Dual goal: economic growth along with environmental improvement

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The concept of sustainable development conceals an inherent tension. It pursues a dual goal: economic growth along with environmental improvement. Is that feasible? On the one hand, some studies portray a black future if population and economic growth continue on the present footing and pace (cf. Wetzel and Wetzel, 1995). Continuous economic growth characterized by a growing volume of throughput through the economy, will contribute ever less to welfare. Many maintain that there is something like a carrying capacity of the Earth that cannot be surpassed on pain of welfare losses due to over-exploitation of the Earth's environmental capital. Beyond that point, environmental degradation is irreversible. And as a result of the phenomenon of entropy, technological solutions are ultimately also not feasible. On the other hand, there are studies indicating at a brighter future: environmental problems will more or less be automatically resolved in the process of economic growth. Studies into the so-called Environmental Kuznets Curve claim that it is true that environmental pressure increases with income growth, but decreases after a particular level of income has been reached. However, there are important pitfalls that undermine this hypothesis, both from a methodological and empirical point of view (Heintz and Verbruggen, 1997). Moreover, recent studies in this field find again a relinking between income growth and pollution (De Bruyn and Opschoor, 1994).

A new perspective in the environment-economic growth debate is opened up by the

Factor 4 discussion. Technological options and cleaner forms to satisfy human needs are available so that welfare can double and environmental pressure can be halved. Von Weiszäcker et al. identified more than 100 of these so-called win-win options (Von Weiszäcker, et al., 1995).

In my opinion, the environment-economic growth debate cannot be settled on the basis of scientific knowledge. And the introduction of the concept of sustainable development in the 1980's has also not been very helpful. Sustainable development indicates a favorable direction by introducing the condition that the needs of future generations have to be taken into account in present-day economic decision making; neither more, no less. It does not provide a blueprint, nor does it specify the means by which a sustainable economy is to be achieved. This is not to say, however, that the concept of sustainable development gives no policy indications at all, as many have alleged. Sustainable development provides a framework within which the use of, or investments in different forms of capital can be compared. In the economic process, different forms of capital are being combined to produce goods and services to meet human needs. In this connection, the World Bank distinguishes four forms of capital, namely environmental capital, physical capital, human capital and so-called social capital (Serageldin and Steer, 1994). The latter refers to the social cohesion and the problem-solving abilities of government and society. Sustainable development is all about the question how much of these different stocks of capital are invested to produce welfare, and in which combinations. To put it in economic terms, to what extent can these capital stocks be substituted for one another. This is the central question in operationalizing sustainable development. In doing so, the needs of future generations have to be taken into account. This means that the trade-offs have to fulfil only one condition: a per capita welfare which does not decrease over time. This condition implies a supplementary one, namely that the total stock of capital goods with which our welfare is produced must, at the very least, be maintained. And if we take account of the increasing needs of a growing world population, then there has to be an enlargement of this total stock, or, at any rate, in total welfare that the capital stock is able to produce. This will require as yet unimagined forms of technological development and also drastic changes in current production methods and consumption patterns. In my opinion, sustainable development can only be

brought closer by means of an unprecedented economic and technological dynamism. Seen in this light, sustainable development, or to put it differently, the reconciliation of economic growth and environmental improvement, actually becomes a sort of 'meta-growth'.

By indicating that a sort of meta-growth is needed, we still have no answers as to the substitution possibilities of environmental capital for other forms of capital. Another important question concerns the spatial level at which sustainability has to be achieved. Do we have, for instance to close substance cycles at each and every spatial level to become sustainable, or is it possible to leave a particular cycle open at one spatial level to be closed at another spatial level. And how can these spatial sustainability questions be coordinated. A final question is, of course, how -by which policies and measures- a sustainable development can be pursued.

I shall address these three questions.

With respect to the substitutability of the different forms of capital, it has to be realized that the environmental capital stock must clearly be distinguished from the other three forms. Environmental capital makes, via the production process, a twofold contribution to welfare: it furnishes primary inputs and space, and it also provides a sink for the waste and pollutants our production processes generate. Remarkably, environmental capital also possesses an autonomous capacity for self-regeneration, though this capacity is rather vulnerable. Equally remarkably, we are far from having exhausted every possible application of the world's environmental assets; consider, for example, the richness of its genetic diversity. Finally, environmental capital contributes directly to our welfare, that is, without transformation in a production process, in scientific, cultural, recreational and aesthetic terms. These aspects, taken together, mean that there is a limit to the replaceability of environmental capital. However, these characteristics of environmental capital, or put differently, the nature and extent of ecological-economic relations, or again in other words: what is the carrying capacity of the various components of environmental capital, all this is surrounded by uncertainty. This means that the substitutability of environmental assets by other forms of capital is open to dispute. And as this is the case, it has to be admitted that several forms of sustainable development can be envisaged, according to the assessment of these uncertainties. These

assessments may well include assumption about future technological possibilities.

In addition, various subjective preferences also play a role; for example, the conservation of an eco-system may be considered to be a higher priority than the strengthening of social capital by creating jobs for the long-term unemployed. The choice between the numerous substitution options - and that is what I would like to stress - is made on the grounds of individual and societal risk analyses and preferences. The operationalization of sustainable development represent a series of value judgements and normative choices which eventually lead to political decisions.

There is, then, no shortage of alternatives, notwithstanding the requirement I have made to achieve a sustainable development, namely, that per capita welfare provided by the sum of different capital stocks may not decease over time, and my warning to be prudent with the use of environmental capital. And this is why so many definitions of sustainable development have been formulated; definitions that vary so much that they can be divided into different categories. The best-known division is between strong and weak sustainability. The adherents of the strong sustainability concept are very reluctant to substitute environmental capital for other capital stocks, whereas the followers of weak sustainability combine a high degree of flexibility with technological optimism. So, as long as these different interpretations exist, there will be a tension between economic growth, that is fuelled by weak sustainability, and the environment which is better protected in the strong sustainability concept.

