RE-EMPHASIZING SUSTAINABLE DEVELOPMENT – THE CONCEPT OF 'EVOLUTIONABILITY'

On living chances, equity, and good heritage

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(Received 4 March 2003; accepted 10 July 2003)

Abstract. The principle of 'sustainable development' is now 15-year-old. There are a lot of definitions and models for its explanation – ranging from 'triangles' and 'prisms' to 'eggs' – but still its sense is diffuse. Moreover, important aspects like *equity* are not sufficiently taken into account.

The following article takes a critical look on 'sustainable development'. It shows logical, systemic, philosophic and ethic reasons for the re-development of substantial parts of the principle of sustainability. Based on the proposed *Principle of Good Heritage* it provides a rough outline of a future *Concept of Evolutionability*, comprising a first tentative for a definition of 'evolutionable development', aiming at achieving a more appropriate and more workable mainstream view of sustainability.

Key words: capital stocks, evolutionability, good heritage, happiness, intergenerational equity, quality of life, survivability, sustainable development, well-being.

1. The principle of sustainable development in transition

At the end of the last millennium, the term 'sustainability' became an overall guiding principle for human development. Its success stems from the underlying reflections on existential problems of mankind perceived at that time: increasing concern over exploitation of natural resources and economic development at the expense of environmental quality.

Sustainable development, as broad political vision, was defined in 1987 by the World Commission on Environment and Development (also known as the Brundtland Commission; WCED 1987) (Figure 1).

Since the release of the Brundtland Commission report, this definition has been subject to several modifications and was re-formulated according different point of views. Thus, the umpteen definitions of sustainability vary considerably. Although today – more than ever – disagreement exists as to the precise meaning of the term, most definitions refer to the viability of natural resources and ecosystems over time, and to maintenance of human living standards and economic growth.

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Environment, Development and Sustainability **6:** 379–392, 2004.

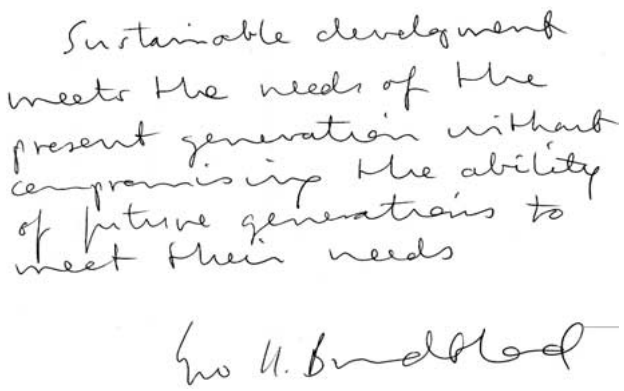

Figure 1. The definition of sustainable development (autograph of Gro Harlem Brundtland).

1.1. MAKING THE VISION OF SUSTAINABILITY CLEARER

In order to offer a more workable interpretation of the principle of sustainable development, the Swiss 'Monitoring of Sustainable Development Project' MONET (SFSO, SAEFL and ARE, 2001) precise the Brundtland definition according to the first of the 10 'Bellagio Principles', saying that 'assessment of progress toward sustainable development should be guided by a clear vision of sustainable development ...' (cf. Hardi and Zdan, 1996). In this sense, MONET modified the definition given in the Brundtland Commission report, using key elements like *justice*, *intra- and intergenerational equity*, *maintenance of options*, *meeting of needs,* and *maintenance of bio-diversity*.

As a result, MONET proposes the following definition:

> Sustainable development means ensuring dignified living conditions with regard to human rights by creating and maintaining the widest possible range of options for freely defining life plans. The principle of fairness among and between present and future generations should be taken into account in the use of environmental, economic and social resources.
>
> Putting these needs into practice entails comprehensive protection of bio-diversity in terms of ecosystem, species and genetic diversity, all of which are the vital foundations of life.

