physical size, and development to qualitative changes. He claims at the same time that sustainable growth is a bad oxymoron, which must be renounced, although this is indeed what many people have in mind when speaking about sustainable development. See Herman E. Daly, “Toward Some Operational Principles of Sustainable Development”, *Ecological Economics* 2 (1990): 1-6. Growth is unsustainable, while development implies sustainable relations, processes which rearrange human life, especially the ways of consumption. This would naturally need further refinements. However, sustainability is also a political term. Since the concept of development has become more and more unstable in an epistemological sense, speaking about sustainable development always implies some uncertainty.

about having to preserve something, but about having to preserve the capacity for welfare for those who come after us.¹ Solow had already integrated non-renewable resources in the intertemporal model of growth, saying that it was possible to replace technological dynamics and natural resources. Howarth and Norgaard, who speak about the equality of generations, claim that we did not inherit natural resources, but borrowed them from our children. By saying this, they completely shatter the traditional viewpoints. They interpret the present in the light of the needs coming from the future. However, these authors do not accept Solow's views on replacement, because they emphasize that even if we presume that the replacement of two kinds of resources is possible in the present, it is not at all certain that it will be possible in the future as well. The relation of present and future cannot be illustrated in the perspective of static anticipation, because this relation is movable. Some authors, including myself, speak of sustainability, but not in the spirit of dividing justice, but in the perspective of economic efficiency. Silvestre for example considers that natural goods can be used for two purposes. According to the first one, natural resources are used for private purposes, or in a negative formulation, this is the destructive use of natural goods. According to the second one, natural goods should be used as common resources, which will also be used by future generations, and this could be the basis for the allocation of resources among various generations.

One should notice that the expression of sustainable development appeared in an allegedly critical age, the seventies (when these crisis processes were even characterized as "great"). These processes questioned the preceding dialectics, together with the developmental patterns of the then still existing realist socialism in reference to development and growth. The world had reached the concept of sustainability and relative barriers when the pattern installed following World War II, based on cheap resources and industrial dynamics, ultimately shattered. The indication of the new period implicitly started from the allegation that the old pattern had been exhausted, but it is possible to reorganize it with help of a transformative policy, that is, the harmonization of development and growth. In an economical terminology, the concept of sustainable development reclines on the harmonization of GDP growth and the sustainability of the environment.

¹ Stephano Zamagni, "Global Environmental Change, Rationality and Ethics", In *The Environment after Rio*, ed. Luigi Campiglio et al., (London: Graham et Trotman, 1994).

While the conviction prevails that sustainability standards can be transformed into the language of political decisional mechanisms, naturally within new institutional frameworks.

Some commentaries sustain that this is a program which lacks firm contours, that is, the targets are easily acceptable but in the absence of significant interpretations, they remain in the realm of abstract ideals and monumental indecision. At any rate, the 1990s witnessed a series of experiments of operationalization (“sustainable Germany”, “sustainable Finland”, “sustainable Siberia”, etc.), which can be regarded as an important completion of sustainable development. (Although one should realize that this research and operationalizations did not share that programmatic optimism which was an organic part of the Brundtland Report’s rhetoric). One should also mention that the research meant to create indicators helpful in applying relatively exact standards in measuring sustainability. Other commentators went further and claimed that the concept of sustainable development remained the captive of old standpoints, although covered up in new rhetorical strategies. The Report and the ideological form of sustainable development try, in their view, to smuggle old criteria in a new outfit, while it authenticates the schemes of modern development and the existing order,¹ and does not deal with the problem of world justice or existing institutional tendencies.² The “paradigm” is only possible if the original model is completed with ethical criteria, but this significantly alters the initial concepts. Some commentaries emphasized that the Report can be relevant, but only if the concept of growth is reassessed in the sense that it creates the concept of *development without growth*. This would presume however the

¹ Donald Worster, “The Shaky Ground of Sustainability”, In *Global Ecology*, 132-145.

