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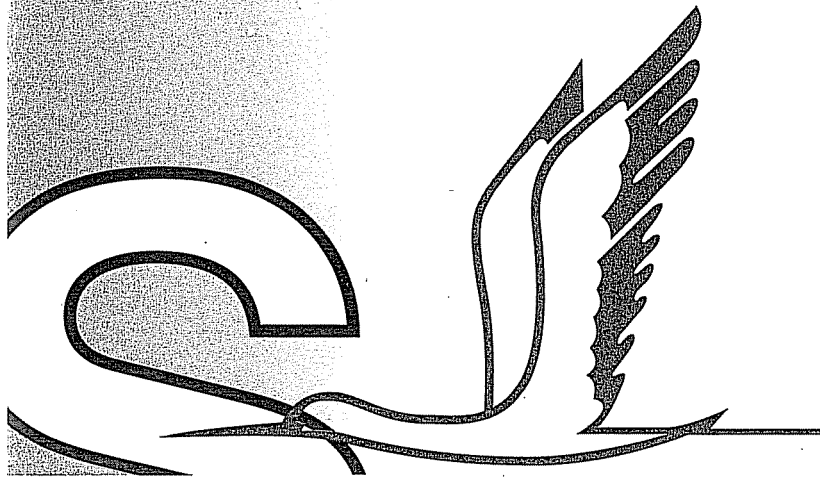


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Sustainability, Economic Restructuring and Social Change

Professor Hans Opschoor



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In what could perhaps be referred to as the postmodernist *mother of fiction* — the novel ‘Haroun and the sea of stories’ — Salman Rushdie at one point puts his main character Haroun in a mail coach driven by a Mr Butt, on a rocky, windy, slippery road high up in the mountains, trying to reach a certain point before sunset. Faster and faster the bus goes, no longer stopping even to collect or deposit mail, frightening the passengers, but Mr Butt disregards their howls. Then Mr Butt sees another dangerous bit of road ahead and exclaims: ‘The snow line! Icy patches ahead! Crumbling road surface! Hairpin bends! Danger of avalanches!...’ and quite contrary to what Haroun had hoped, Mr Butt then turns his observations into a possibly fatal conclusion by shouting to himself: ‘Full speed ahead’ (Rushdie, p.36). I tell this story — which, incidentally, has a happy ending — because I regard Mr Butt’s attitude as illustrative of the archetypical mainstream economist’s response to almost any problem he or she may be confronted with: they are very likely to conclude their analysis by recommending more economic growth — to develop at full speed. In a context of trying to contribute to sustainable development from a social science perspective, I think there is much more — if not much else — to say. We should learn from the warning on the wall near the exit of the bus station where Haroun read:

If from speed (read: growth — JBO) you get your thrill,
Take precaution — make your will

This inaugural address marks my passage from the domain of environmental economics to the wider one of development studies, and the bridge between the two is called ‘sustainable development’. My first inaugural address — in 1987, when I took up the chair of Environmental Sciences and Environmental Economics at the Free University — was entitled: ‘Sustainability and Change’. It dealt with the notion of sustainability, and with the contribution economics may make to environmental sciences. Now that I am taking up a chair in Development Studies at ISS it seems appropriate for me to address the issue of sustainability and development more explicitly, and also to ask what environmental economics could contribute to development studies, especially in the domain of sustainable development. Sustainable development is a difficult, if not elusive concept; it implies a form of economic growth as well as technological and institutional change. It

assumes that growth can be made ecologically viable if, or to the extent that growth can go hand in hand with a reduction in environmental pressure. Otherwise, it means depressing the brake and the accelerator at the same time. As even Mr Butt seemed to realize: that is rather risky, especially on slippery ground. And slippery indeed the ground turns out to be, when biodiversity is dropping significantly through human activity, when natural forests and arable land are declining and when the atmosphere is warming up more rapidly than has occurred before in geological memory.

I will address this issue as one of two examples of how empirical analysis demonstrates that reductionist approaches to development are inadequate. I therefore must discuss 'development' first. Furthermore, I would like to show that development studies should incorporate concern about processes at the interface between society and the natural environment from a broad perspective of social change, and I will give some examples of how it could be enriched by drawing on the results of environmental economics.