1.2. DEVELOPING MODELS OF SUSTAINABLE DEVELOPMENT

The popularity of 'sustainability' stems also from a simple model used to facilitate the comprehension of the term: the triangle of environmental (conservation), economic (growth) and social (equity) dimensions (Figure 2). Mostly, sustainable development is modeled on these three pillars (cf. Serageldin, 1995).

This model is also called 'three pillar' or 'three circles model'. It is based on basic aspects of human society, but does not explicitly take into account 'human quality of life'.

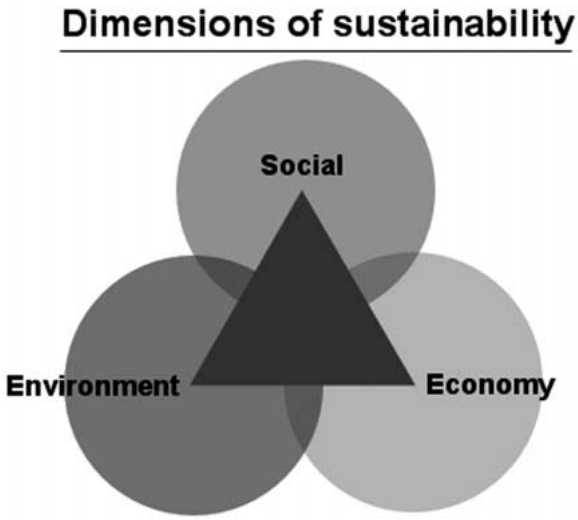

Figure 2. The three pillar (triangle) basic model of sustainability, sometimes shown as three interlocking circles.

1.3. Capital stocks of sustainable development

In 1994, a study group of The World Bank developed the so-called 'capital stock model' with the basic idea being: if we live only off the interest and not the capital, the basis of prosperity is maintained – however, if we consume the substance, our means of existence is endangered in the long term. The definition of *ecological capital* for the planning process includes bio-diversity, landscape, mineral resources, clean air and healthy water. *Human and social capital* equates to health, social security, social cohesion, freedom, justice, equality of opportunity and peace.

The equation is simple:

$$\begin{aligned}&\text{Capital stock of sustainable development (CSD)}\\ &= \sum \text{Capital stock of the environment (CEn)}\\ &\quad + \text{Capital stock of the economy (CEc)}\\ &\quad + \text{Capital stock of the society (CS)}\end{aligned}$$

The equation for the capital stock model assumes that one form of capital can substitute for another. For example, CSD can rise if CEc goes up more than CEn goes down. This is the weak sustainability view of sustainable development, which is widely criticized by ecological economists (cf. Daly, 1996; Lawn, 2000). Ecological economists believe, above all else, that CEn must be kept intact in order to achieve sustainability. Moreover, they also believe CEc and CS should also be kept intact. Indeed, ecological economists often refer to CS moral capital and argue that much needs to be done to regenerate it should it decline (Hirsch, 1976; Daly, 1987; Lawn, 2000).

1.4. Alternative Prism Models of Sustainability

In recent years, alternative models to the triangle of sustainability have been proposed. Among the most interesting one are *prisms* and *eggs*. The 'prism of sustainable development' adapted from Spangenberg and Bonniot (1998), Valentin and Spangenberg (1999) stipulates four dimensions:

- economic dimension (man-made capital)
- environmental dimension (natural capital), and
- social dimension (human capital) as the base for
- institutional dimension (social capital).

In each dimension of the *prism of sustainable development* (Figure 3), there are imperatives (as norms for action). *Indicators* are used to measure how far one has actually come in comparison to the overall vision of sustainable development (cf. Valentin and Spangenberg, 1999).

Criticizing this prism of sustainable development, Kain (2000: 25) argues, that 'the economic dimension tends to include assets emanating from all four dimensions, thus, adding confusion to the description and analysis'. Consequently, the same author proposes a 'MAIN prism of sustainable development' (Figure 4). In this model, Kain uses the terms of *mind*, *artefact*, *institution* and *nature* in order to relieve the prism from the burden of expressions as *social* and *economic*, which are judged to be more confusing than explanatory.