² Other questions are also asked: “One of the possible reasons for the gap between declarations and reality is connected with the vague definition of the notion of sustainable development, which, on the one hand, concentrates attention on stability problems, while, on the other hand, emphasizes the importance of development—in this connection, it is apparent that the notions of ‘stability’ and ‘sustainable development’ cannot be considered identical and therefore their interchangeable use in *Agenda for the 21st Century* is, of course, incorrect”, Vladimir F. Krapivin, Costas A. Varotsos, *Globalisation and Sustainable Development*, (Berlin/Heidelberg/New York: Springer Verlag, 2007), 50.

rearrangement of existing categories.¹ Moreover, there is a further possibility that sustainability should be separated from the syntagm of sustainable development, and this would free us of the burdened concept of development.² The concept of nature we use while speaking of sustainable development is also not immaterial, therefore it is probable that the Newtonian mechanical concept of nature is hardly adequate for grasping the processes of nature. However, it is not clear what kinds of possibilities this fact yields from the perspective of the changed natural philosophy. (The social construct of nature, that the concept of nature is unimaginable without social interpretive practices, is considered highly important by contemporary theorists.³) Sustainable development can always be illustrated in a definite temporal distance. But “the problem is that, like “fitness” in evolutionary biology, determinations of sustainability can only be made *after the fact*. An organism alive right now is fit to the extent that its progenies survive and contribute to the gene pool of future generations. The assessment of fitness today must wait until tomorrow. The assessment of sustainability must also wait after the fact...what passes as *definitions* of sustainability are therefore often *predictions* of actions taken today that one hopes will lead to sustainability.”⁴ What segments of time and space does sustainability refer to? It is hardly true that sustainability is endless in time and space: “sustainability thus cannot mean an infinite life span or nothing would be sustainable. Instead, we argue it means a life span that is consistent with the system’s time and pace scale.”⁵

¹ Herman E. Daly, John B. Cobb, Jr., *For the Common Good: Redirecting the Economy toward Community, the Environment and a Sustainable Future*, (Boston: Beacon Press, 1989).

² Christopher S. Sneddon, “‘Sustainability’ in Ecological Economics, Ecology and Livelihoods: A Review”, *Progress in Human Geography* 4 (2000): 521–49.

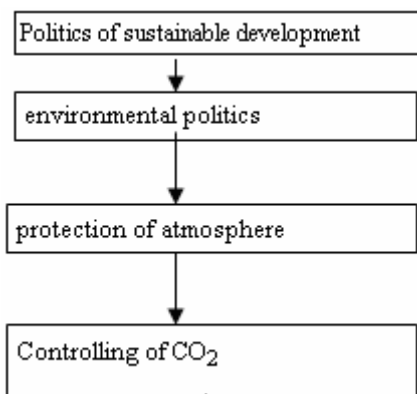
³ Noel Castree, Bruce Braun, “The Construction of Nature and the Nature of Construction: Analytical and Political Tools for Building Survivable Futures”, In *Remaking Reality: Nature at the Millennium*, eds. Bruce Braun, and Noel Castree, (London: Routledge, 1998), 3–42. On the concepts of deep ecology, see Arne Naess, “The Deep Ecological Movement”, *Deep Ecology for the 21st Century*, ed. George Sessions, (Boston/London: Shambhala, 1995), 64-85.

⁴Robert Constanza, Bernard. C. Patten, “Defining Sustainability”, *Ecological Economics* 15 (1995): 193-96.

⁵ *Ibid.*, 195.