Basic concepts

Society and Institutions.

Societies can be defined as sets of actors — individuals and groups of individuals — co-ordinating their activities. From the inside, or from the perspective of the individual actor, society ideally provides meaning and significance — in this sense it is a 'living space' (Habermas 1984), within which notions such as relationality, reciprocity, etc. have relevance (de Vries 1961). From the outside, society manifests itself as a system in the sense of structures that function on the basis of inherent laws of motion, independent or quasi-independent of the norms and values of individual actors (Habermas). Looking at the nature of the process of co-ordination, one can, following Habermas, discern 'communicative' and 'mediative' coordination. The former is based on argumentation and rational discourse or on conventions, both anchored in norms and values; the latter refers to coordination by exchange and money, or the exertion of power. In Habermas' view, the living space is increasingly occupied — 'colonized' is the phrase he

uses — by quasi-autonomous, politico-economic systems. What that means is that mediation replaces communication. In a more anthropocentric perspective, society can be seen as a machine for inclusion and exclusion, for creating hierarchies of actors, principals and agents — and even outcasts — ‘...for the control of definition, access, exploitation, development and management of natural and social resources’ (de Ruijter 1996). Members of the excluded groups have little or no say over the way society’s capital is defined and used, or managed. Hammar (1990, as quoted by de Ruijter) referred to their situation as that of ‘truncated citizenship’.

Institutions which provide the framework within which human beings interact, cooperatively or competitively, consist of rules, compliance procedures and moral and ethical behavioural norms designed to constrain the behaviour of individuals. Institutions make human organization possible by sometimes limiting certain types of behaviour (in the interests of dominant agents). Included in institutions, and a crucial part of them, are property rights, broadly defined. Essentially, they define the access to and control over scarce resources including environmental and natural resources.

It is within this very broad setting that I would like to discuss development, and look at one aspect that is of relevance in terms of intertemporal or intergenerational equity: namely sustainability.

Development

Linguistically, development is the gradual growth or formation of something, especially a process in which a person or thing matures, changes or advances to another stage to realize inherent potential. In the context of development studies, and particularly in economic development theory, development has become much more narrowly defined — if it is defined at all. For instance, one will not find a definition of development in Arthur Lewis’ seminal ‘Development Planning’ (1966); it seems to be taken for granted that development is equal to ‘... consciously, deliberately stimulated growth’, in Brenner (1966), while economic growth is defined as non-negative changes in *per capita* income or gross domestic product (e.g. Kuznets 1965, Tinbergen 1956: 86), with as its most important driving forces an increase in capital per head and an improvement in the skill levels of a popula-

tion and in the methods of production used. This is no longer generally regarded as the final word on what development is all about, as we shall see. But we should already note that development is also defined as the broadening of the set of options that people have to improve their livelihoods and determine their futures (UNDP 1995).

The common understanding is that development is something deliberately set in motion to improve living conditions — more or less narrowly defined. As Lele (1991) says: ‘...development is a process of directed change’. And interpreting our first long-serving rector de Vries (1961: 48, 49, 79, 103) I define change as alterations in the structure and functioning of society, such as community structure including kinship relationships, social institutions, economic relationships, attitudes and values including the concept of nature.

Sustainability

In the broad setting of the biosphere and those who inhabit it, one may extend the Habermasian metaphor and speak of a process of colonization not only of the living space but also of the biosphere or environmental space. Looked at intertemporally, one could, when discussing resource use, distinguish a moral community of all those who have an interest in what happens to a resource base. Society is cutting off (‘truncating’, cf Hamer 1990) part of itself if it marginalizes groups and ignores other members of the moral community such as future generations.

Sustainability is an old notion with roots in disciplines such as forestry (which employed the concept of sustainable yields more than 100 years ago) and economics (where the notion of sustainable income has arisen). In the latter case, sustained growth was regarded as non-negative change in *per capita* income over time, without deliberate outside intervention to support it (e.g. Brenner 1966, p. 175; Kuznets 1965: 6 and 110; reprints of articles dated 1955; Rostow 1956; de Vries 1961, p. 67).