The *environmental dimension* (nature) comprises all natural capital, which may be subdivided into stocks of non-renewable and stocks of renewable resources. The *economic dimension* (artefact) stands for all man-made material assets such as buildings and roads. The *social dimension* (mind) should be perceived as the awareness of the individual subject (worldview, knowledge, and experience). The

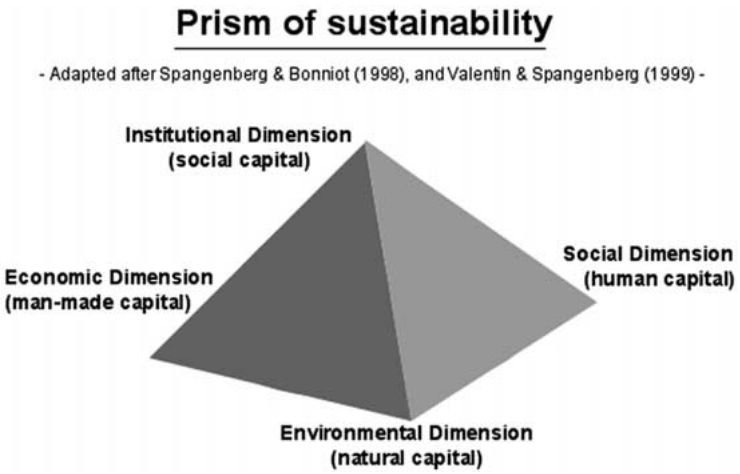

Figure 3. The prism of sustainable development (*Source*: Stenberg, 2001: 42).

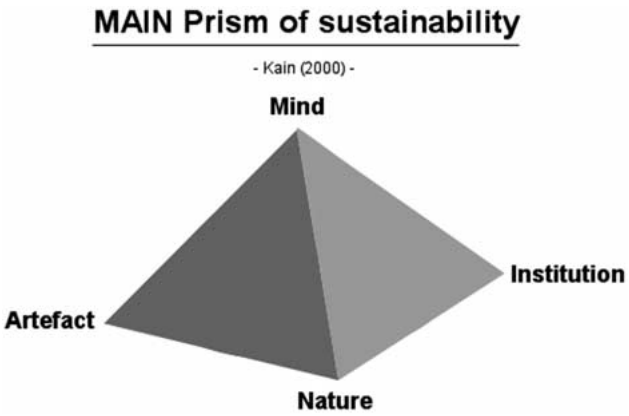

Figure 4. The MAIN prism of sustainable development (*Source*: Stenberg, 2001: 43).

institutional dimension concerns the organization of our society and the relation between people.

The two prism models point out the impossibility that man-made capital, social capital and human capital can increase at the same time at the same amount. The focus has to be on the interaction between the four dimensions. Regarding all four dimensions simultaneously, sustainable development can be achieved (Stenberg, 2001: 44).

1.5. The Egg of Sustainability and Well being

The prism models can be criticized that they pay too little concern to the environmental dimension (natural capital). For many, environment is the precondition for the development of human well being. This view requires a model of sustainability, which puts the environment in the center.

In conceptual terms, the International Development Research Center (IDRC, 1997) proposes to replace the graphics of three pillars or interlocking circles of society, economy, and the environment with the 'egg of sustainability' (Figure 5), originally designed in 1994 by the International Union for the Conservation of Nature, IUCN (cf. Guijt and Moiseev, 2001). The *egg of sustainability* illustrates the relationship between people and ecosystem as one circle inside another, like the yolk of an egg. This implies that people are within the ecosystem, and that ultimately one is entirely dependent upon the other. Just as an egg is good only if both the white and yolk are good, so a society is well and sustainable only if both, people and the eco-system, are well. Social and economical development can only take place if the environment offers the necessary resources: raw materials, space for new production sites and jobs, constitutional qualities (recreation, health, etc.). Ecosystem is therefore to be regarded as a superordinated system to the other dimensions of the triangle or prism models: social, economical, and institutional.