Summarizing the increasing number of debates, one can hardly say that a consensus was reached.¹ Although there were some attempts of operationalization, the territory of uncertainty still prevails. It is not accidental that the critics of the concept in question speak of a kind of *hypo-crisis*. The application of the rules foreseen met with enormous barriers, despite the promises given (by the North) in Rio de Janeiro. (Rio was a cultic event for ecological activists in 1992, but they bitterly acknowledged later in Johannesburg that the earlier promises were not kept.²)

Sustainable development is in fact a substratum for all kinds of simplifications; we know of countless ideas which reveal the concept on the basis of linear relations. One example:³



This is a linear concept of sustainable development. Such concepts are based on the conviction that the dynamics of supply industry automatically enhances the environment. Development balances growth, environment balances atmosphere, and sustainable development balances the care for atmosphere. But this way they neglect the question

¹ Carlos J. Castro, "Sustainable Development, Mainstream and Critical Perspectives", *Organization & Environment* 2 (2004): 195-225.

² The 1992 discourse was a globalized one, while in Johannesburg the most important issues were water, forests, and local problems. Naturally, it is very hard to escape the question whether a *global deal* is possible without a worldwide authority?

³ Peter Bartelmus, "Sustainable Development: Paradigm or Paranoia?", *J Sustain. Devel.* 3 (2000): 358-69.

that the problem of sustainability can be exported, and that post-industrial supplies cannot do without the use of energy and resources.

Strong and weak sustainability: lukewarm compromise or polarization?

Before I go on with the interpretation of the concept of strong and weak sustainability, I must pin down my starting point. It is known that in economy decisional models emphasize the highest net present values.¹ Let us look further, and interpret the model of decision making in ecology. The following alternatives exist:

a) $A_1, \dots, A_i, \dots, A_m$ ($m > 1$)

The decision maker possesses the function of evaluation (V), or a system of values by which he evaluates the alternatives:

b) $V(A_1), \dots, V(A_i), \dots, V(A_m)$

The decision maker possesses the rules of decision, on the basis of which he chooses the desired alternative.

c) $A^* = \Omega [V(A_1), \dots, V(A_i), \dots, V(A_m)]$

If we keep ourselves to the greatest net value, we may find the situation simple. But we have said enough already to be able to assess: *the alternative of the highest net value does not correspond to the ecosystem.* The logic of ethical arguing, which primarily refers to values *regardless* of the consequences must first be accepted in relation to the ecosystem.² This fact does not mean that all other modes of argumentation must be put aside, but on the contrary, that a multidimensional argumentation is an organic part of a way of thinking referring to the ecosystem. However, one can hardly gain any insight into the functioning of the ecosystem without values as orientative aspects. Do we not often meet problems such as that of the individual consequences (like external transnational effects) which are dispersed both in time and in space, and are characterized by uncertainty? Do we not see effects with negligible dimensions, which yet increases in a cumulative way, or causes

¹ For the mathematical deduction, see Giuseppe Munda, "Cost-benefit Analysis in Integrated Environmental Assessment: Some Methodological Issues", *Ecological Economics* 19 (1996), 157–68. Giuseppe Munda, Peter Nijkamp, Piet Rietveld, "Qualitative Multicriteria Evaluation for Environmental Management", *Ecological Economics* 10 (1995), 97–112. László Zsolnai L., *Ökológia, gazdaság, etika* (Ecology, economy, ethics), (Budapest: Helikon kiadó, 2001), 52.

² Deontological evaluation.

negative ecological consequences together with other similar effects? *In such cases it is untenable and unjustifiable to recline on the consequences, and the correct decision making is only made possible by value orientation.*

In addition to those said above, there is another factor which also refers to value orientation. In the world of regardless competition one may anticipate a kind of behaviour which validates self-references. Ecological thinking represents it as follows. In the first alternative there is a certain profit (G) and xL deficit, occurring on the basis of $1/x$ ($x > 1$) probability. According to the second alternative, there is L profit and yG deficit, which occurs on the basis of $1/y$ ($y > 1$) probability. Our presupposition is that the economic actor will choose the first alternative, although the two possibilities are mathematically equivalent.¹

The following situation also offers two alternatives. According to the first, there is the G profit, which refers to the present moment, and there is the L deficit at an uncertain future moment. The other is the reversed alternative: the L deficit occurs now, and the G profit in the uncertain future. The presupposition is that the economic actors will choose the first alternative, although the two alternatives are mathematically equivalent.