In discussing sustainability, no spatial distinction has been made yet. But that is rather abstract, and only relevant for genuine global environmental problems. At lower spatial levels, the degrees of freedom further increase, and hence, the tension between economic growth and the environment becomes more manifest. This has to do with the fact that at lower spatial levels, the external effects of environmental degradation can be shifted to other and/or higher spatial levels. It also opens new opportunities: unsustainable practices in one country can be compensated by sustainable practices in another country. It is even thinkable that economic benefits can be reaped from these, what I would like to call, sustainability interactions between different spatial levels. Take, for instance, the case of recycling or re-use of materials. It can be sustainable to have our waste or scrap be recycled in India. We leave our materials cycle open to be closed in another country. In

other words, if we take into account cross-country differences in environmental endowments and natural conditions, it is possible to realize environmental gains through trade and specialization, deliberately leaving open specific cycles at specific spatial levels, but closing them at higher spatial levels.

Not only the degrees of freedom increases if different spatial levels at which environmental capital can be used, are taken into account. It also poses an entirely new question: namely, how do we have to measure, value or compare sustainability at different levels? Can importing countries be held responsible for the depletion and externalities in exporting countries. Why should we grow wheat in The Netherlands when it can be grown substantially less environmentally harmful in Spain? Is it sustainable to reallocate polluting industries outside the country, without changes in the pattern of consumption?

Just to give you a concrete example. At the Institute for Environmental Studies, Vrije Universiteit Amsterdam, a research project has been carried out on different scenarios for sustainable economic structures for The Netherlands for the year 2030 (Verbruggen, 1996). The study was commissioned by the Ministry of Housing, Spatial Planning and the Environment. The objective of the research was to construct four economic structures for the Dutch economy that could be labelled sustainable depending on a chosen perspective. These perspectives ranged from a world-wide pursuit of strong sustainability with limited substitution possibilities between various forms of capital and ambitious environmental objectives, to a world-wide market-led weak sustainability.

The economic structures in the different scenario's were shifted such that value added was optimized subject to different environmental objectives and other conditions. The Ministry also asked us to construct a so-called ecological trade balance. This balance is defined as the difference between the ecological impact related to exports, and the ecological impact related to foreign production for domestic consumption, that is import. The results are shown in the table.

The ecologic trade balance in 1991 and the four scenarios for 2030, The Netherlands

	1991	Strong (Together) *Sustainability*	Strong (Alone) *Sustainability*	Negotiated *Sustainability*	Weak *Sustainability*
Climate Change (10^6 carbon equivalents)	21.572	3.833	-10.910	-8.653	3.234
Acidification (10^6 acid equivalents)	3.183	808	-305	92	1.348
Eutrophication (10^6 manure equivalents)	34	-4	-25	33	9
Waste (10^9 kg)	2.469	-830	-1.150	-624	-409

Source: H. Verbruggen (project leader, 1996. Duurzame Economische Ontwikkelings-scenario's voor Nederland in 2030 (Sustainable Economic Structures for The Netherlands in 2030), Publikatiereeks Milieustrategie 1996/1, VROM, The Hague.

In 1991, the Dutch economy has a surplus in all four identified environmental themes, indicating that, on balance, environmental impacts are accepted on behalf of foreign consumers. This ecological trade balance "detoriates" if economic structures in The Netherlands are made more sustainable: the surplus reduces and even becomes negative in a number of cases. But what does that tell us? In case of international environmental problems like climate change and acidification, it can be argued that economic activities are re-allocated from a high energy-efficient country to countries with low energy-efficiency. This is bad for the global environment. For national environmental problems like eutrophication and waste, the inference is ambiguous. Environmental quality in The Netherlands will improve, whereas the environmental impact of these reallocated activities in other countries and the appreciation thereof depends on local environmental circumstances and preferences.

Finally, I would like to address the issue on policies and measured to achieve sustainability, or to reconcile economic growth and environmental care. As it presently stands, and that is relevant for all developed economies, environmental policy is largely being implemented by regulating the sources of pollution, through rules and regulations, permits and so on and so forth. In this approach, the polluters have to bear the cost of complying to the regulations, but for the rest, the use of the environment is still free. That is to say, that the environment is not managed as a stock. Hence, the use of the environment has no price. The tension between economic growth and the environment is exactly due to this fact: regulated polluters who get the environment for free. They feel themselves restricted; they may be restricted in their growth prospects, they have to bear extra cost, and they might lose their competitive edge.

This conflict can only be overcome, if the environment becomes a genuine economic good, that means scarce and adequately priced. Irrespective the interpretation of sustainable development at whatever spatial level, environmental capital has become a very scarce resource indeed. A scarce resource is an economic resource, and should be treated accordingly. This implies that property and use rights should be defined and allocated for all the components of environmental capital. I am all too aware of the political resistance to, and the practical difficulties and problems involved in an actual transition to a system which allocates environmental property and use rights, and creates markets to trade these rights. A great deal of creativity will be needed in the development of such markets for environmental goods. The already existing examples of tradeable emission permits and tradeable fish quota should be extended on a much wider scale (for other emission, CO_2 in particular and other natural resources). For The Netherlands, a system of tradeable manure rights, tradeable parking lots and road pricing are interesting possibilities.

To conclude, the use of the environment should become a hundred percent economic good, that can be traded on the market. Only then will environmental capital be put to an efficient use and only then can economic growth and the environment be reconciled.

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