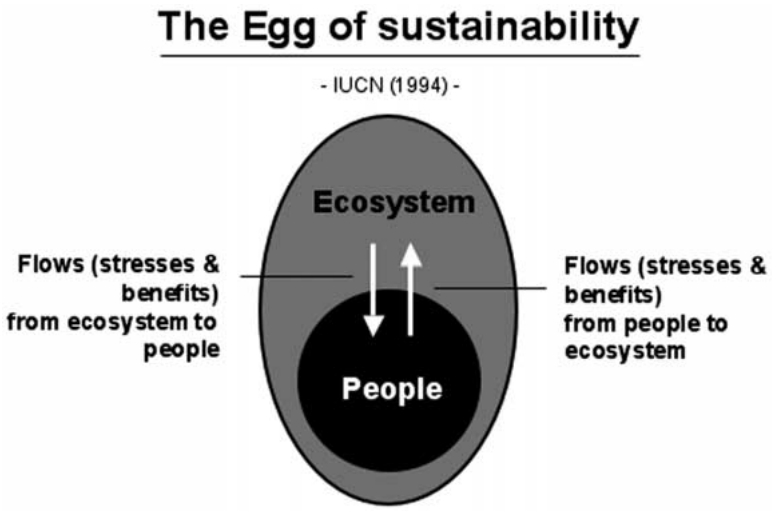

Figure 5. IUCN's egg of sustainability (*Source*: IDRC, 1997).

These latter can only prosper if they adapt themselves to the limits of environmental carrying capacity.

$$\text{Hypothesis of IUCN: sustainable development} = \text{human well being} + \text{ecosystem well being}$$

As with any equation, the above hypothesis of IUCN appears to be too simple. It implies that the environment is not the superordinate system, because it allows that sustainable development can occur if human well-being goes up more than ecosystem well-being falls. Thus, the equation does not show that humanity's well-being depend on ecosystem well-being and sustainable development as a whole.

A similar egg has independently been proposed by Busch-Lüthy (1995), placing 'economy' and 'society' instead of 'people' in the yolk. This is problematic as it may evoke that people are being rendered subordinate to the needs of the economy.

2. Further constraints of 'sustainable development'

Today, the objective of sustainable development is acclaimed by almost all groups of society. This general consent seems mainly to rest upon the vague substance of the term *sustainability* (Voss 1997). What is still missing, is a *profound theoretical basis for the justification for sustainable development* as overall guiding principle. Sustainable development can be interpreted by various groups of society according to their different interests (cf. Fritsch et al., 1994). Therewith, the term becomes broadly acceptable on the one hand, but on the other hand it may loose its substance as political concept. Also for the achievement of *individual happiness* (cf. Veenhoven, 1988) the principle of sustainability does not offer clear visions or means.

The challenge lies now in the operationalization of the term sustainable development, i.e. 'the implementation of initiatives that do not merely pay lip-service to the words but actively do justice the original concept' (Campbell, 2000: 259).

2.1. Missing Justice, few Dynamic of the principle of sustainable development

Peter Marcuse stresses that environmental sustainability is only one criterion for development and that *social justice* is another one. Both do not necessarily go hand in hand: 'To think that their present circumstances and their present societal arrangements might be sustained – that is an unsustainable thought for the majority of the world's people' (Marcuse, 1998: 103). 'No one who is interested in justice wants to sustain things as they are now' (Marcuse, 1998: 105), because it would be socially unjust, if the current living conditions of the world's poor would be sustained and that only one part of mankind could live in happiness.

Thus, sustainability is judged by Marcuse as 'slogan' and 'trap', because it would hide rather than it would reveal the unpleasant fact that society does not really recognize its responsibility and the real causes of pollution and degradation (Marcuse, 1998: 111).