What is the conclusion? *Economic actors choose certain profits and uncertain deficits, and disregard all other alternatives.* At least, it is reasonable to think like this. But this alternative damages the ecosystem, because it implies the *absence* of sacrifice connected to long-term questions. The discount rates will be high, which means that the long-term net present value of the consequences will be low. This happens also in the case of large corporations, applying technologies which involve the possibility of ecological catastrophes (many remember Bhopal, for instance), although the probability is not very high. Apart from this, in certain determined situations the negative feedback, which would induce corrections, is missing. *This deduction repeatedly reminds us that, before turning to sustainability, we must enforce that the complexity of the ecosystem, the temporal determination of eco-dynamics needs a value-oriented decision, that is, value-orientation works as a milestone.*

¹ An excellent, though not ecologically intended description can be found in Daniel Kahnemann, and Amos Tversky, "On the Reality of Cognitive Illusions", *Psychological Review* 101 (1996): 582- 91. See also Zsolnai, *Ökológia, gazdaság, etika*, 44.

These having been said, we may turn now to the analysis of sustainability. Sustainability may easily be expressed in a technical way. ST stands for *stock*, t stands for *time*. So, sustainability needs the ST not to decrease. I do not have in mind here the physical-natural meaning, but the value of the *stock*. Given that V is an assessing function referring to the stock, it can be written:

$$\Delta V(ST) (t) \geq 0$$

But the concept of sustainability contains differences. The measure of differentiation between the two perspectives is the *possibility of replacement* between natural goods and the environment, or in other words, the difference can be judged on the basis of the difference and replacement between the “natural” and “artificial” capital. First, I must pin down the standpoints which sustain weak sustainability.¹ In the centre of this concept lies a projection of the level of development which does not diminish in the course of time. In an economic terminology: sustainability means the non-decreasing value of the economic output amidst conditions of limited capital. More precisely, in harmony with those said above, we are speaking about a non-decreasing level of development in the continuum of various generations. In one version, this situation can be understood as a non-decreasing level of welfare. When operationalizing the given signs, sustainability becomes nothing else than control unfolded on the basis of capital size, the purpose of which is to preserve the level of the capital, or the *per capita* level of the capital. An expression of this is the possibility of absolute or relative replaceability between natural and artificial forms of capital.

The best known formalized formula of all this is the following:²

$$Z = S/Y - \delta_m/Y - \delta_n/Y$$

(Z – the index of sustainability, Y – GNP, S – national economy, δ_m – devaluation rate of artificially produced capital, δ_n – devaluation rate of natural capital; on this basis one may speak of sustainability if $Z > 0$).

¹ Maite Cabeza Gutiérrez, “The Concept of Weak Sustainability”, *Ecological Economics* 17 (1996), 147-56.

² David W. Pearce, Kirk Hamilton, and Giles Atkinson, “Measuring Sustainable Development: Progress on Indicators”, *Environment and Development Economics* 1 (1996), 85-101.

If this formula is connected to the rhetoric of the Brundtland-report, it is obvious that in the case of weak sustainability it is the global control referring to the replacement of the two aforementioned forms of capital that comes to the forefront. And, very importantly, the possibility of control is based upon the lines of optimization, and is connected to the harmonization of growth and development.

Precisely these latter instances form the object of criticism of the adepts of strong responsibility. Because it can be stated that during the process of replaceability we leave aside the level of the existing natural capital. More precisely, what we say is that the attention on the *absolute* level of natural resources is left out of the perspective of weak sustainability. Weak sustainability polarizes the debate between ecocentrism and anthropocentrism, clearly taking sides with anthropocentrism.¹ What is more, the concept of weak sustainability may as well play a role in damaging the natural environment, as it is allowed to decrease the amount of natural resources, insofar as it corresponds to the aforementioned conditions. The concept of strong sustainability may rely on examples (Nauru, etc.) which prove that in certain cases weak sustainability can be *harmonized* with the destruction of nature. The following is valid for weak sustainability: "Anthropocentric concepts postulate that an obligation to provide for the future exclusively applies to the future descendants of mankind. An obligation to preserve nature and its subsystems (ecosystems, biotopes, species) exists only so far as it could be of use for future human generations, be it as a resource for a practical technological purpose (instrumental value) or be it as an object of a contemplative (theoretical, religious or aesthetic) attitude (inherent value)."² While economic argumentation is relative, the ecological discourse operates with absolute greatness.