However, since the Brundtland report (WCED 1987) sustainability has come to mean more; it has come to mean the capacity to maintain a certain phenomenon such as growth, based on the potential of inherent or underlying social, economic as well as ecological processes. WCED

defines sustainable development as a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all compatible and satisfy current human needs and aspirations without jeopardizing the future potential for satisfying these (after WCED 1987:46).

We need to ask ourselves whether these concepts of development and sustainability will help us in coming to terms with the key issues ahead of us, or whether they need refinement. Both concepts have evolved very much since they were conceived from at least two different perspectives: that of the number of disciplines involved in defining them, and that of the number of spatial scales at which they are important. The former is demonstrated by terms such as complexity and integrativeness; the latter by the notion of globalization.

The development of the notion of development

Let us go back in time some 50 years.

After the war, the issues of reconstruction and poverty gained high priority on the international agenda. Moreover, the idea emerged that poverty was something that one could do something about (Brenner 1966: 248). Development economics evolved as the study of the way by which economic progress could be promoted in countries with substantial poverty (Brenner 1966: 254-5). This new discipline also arose in response to a political interest in the capitalist part of the world to arrest the threatening proliferation of socialism in the newly-independent countries. For a long time, development economics was dominated by the idea that developing countries needed to engage in a process that would lead them to the same condition as the Western economies, along some single-track development path. Although the linearity as suggested by notably Rostow (1960) was not shared by all, it was matched by analogous views on determinist processes of change in Marxist theory - *bien étonné d'eux trouver ensemble*. This view has become particularly vulnerable to more recent fundamental attacks on both the dogmatic socialist and liberal beliefs in modernization, given the currency of more contextual approaches and given the emerging awareness of ecological and social limits to continuous expansion

which until recently was an essential part of the dominant model of development.

North has attempted a synthesis of classical, neoclassical and Marxist elements to derive a theory of structural change in economies, by which he means institutional change allegedly developed in the search of more welfare (1991). North presumes that institutions are determined by principals in search of maximum wealth or utility. Crucial institutions are property rights, broadly defined. States are necessary to specify these rights — any rights — and to enforce them. Institutions are devised by taking into account the perceived costs of compliance, technologies of measurement and enforcement, norms, etc — all leading to the ‘transaction costs’ associated with institutional innovation. I feel that North too easily presents the market approach as the efficient solution to all development problems. The new institutionalism he proclaims should learn more from the old institutionalist or political economic approach. The result would be an enrichment of development studies in the forward-looking design of institutions and the means of applying them to achieve development objectives.

Development has thus come to mean a range of things in addition to how it was originally defined. In our own ISS context — and as an incumbent rector I, as a matter of course, delved deeply into the history of ideas at ISS — more has been said about the nature of development. Let us consider what some fellows, honorary fellows and previous rectors have put forward. Kurt Martin saw development as changes in the social and economic structure of poor societies leading to a continuing domestic growth in productivity in terms of rising *per capita* incomes (Martin 1991b: 28), which would alleviate and eventually eliminate poverty, as a contribution to social welfare. He saw the ultimate end of an increase in the richness of human nature as an end in itself. Apart from this humanist concern, another ethical notion characteristic of Martin and distinguishing him from a large part of neoclassical economics is his rejection of a concept of society based on competition rather than cooperation (ibid: 15). Another ISS Honorary Fellow, Jan Tinbergen also puts economic development (i.e. the growth of *per capita* production) in a wider context when he describes what constitutes the arguments of a social welfare function: *per capita* production, social justice and peace, cultural development, freedom,