Many definitions of sustainable development (including the one of the Brundtland Commission) and their deduction to practical implementation reveal a more or less static character. 'To sustain' is often interpreted with 'to conserve', 'to preserve' and other terms that give an impression of enshrining a certain state of development. Sustaining a certain unfavorable state may evoke the image of almost *stagnation* or *non-development*. In implementation programs the vital aspect of sustainability (as, for example, 'to develop', 'to promote', 'to improve', asf.) is often small. This is on the one hand *not attractive*, and does not inspire a lot. Sustainability could, in that way, simply be perceived as *boring*.

3. Alternatives to sustainable development

As the concept of sustainable development is being heavily criticized, one has to ask: are there better alternatives? Or, at the minimum, are there appropriate concepts to re-emphasize the importance of evolutionary aspects, which need to be understood to establish a more workable mainstream view of sustainability?

Basically, there are two possible answers: *survival development* is a concept that already existed before sustainability was born. It has just been neglected since. Second, the incorporation of *inter-generational equity* and the *Principle of Good Heritage* lead us to the new concept of *Evolutionability*.

3.1. Survivable Development

In 1972, the Club of Rome edited its *Limits to Growth* (Meadows et al., 1972). This report describes a computer based dynamic systems modeling and its results.

Different scenarios about the carrying capacity of the planet Earth and simulations of the future availability of resources showed by selected resources-related indicators that humanity was about to destroy its living space. The shocking effect for the public was more lasting than the scientific bases of the report. The methods were too simple, and the utilized computers not powerful enough to comprehend the complexity of the man–environment system. The self-healing effects and the flexibility of ecosystems as well as the technological and bio-genetical progress were surely underestimated. Mankind survived until today, and the raw materials did not run out. However, as not all natural resources are ubiquist, recyclable or substitutable, it would mislead to think that there are no more limits to growth. These constraints exist, but are very difficult to find. Multi-factor analyses are just as indispensable as the use of new, more viable methods (e.g. back-casting, future scanning and other flexible methods to explore the future; cf. Nowotny, 2002).

In recent years, Dennis Meadows, the principal author of the 1972s *Limits to Growth*, developed a so-called *World3 simulation model*. This model is based on similar presumptions as the 1972 model, and it takes also into account the principle of sustainable development. Anyhow, Meadows insists that sooner or later a scenario of collapse will be inevitable. For him, it is too optimistic to believe in sustainable development, for it would be already too late to achieve this goal. As human behavior could not be changed without obvious need (War, famine, etc.), the structures, pollution and gaps that the present generation is about to leave to its heirs would press the next generations to strive for their sheer survival. In such a situation, individual and collective happiness would hardly be able to be achieved. Meadows (1995) calls this *survivable development*. Using this term, he comes back to the same nomenclature as of the 1972 UN Conference on the Human Environment at Stockholm (cf. Friends of the Earth, 1972).

3.2. The concept of equity

Philosopher Vittorio Hösle (quoted in: Stiftung für die Rechte zukünftiger Generationen 1999), following the thoughts of John Rawles, distinguishes three kinds of equity of distribution between human: social equity, international equity (cf. also Estes, 1984; Veenhoven, 1993; Diener and Lucas, 2000) and equity between generations. The first two types comprise the problem of distribution between people living today. 'Equity between generations' means equity between the present and the future generations.

As many other unsustainable societies throughout history, today's western-style society lives in many domains on the expenses of its children. Examples for the progressing destruction of the environment are: Ozone hole, global warming, disappearance of species, deterioration of soils, over-fishing of the Oceans, lumbering of the virgin forests, and atomic waste. Technological progress is responsible for long-term impacts of today's acting. The effects of the construction of a nuclear power station, for example, last very far into future because of the still unsolved

problem of ultimate disposal of atomic waste, influencing the quality of life of many generations.

But also excessive national debts have a negative impact on the ability of acting of coming generations. Such effects of contemporary policy offend against the principle of equity between generations: to leave a heritage that enables future generations to organize their life corresponding to their own visions and wishes and to have at least the same potential of opportunities at their disposal as current generations.