Starting from the concept of strong sustainability, one may say that the previous concept unjustifiably presupposes the optimistic pattern of the replacement of natural resources. In fact the strong concept disagrees with the fact that even relative replacements have an irrevocable effect on nature. That is, the difference between the strong

¹ On the debate see George Sessions, *Ecocentrism and the Anthropocentric Detour*, *Deep Ecology for the 21st Century*, op. cit. 174.

² Dieter Birnbacher, "Responsibility for Future Generations – Scope and Limits", In *Handbook of intergenerational justice*, ed. Joerg Chet Tremmel, (London: Edward Elgar, 2006), 30. On the opposition of anthropocentrism and biocentrism see Gunar Skirbekk, "Ethischer Gradualismus: jenseits von Anthropocentrismus und Biocentrismus?", *Zeitschrift für Philosophie* 43 (1995): 419-34.

and weak concepts is determined by an altering image of economic growth. The strong concept aims at embracing wider perspectives that it envisages not only as non-decreasing development, but also as “unbroken possibilities of human life conduct”. At any rate, the consequences have long-time effects as they presuppose various strategic implications.

In the background of the strong concept one may recognize the intention of acknowledging the importance of natural resources; that is to say, natural resources must be valued even in the lack of monetary perspectives, as in physical-biological terms. This explains the convergence between economists and natural scientists with regard to the second concept, at least between those who include ethical considerations into their trains of thought (let us mention here the research of biological population or biodiversity). Natural sciences have developed methods which may yield a firm basis for the understanding of the strong concept. It is absolutely clear that, according to the concept of strong sustainability, at least some resources are unitary, the consequences of their use are irreversible, that is, the advancement of replacement has or may have disastrous consequences.

Of course, there are differences inside the strong concept as well. Within these frameworks one may also recognize certain (let me add: quite questionable) ideas which completely deny *any* kind of replacement between natural and artificial resources. They declare an absolute concept of non-replaceability. At the same time, one may note certain ideas which allow partial replacement. This latter remark sends us to orientations which make an effort to render a framework for *partial and justified* replacement by differentiating the resources.

There are several kinds of sustainability, as follows:

- a) very weak sustainability, which presupposes a perfect replacement between the inputs;
- b) the very strong rules of sustainability, which allow no kind of replacement whatsoever (Daly called these the absurd rules of strong sustainability).

According to Turner, the hierarchy can be described as follows:

- a) weak sustainability, according to which welfare is not based upon some specific kind of capital, and it can be maintained by replacement;
- b) sustainability in a strict sense, which is based upon a strictly limited replacement, because of characteristics such as irreversibility, uncertainty, and natural forms of capital.

One possible answer for the question of which concept to support could be that this is an experiential problem. However, despite the fact that one values the importance of experiential aspects in this matter, I consider that this would be in fact the avoidance of a real answer. One problem of the weak concept is that it does not differentiate between various kinds of capital, and the various forms of welfare that could be achieved. That is, weak sustainability presumes the unification of the capital, with the help of monetary units.¹

Naturally, there are possibilities that allow us to speak about partial replacement. Insofar as welfare based on natural capital can be compared to welfare based on production, then replacement is justified. *That is, the rules of the strong concept allow for a flexible interpretation in certain cases; the strong concept allows the application of the weak concept in well defined situations.* At the same time, it should be clearly noted that it is mistaken to *a priori* presume the possibility of weak sustainability merely on the basis of strong sustainability, that is, any pertaining decision must be situational. *Strong sustainability* means *complex relations* and last but not least, the *preservation of evolutionary possibilities*.