stability and international peace (Tinbergen 1967: 208). Hans Linne-
mann (1964), another Fellow, regards as the economic dimensions of
the development problem those related to the material aspects of the
use of scarce means, but acknowledges the existence and relevance of
non-economic dimensions, which he sees as a set of well-being-related
objectives, as well as of responsibilities associated with individual and
collective stewardship of the gifts of spiritual and material resources.
Another Honorary Fellow, Amartya Sen, saw development as an in-
duced process of change, with objectives related to the aspirations and
preferences of people: '...the formulation of development objectives
requires a system of relative priorities and weights dealing with the
interests and aspirations of the groups that constitute a nation' (Sen
1991: 80) — which goes far beyond national income or GDP. Aspir-
ations relevant to development objectives cover not only poverty allevi-
ation and concomitant goals but also the abolition of exploitation and
inequity; he also pleads for taking into account the 'dynamism of aspir-
ations'. Turning to previous Rectors, van Nieuwenhuijze (1962:186)
considers development as a triggered and conditional complex of con-
stituent factors and causal chains, or activities directed towards the
betterment of the conditions for human well-being (ibid: 200). Wolfson
(1979) indirectly defined development as the upgrading of countries'
performance in terms of the allocation and distribution of resources and
the stability of resource utilization and income generation by address-
ing market failure; he thus added an institutional dimension to devel-
opment. Finally, Lycklama (1991) draws attention to the role of people
and their participation as actors in processes of development and
change and adds a gender and empowerment dimension to what has
been referred to earlier as a 'truncated' view of society.

At the risk of stating the obvious, development is more than economic
development and economic development is more than economic
growth. It has been thought for decades that it was not too unreasonable
to assume that the three somehow ran parallel; that if economic growth
occurred, this would imply development in a broad sense, or at least
entail enhanced possibilities for development. This is already behind
Pigou's focus on income as a measure of welfare; it is behind Tinber-
gen's view that growth of production or income is '... the most natural
basis for a long-term increase in material wellbeing' (Tinbergen
1967:86) and Keynes' description of economists as the 'custodians of

the foundations of civilisation' (Wolfson 1979). We will come back to these views later.

The assumptions regarding parallels between growth and development are no longer valid in a finite biosphere and if one takes a 'de-truncated' view of society. However, even independently of these two points, there have been serious doubts. Already in the 1950s, changes in the sectoral structure of the economy were seen as an additional dimension of economic development, and concerns about income distribution (in fact dating back to Pigou) have led to the broadening of factors taken into account. Institutional considerations have also been added, as is demonstrated by deliberate attempts to introduce market forces in structural adjustment policies, for example, or to complement market forces by social policies and associated institutions.

Because economic development and development as such might not run parallel, human and social aspects were added, such as poverty, health, literacy and empowerment. 'Human development' is defined by UNDP as a process of enlarging human choices, and operationally focused on productivity, equity, sustainability and empowerment (UNDP 1995: 12). But this broadening of the concept of development does not really capture all concerns related to the notion. There are at least three more: (i) the alleged context-relatedness and practical confinement to countries characterized by certain levels of *per capita* income; (ii) the inherent assumption of progress and limitlessness; (iii) the relevance as a driving force behind societal change. Some of these points will be clarified as my argument unfolds.

Development and Change

Development is deliberate, intended change. Given the intentions behind development, there are implicitly primary stakeholders — those whose intentions are to be served, as well as others. Development is a power-laden and hence political notion — see de Ruijter (1996). Any detailed definition of development needs to show the objectives of the intended change, the actors whose intentions have been formulated and the means of achieving these objectives (Lele 1991: 609). The set of 'intending' actors may be smaller in comparison with that of all relevant stakeholders. Delineating the set of all relevant stakeholders, moreover, is a normative issue on which economics or even develop-

ment studies as a positive academic activity, has little to say — it may, nevertheless, have intuitions. Both when it comes to change and development, we may look at the outcomes of processes and assess their performance in terms of deliveries to the various categories of stakeholders.

As development is a design-oriented activity, we may also be interested in how — i.e. by what mechanisms, instruments and institutions — we could affect the processes of change and development in such a way that the goals of (more) stakeholders are achieved in a (more) satisfactory way, or with a fairer distribution. Analytically, this may require a synthesis of systems analysis, actor-in-context approaches and rationalist modelling of behaviour — very much along the lines of the new institutionalist and new political economy syntheses (North 1991; Gamble et al. 1996).