3.3. Philosophic background for a new approach

The early advocate of future ethics, philosopher Hans Jonas, couched a moral imperative, saying that human acting of today should leave enough freedom to future generations so that they will also be able to act. 'Act so that the effects of your action are compatible with the permanence of genuine human life'; or simply: 'Do not compromise the conditions for an indefinite continuation of humanity on earth'; or, again turned positive: 'In your present choices, include the future wholeness of Man among the objects of your will' (cf. Jonas, 1985). These reflections are close to Kant's categorical imperative 'Act only on that maxim by which you can at the same time will that it should become a universal law'.

Economist and philosopher Ralf Dahrendorf (1994) argues that opportunities of living (*life chances*) contrast to *ligatures*. Whereas ligatures are established bonds of the individual to society, opportunities are the chances to choose, and the potentials for decision of an individual. Development offers new opportunities of choice and alternative action. The moral appeal that can be derived from this is to ensure that the following generations will actually find the preconditions to have more options than we have.

The pledge to prolong the present *beatitude* would lead to a neglect of the future, says philosopher Dieter Birnbacher (1999). The equity between generations gets massively hurt, because our generation is longing for short-term gains and instant benefits. Our well being of today threatens the well being of coming generations. However, we push the costs for our bacchanal life into the future. Remember: *happiness* is – next to *right of living* and *freedom* – one of the key words of the US declaration of independence. The happiness of the present-day adult is paid with the mishap of yet unborn generations. The *futurization* of ecological problems means an existential danger not only in many years, but already for the young generation of today. Already today, ecologists lament the 'sustainable destruction' of habitats.

Considering this, and also the idea of equity between generations, the author proposes the *Principle of Good Heritage.*

3.4. The Principle of 'Good Heritage'

Every generation inherits benefits and burdens from its previous generations. Every generation, in search of its well being, shapes the living space and transforms the

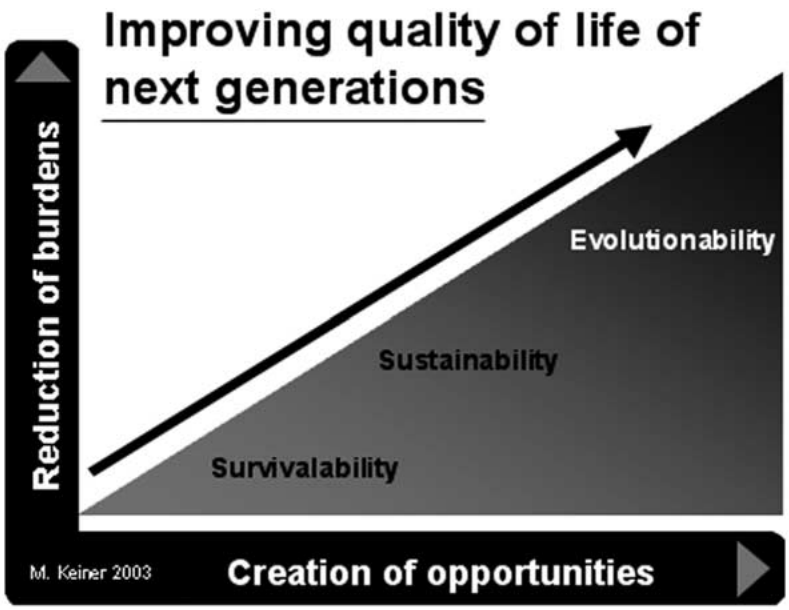

Figure 6. Improving the quality of life of next generations.

natural environment according to its needs. Today, for example, a lot of interstate highways do exist. This is, at a first glance, a good heritage. But with the infrastructure comes the need to pay for its maintenance, and comes – not only in the US – the custom to use motorcars, which emit, among other pollutants, carbon dioxide that is made responsible for the greenhouse effect. Our descendants will come upon this.