When speaking about replacement, one must differentiate between macro and micro dimensions. Replacement is limited to the macro, rather than the micro dimension. Stern exemplifies it with a house's insulation, which directly replaces the fuel; this is thus the replacement of manufactured capital and natural capital in the household. But the relation of insulation and fuel (as a matter of fact, the making of insulation needs fuel) means that from the point of view of economy the net replacement is lower than induced by the analysis of the household.² There are some studies which urge replacement in the case of the most important metals, while others emphasize that there is a possibility of replacement between artificial capital and those aggregated material inputs which depend on an *a priori* pattern specification. Yet other studies note zero replacement for strategically important metals. Very importantly, these studies take into consideration the dimensions of

¹ The criticism of the monetarization of the capital and supplies: Gretchen Daily, ed., *Nature's Services: Societal Dependence on Natural Ecosystems*, (Washington, DC: Island, 1997).

² David. I. Stern, "Limits to Substitution and Irreversibility in Production and Consumption: A Neoclassical Interpretation of Ecological Economics", *Ecological Economics* 21 (1997): 197-215.

economy of scale and globality. Pearce and Atkinson¹ for example spoke approvingly about the ways followed by American and Japanese economy, claiming that these economies invested in manufactured capital more rapidly than it devaluated. Still, we have to think about the fact whether it is only the forms of the artificial capital of the country that must be considered, as the use of forms of capital transgresses national borders, and therefore one must speak about the global stock of capital. Victor emphasized that economy,² at least ever since Marshall, knows the differentiation of artificial capital and environmental resources. The sources of artificial capital are simply found in human efforts, while the natural capital is none other than nature's gift, although the supply for it is fixed. Experience shows that the destruction of the artificial capital is rarely irreversible, in opposition to the natural capital. Is it possible at all that a society designed for competition may achieve sustainable paths?

The concept of co-evolution criticizes the concept of replacement. This is so because, with the help of co-evolution, we emphasize the complementarity of economy and the ecosystem. If we speak about the need to preserve the ecosystem, then it is crucial that we make efforts for the complementarity between nature and economy/society. And if we take into account the uncertainty of the ecosystem, then we must also take into account the experiments as well, which are directed towards the optimal use of the resources. Therefore the unrenovable resources must be used in such a way that the rate of the increase of the pertaining prices must be equal with the discount rate. Or, one may say that the unrenovable resources must be used with the help of a rate on the basis of which the renewable resources can be created. In an economical terminology, this means that the use of unrenovable resources is acceptable if the increase of productivity is in harmony with the degree of exploitation. *Still, let us ask the question: does this not enforce the logic of replacement and complementarity?* As Gowdy claims, it is doubtful whether any kind of "pure" technological replacement of resources is at all possible. In fact, the regime of the use of resources necessarily influences the space and forced routes of the future generations. What we know for sure is the following: we live in

¹ David W. Pearce, and Giles. D. Atkinson, "Capital Theory and the Measurement of Sustainable Development: An Indicator of Weak Sustainability", *Ecological Economics* 8 (1993): 103-108.

² Peter A. Victor, et al., "How Strong is Weak Sustainability?", *Sustainable Development: Concepts, Rationalities and Strategies*, ed. Sylvie Faucheux, Martin O'Connor, Jan Van der Straaten, (Dordrecht: Kluwer, 1998), 195-210.

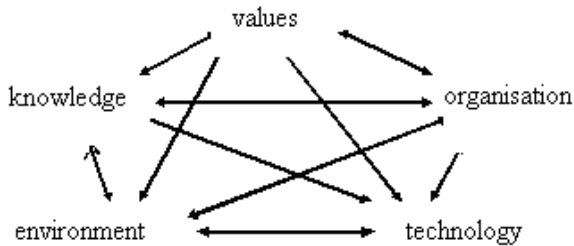
societies in which growth is normative, and what is more, it is endowed with an ideological value.