Change and Transformation

We agree that development is intended change. One may wonder to what degree development efforts have an impact upon ongoing 'endogenous' processes of societal change. Is development not in fact or has it not become one of the weaker forces of change? Should we not consider major processes of change such as globalization and associated liberalization as a much stronger, systemic, structural form of change of a mediative rather than a communicative nature, using Habermas again? Being involved, both nationally and internationally in the development of an international research programme on the human dimensions of global change, I would like to discuss this point briefly at the rather abstract but nevertheless significant global level. Global change can be defined as the result of processes of change that modify, sometimes irreversibly, the characteristics of substantial parts of the biosphere and of human society. Global change may be natural or anthropogenic in origin. Social change — global or sub-global — may be the result of interactions within the various modules of the social system, or it may result from changes in the biosphere, with which the social system is connected. We shall deal with this second category in more detail when we discuss sustainability.

Some examples of global change are demographic processes such as population growth, migration and urbanization; changes in the world

economy and an associated change in socio-political institutions; changes in the perceptions of human interaction and human-nature interactions and the value systems inherent in these interactions; and changes in technology (especially in fields such as energy and information). In this address I am focusing on economic and institutional change. Change then can be defined in terms of quantitative aspects — for example the values of certain variables — or structural, by which I mean the ‘physical’ appearance of economic or social systems; the actors they are made up of and the way they are arranged and relate to one another, sectoral and regional characteristics, patterns of production and consumption; technology and consumer preferences, and their distribution. When structural changes are very substantial, one sometimes refers to them as ‘transformations’ (as when a post-industrial society is seen to emerge, or a market-based economy develops from a centrally planned economy).

In a study of regime transformations and global realignments, several contributors discern a range of such processes or tendencies changing the world economy (Ahuja et al. 1993). Linnemann (1993) points to globalization of the world economy, regionalization, the demise of the Soviet system, the discovery of the ‘ecological factor’ or the sustainability imperative. Panchamukhi (1993) adds the emergence of new economic power groups and multipolarity. These tendencies do not necessarily imply an increased uniformization, as is already clear from the notions of regionalization and multipolarity. Eisenstadt (1993) also indicates the emergence of a ‘multiplicity of cultural programmes of modernity’. Emmerij (1993) points out that the process of economic globalization is a highly non-uniform, basically emerging in the OECD and Eastern and Southeastern Asia. And most certainly the ecological problems manifest themselves in a plurality of ways and will require a diversified response depending on differences not only of cultural, social and economic settings, but of ecological conditions as well. De Ruijter (1996) speaks of hybridization in relation to globalization. The ISS-based journal of development studies, *Development and Change*, recently published a special issue on globalization and social change. One of the features of global change is the increasing dominance of ‘manufactured risk’ over ‘external risk’ (defined more or less as natural hazards). A range of basic changes have contributed to this (Giddens 1996) amongst which are: (i) globalization, ‘detraditionalization’ and

the 'end of nature', and the expansion of social reflexivity (the need to deal with an increasingly larger number of sources of information). (In the context of this address I put an exclamation mark behind the notion that nature is disappearing — both as a source of uncertainty/risk and as a source of livelihood — to indicate that it is a rather disconcerting statement only a few years after UNCED).

The globalization of the economic system is taking place in what in some sense is a finite world and these two elements lead to what van Benthem van den Bergh (1993) called the 'globalization of interdependence'. In fact, they require an institutional response recognizing this factual interdependence: new alignments between nations, new manifestations of civil society and new forms of self-organization of major actors in the face of these new realities. The last point implies the need for sustainable patterns of change. And given the institutional features of socio-economic processes at present, ecological sustainability in particular is rather unlikely to come about automatically, so there have to be interventions, there has to be a deliberate effort in order to achieve sustainability. Whether we like it or not, there is an imperative to develop an adequate institutional response at all levels — national, regional and global — to this process of globalization and economic growth in a finite world. And the further challenge now is to design policies that integrate economic, ecological and social considerations rather than to develop separate approaches, as these features, too, are interdependent. But these important institutional aspects are beyond the territory I am attempting to cover here. What is important is that there are severe effective constraints on our institutional potential to influence processes of change and that development-oriented studies must be broadened to incorporate that fact, to incorporate the study of processes of change in general. And, secondly, that processes of global change have important ecological dimensions in relation to social and economic phenomena (which we shall cover in the next section).