They will not be free to decide whether they would prefer this network of highways or if they would perhaps prefer another – environmentally and economically sounder – mode of travelling. Searching and finding alternatives in transportation, they probably will not only have to construct new transportation systems but will also have to build back existing structures at tremendous costs. Similar examples could be given for other inherited pollution (water and air), for the organization of territory (settlement structures and functions), energy production, and so forth.

The *principle of good heritage* is based upon the basic idea that we should leave *less burden* than we inherited ourselves. So, the task of today's generation should be to transform its heritage from burden to gain, from limitation to freedom of acting, from hardly changeable destiny to the ability of achieving happiness. The next generations should not find *equal*, but *better* living conditions than we have (Figure 6). Therefore we will have to augment the social and economical, but first of all the ecological values and qualities of life. In other words: to increase the quality, and not only the quantity of capital stocks.

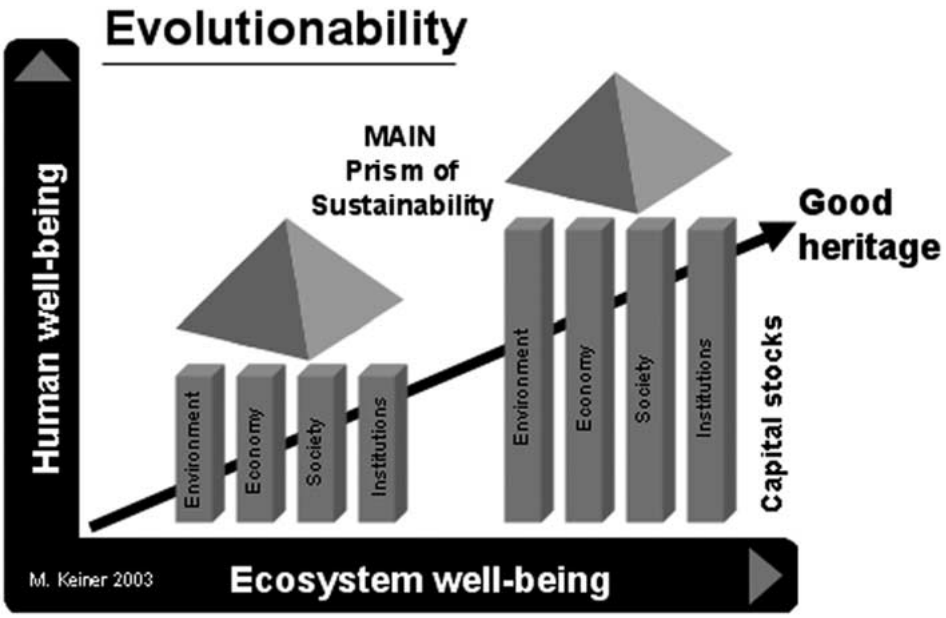

Figure 7. Evolutionability.

Karl-Raimund Popper wrote: 'History has no sense', but he added that we can and must give it a sense, for example by opening the best *living chances* to the biggest number (Popper, 1999).

Instead of just maintaining the resources for the people going to live on planet Earth when we'll be gone, there is need of exploring and harnessing new resources, and to find substitutes for those that are non-renewable. The aim should be to increase as well the quantity as the diversity of resources. By this, new opportunities – not only sustained problems – could be offered to the following generations.

The postulation is to act like far-seeing bequeaths who want their successors to be able to enjoy the heritage. However, this heritage won't be for free. An effort from the heirs should be required. 'That which you have inherited from your fathers, acquire it so as to make it your own' (J.W. Goethe, Faust I) demands the heirs to reflect about our ideas and values, successes and failures, and about their own chances and inconveniences. To prepare them, each generation from now on should leave a kind of *last will* to testate our efforts, neglects, recommendations and hopes for future human life. It should also contain a set of quality-of-life indicators with according data material that can be used as controlling and benchmark tools.