Certainly, in order to understand the problematic nature of sustainability, one must take into account the value of natural resources. Daly offers one of the possibilities: we must follow the paths which offer a steady state. This term is mostly used in the theory of growth, and denotes a situation in which all real variables change in the same rhythm. The other (and let me add: more radical) possibility is to create a declining state, which presupposes the strong decline of man's effect on the planet, and ultimately also means the strategic avoidance of unnecessary use. (Gowdy mentions an example of the successful communal guidance of resources: the American National Parks. They have reached outstanding results in an ecological respect; they have improved economical conditions because of the increasing welfare and a greater number of available jobs. One of the most important cases is the efforts for biodiversity of the Society for Conservation Biology ("Wildlands Project"). A long-term project has been reached, for instance, concerning the use of North-American lands for the next 200 years).¹

The *co-evolutional interpretation of sustainability* takes into account the complexity and self-organizing features of the social-economic and natural system, and sheds light on the relations between various subsystems (here we find again a deontological assessment) on the basis of knowledge, social structure, and technology, while the interactions are non-linear. Furthermore, the co-evolutional approach is holistic inasmuch as it examines its object in the perspective of complexity. I draw attention to the fact that all these changes occur on multiple levels. Just as society/economy has an effect over nature, it also influences itself. It is not about sustainability as sustainability, but about the definite relations in the perspective of co-evolution. It is not about urging sustainability as purposeful dynamics at all costs, but to examine mobile relations. This is illustrated below by a pentagon-like image:²

¹ Charles C. Mann, and Mark L. Plummer, "The High Cost of Biodiversity", *Science*, 5116 (1993), 1868-1871.

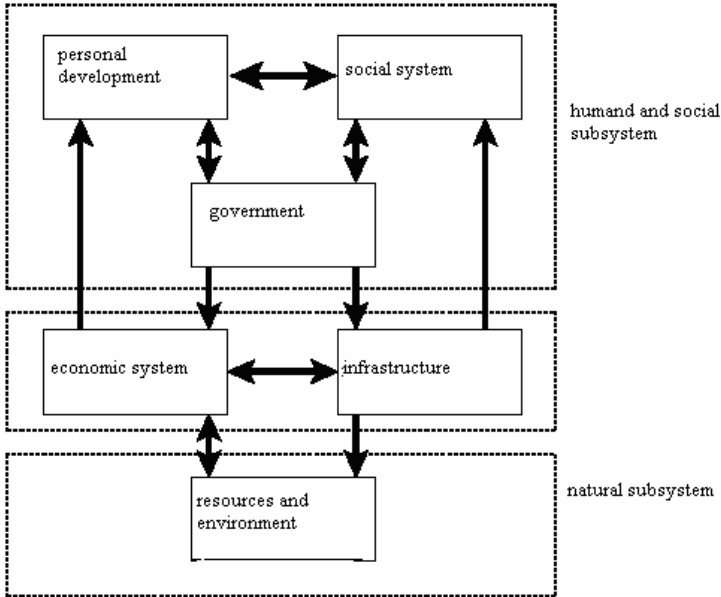
² I used the image from Norgaard, Richard B. Norgaard, *Development Betrayed: The End of Progress and a Coevolutionary Revisioning of the Future*. (London: Routledge, 1994).



If we wish to speak about sustainability, then we must speak about the relations within the pentagon. That is, sustainability can be discussed on the basis of the quality of interactions, and not absolute figures.