Moreover, these observations imply that the notion of development cannot apply only to what was referred to as 'developing countries'. The process of socio-economic change in a finite world implies the necessity of structural change of the economy (in the sense of patterns of production and consumption or sectoral composition, as well as in the sense of institutional reform) also — if not especially — in the 'developed' or the industrialized, market economies. And, albeit for a

range of other specific reasons as well, it is a necessity in the economies in transition. But the same inference also follows from the human approach to development (UNDP 1995:12:). (Development) ‘...applies equally to developing and industrial countries’) and from the very notion of global change and interdependence (see also Lycklama 1991:23 for another argument in favour of this broadening of scope). This view is not new — certainly not for ISS. Van Nieuwenhuijze (in 1968) spoke of development as: ‘...a sociocultural process as such of which we are as much part as anybody else and any other society’.

It is these phenomena and their repercussions in various local and regional, social and cultural settings, including the responses to these, that need to be understood. This is, in my view, one of the key elements of the mission ISS has, and most certainly of what I feel to be my own mission in this chair of Development Studies.

Growth and Welfare (1): Equity

But let us go back to some less esoteric aspects of the development debate. We have seen that growth and development cannot be equated; development also has to do with structural change and its repercussions, not only in terms of *per capita* income levels but also (at the very least) income distribution. Equity concerns have always been part of the development effort. Many have seen these two dimensions: equity or distribution, and efficiency or production/income, as two separate dimensions requiring perhaps even separate policies (e.g. Tinbergen 1956). Others have suggested that maybe the two are connected in the sense that one may lead to the other; growth of income may — almost automatically as if led by an invisible hand — eventually lead to a more equal distribution of income, even though at low *per capita* income levels it may initially induce more inequality. If that were true and to the extent that this indeed is an endogenous process, the advice of Mr Butt and so many economists (to get on to a sustained growth path fast) would also lead to a better world in equity terms. Kuznets was the first to point out this possibility, by suggesting that there might be an inverse-U shaped relationship between income inequality and GNP *per capita* (Kuznets 1955, 1965) extrapolated from a rather limited number of data (from three developed and three developing economies in the latter part of the 1940s): ‘A plausible case can be made for a long swing in internal inequality in the size distribution

of income, rising in the earlier phases of growth and declining when these turbulent phases have passed' (Kuznets 1955, reprinted in 1965: 274, 275; *ibid.* 155-157). This relationship has become known as the Kuznets Curve. Kuznets himself always has been extremely careful in pointing out the imperfection of the data available and other methodological problems. It would indeed be wonderful if such relationships existed but this existence as well as the scientific justifications or rationales for it, have been thoroughly criticized (see e.g. Saith 1983 and Bacha 1991). The curve has been moved from the realm of empirically-validated insights to that of wishful thinking.

So, there is no invisible hand making sure that growth can be regarded as a panacea for social problems in general. Simplistic economic strategies may fail broader, development or welfare-oriented, tests. One example of this is the critique by so many scholars and organizations of the social repercussions of structural adjustment processes. And my predecessor Emmerij has argued repeatedly that globalization, in the sense of more unregulated market forces, might be, from the social angle, a 'recipe for disaster' (Emmerij 1995). I will develop another empirical argument against reductionists' approaches to development, based on sustainability-related issues later on.

'Sustainability' revisited

Let us now return to the notion of sustainability and unravel it a little bit more.

The interactions between the environment and the economy essentially manifest themselves as amounts of energy and materials drawn from the environment into the economy, amounts of energy and material residuals released from the economy into the environment, and spatial intrusions into and claims on natural ecosystems. Restricting ourselves here to the exchange of matter and energy, one could call this exchange the 'metabolism' within the integrated environment/society system. Sustainability implies that this metabolism does not impair the functioning of the system to the extent that the future generation of welfare *per capita* would be jeopardized.