The responsibility of both bequeaths and heirs calls for new *contracts between generations*. Such contracts should prevent the transfer of hereditary defects from our generation to the next ones, as well as the respect and care of the good parts of heritage. In other words: the environmental, economic, social and institutional capital stocks should continue to grow to achieve an advanced ecosystem and human well-being (cf. Diener, 1984; see also Figure 7). Taking these ideas and the added

values into account, the principle of good heritage goes ethically beyond the concept of sustainable development.

3.5. The concept of Evolutionability

The augmentation of good heritage by creation of new opportunities (life chances) and by the reduction of burdens is based on a theory of evolution of mankind towards a higher quality of life (cf. Veenhoven, 2000). Instead of sustaining our burdens and limiting the freedom of our children and grand children we should create an environment in which they do not have to be worried of how to survive but to look ahead, and reflect about new opportunities, developments and challenges.

Thus, the principle of good heritage leads to what the author calls a *Concept of Evolutionability* of mankind.

A definition could be:

> *Evolutionable development* meets the needs of the present generation and enhances the ability of future generations to achieve well-being by meeting their needs free of inherited burdens.

The vision of an 'evolutionable development' is the development towards a society that neither wastes nor destroys its means of existence. The use of raw materials (resources) and the stress on ecosystems should not go beyond the capacity of rehabilitation so that future generations will find a reasonably intact environment with enough resources, which enables them to live in a same or better wealth than we do today. In this sense, evolutionable development is very close to what sustainable development would be, if the environment would clearly be the key element. For this, a change of attitude and economical, ecological and social behavior of the present generation is essential. Furthermore, the above definition is more dynamic and action-oriented ('to enhance the ability') than the Brundtland definition of sustainability. Semantically, it is also formulated in a positive manner by replacing the term 'without compromising' in the original definition of sustainable development.

'Evolutionability' is not a new word. It is based on the term 'evolution' in its biological sense (cf. Ch. Darwin, J.-B. Lamarck) as well as in its philosophical sense (cf. H. Spencer, P. Teilhard de Chardin, H. Bergson). The suffix '-ability' comes from the number of opportunities to decide what to do with the heritage (cf. for example, R. Dahrendorf, V. Hösle), and pays tribute to the flaming star 'sustain-ability'.

Today, together with *flexibility*, and *expandability*, computer scientists use the expression *evolutionability* in the field of network architecture. Evolutionary biologist Richard Dawkins and Tim Berners Lee, the inventor of the World Wide Web, use a similar expression, *evolvability*, to describe the natural selection in evolution of species (Dawkins), respectively the evolution of advanced computer languages (HTML and others) and the evolution of data on the web (Berners Lee).

3.6. Outlook: refining and implementing the Concept of Evolutionability

This article presents logical and ethic reasons for the re-development of substantial parts of the principle of sustainability. It provides a rough outline of a future concept of evolutionability and a first tentative for a definition of 'evolutionable development'.

However, this first draft must be followed up. A broad theoretical basement for the concept of evolutionability is to be worked out, and concrete examples for implementation and application must be developed.

The concept of evolutionability should become a leading principle for politics, economy, and society. A first approach for offering more living chances could be made in spatial planning. Spatial planning is the discipline that steers the development of our present and future living space. In many countries it has been assigned to implement sustainable development. Project cities and case regions for evolutionable development could be determined, and the guiding principles of spatial planning could be oriented towards the concept of evolutionability. Planning instruments could be reshaped in order to increase the capital stocks in order to create more environmental, economical and societal qualities.

Besides planning, the role of markets have to be considered. Also, questions will arise how appropriate incentives or disincentives be put in place to achieve evolutionable development. As the paper is a first approach to re-focus the discussion on the mainstream of sustainable development, many more questions that are beyond the scope of this paper cannot be answered.

Concluding, the concept of evolutionability is not meant to replace the principle of sustainability completely, but to guide sustainable development into the desired direction: that the ability of future generations to meet their needs and to achieve collective and subjective well being will not just be *not compromised*, but – expressed in positive terms – will be larger.

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