The next image presents Bossel's interpretation,¹ and it also demonstrates the subsystems which are directly or indirectly linked. The image illustrates that the sustainability of the parts is closely linked to the sustainability of the whole. Bossel emphasizes that the basic elements of his analysis are hierarchy and subsidiarity. He finds hierarchy in subsystems, especially in the social-economic field. The image contains three subsystems that he operates with, so we see a society which comprises a social system, personal development, and the government, as well as infrastructure, economy, and nature. It is highly important that the necessities and interests of the subsystems, which define the "orientators", are determined. Bossel particularly emphasizes the importance of the ethical dimensions. This is the first phase of the definition of sustainability. In the second phase one must take into account the orientators which show that every indicator mirrors the necessity of the sustainability of the parts and the whole.

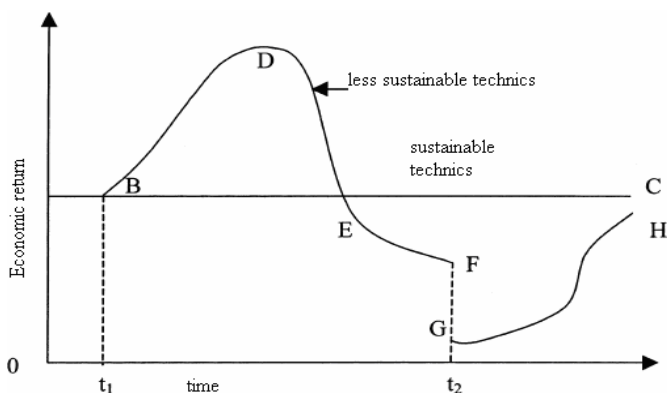
¹ Hartmut Bossel, *Deriving Indicators for Sustainable Development* (University of Kassel: Environmental Systems Research Centre, 1996).



A disturbing example of unsustainability

The following example illustrates that sustainability cannot be discussed in a vacuum, that is, without an eye to its social-economical dimensions. Sustainability can only be examined if one takes into consideration those conflicts of interests which present themselves in a given situation. Let us take an agricultural example, while hoping that it is pattern-like. The next image presents a situation where farmers follow a path-dependent route, which is unsustainable. This situation can be explained by the existence of high initial costs which make more difficult to follow sustainable routes. In the image BC means traditional agriculture, or in other words the path of sustainability. The modern, non-organic technology is used in time t_1 , and in this case economical payback follows the BDEF. The return to traditional technology is impossible because of the high costs of the exit. If the exit is attempted in t_2 , then path FGH will be followed. If every farmer moves towards t_2 , the product's price rises, and this enables easier mobility. So farmers

adapt to the paths of unsustainability. In this case the change to the old techniques would follow the path from F to G, which would mean the individual farmer's decreasing welfare. Welfare may raise in fact on the path from G to H. In certain cases the net present value of BDEFGH is lower than under BC. This simply means that the net discount welfare is higher in the case of the new technology than in the case of the old one.¹



There are tendencies, naturally, to decrease the use of pesticides. But the costs are still high. Tisdell has shown that as the chemically determined agriculture is adapted, the agricultural system is fixed, the agricultural output becomes dependent of this system, *even despite the high costs*. The conclusion is that certain definite agricultural practices are accepted, regardless of the fact that they operate on unsustainable paths. We have seen that the use of pesticides influences sustainability. It is a frequent situation that the use of pesticides implies high costs, as proved by various studies (high costs are justified for instance because of health care, and there have also been cases of death, etc). But if agricultural mobility is fixed on one single path, the return becomes difficult. This explains the fact that farmers hold on to the use of pesticides, despite the important negative side products.

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¹ Clevo Wilson, and Clem Tisdell, "Why Farmers Continue to Use Pesticides Despite Environmental, Health and Sustainability Costs", *Ecological Economics* 39 (2001): 458.

A non-dogmatic concept of strong sustainability is a better way to grasp these questions. It does not start from the fact that the existing condition is some kind of cyclic ecological crisis, or that we live in the civilization of risks, but it claims that the means at our disposal mean an extraordinary potential of power and deserve a particular kind of responsibility. The cumulative side products presume a special sort of ethical sensibility. As we have borrowed our present condition from future generations, the extension of this responsibility has an *orientational* role.

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