Environmental space

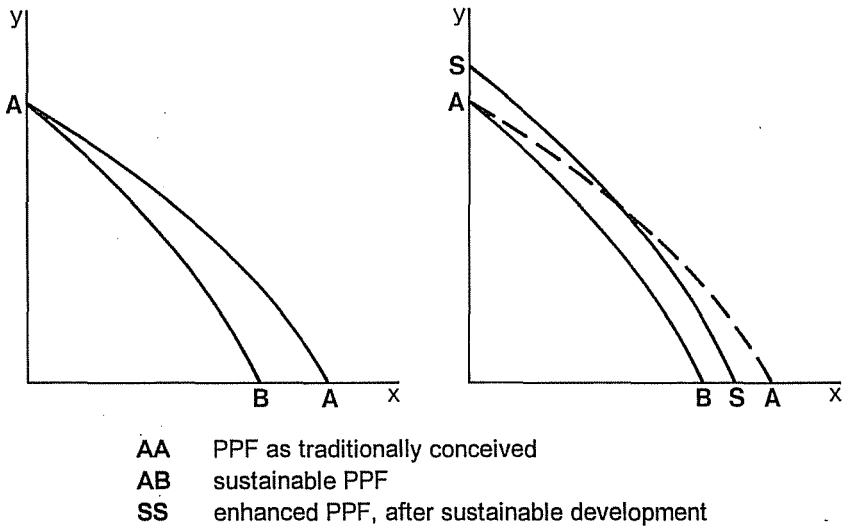
Nature thus provides society with what economists could term an 'environmental utilization possibilities frontier' defined as production possibilities that are compatible with the constraints on metabolism derived from this concern about future welfare. These constraints include processes of resource regeneration, biogeochemical cycles and waste absorption that cannot be dealt with here but that, in combination represent a multidimensional environmental utilization space (environmental space, for short) (Opschoor 1992). If economic activities generate claims on the environment that exceed the limits of the environmental space, then the biosphere's (future) capacity to satisfy human needs is adversely affected.

Sustainable development is an integrative notion encapsulating social, environmental and economic sustainability. Economic sustainability focuses on the maintenance of a set of factors of production large enough to ensure future non-negative changes in income or welfare *per capita* through the economic processes of extraction, production and consumption; environmental sustainability implies concern for the maintenance of a life-supporting environment essential for production and the continued existence of humanity or life in general (see e.g. Goodland 1995). An economy that is developing sustainably operates at a scale at which the ecosystem can continue to function and renew itself (after WCS 1990:10; for a totally different view, see Beckerman 1992).

Environmental degradation may take the shape of irreversible changes (i.e. a permanent reduction in environmental space when certain ecosystems or species are definitely destroyed or pushed to extinction) or it can take the form of reversible change, as when future investment in resource restoration would result in a reconstruction of the original environmental space. Society is also able to 'expand' its environmental space through scientific innovation and exploration by identifying hitherto unknown resources, technological innovation, enhancement of the productivity of (semi-) natural regenerative systems or (waste/pollution-) absorptive capacities, etc. Environmental sustainability effectively entails a set of constraints on the major activities regulating the scale of the human economic subsystem in relation to its environment utilization space; it means that sustainable production possibilities may

be different from the perceived production possibilities frontier. Sustainable development would mean that the sustainable production possibilities frontier is expanded (see Fig. 1).

Fig. 1. Production Possibilities Frontier and Sustainable Development



Sustainability implies the condition that global life-supporting systems are to be allowed to function indefinitely, especially, or at the very least those systems that support *human* life. According to Munasinghe and Shearer (1995: xxii) this entails (i) making adequate provision for the maintenance of biological diversity and (ii) maintaining the biogeochemical integrity of the biosphere by conservation and proper use of its air, water and land resources (see also WCS 1980 and 1990). Clearly, this notion is question begging: to what extent should other species and ecosystems without transparent functions to humans be preserved? To what degree can one allow the loss of such systems on the strength of expected but still not manifest future improvements in knowledge and know-how? What attitudes should be adopted in rela-

tion to risk and — especially — uncertainty? What is proper use? Moreover, there are social and economic conditions to be met if environmental sustainability is to be achieved. An example of this is that at low levels of material welfare it may be regarded as acceptable to reduce (or ‘truncate’) the set of relevant stakeholders to include only those whose livelihood is directly related to a certain environmental asset, whereas at higher levels, the interests of future generations or humanity at large, or even other life forms become important. This adds an intertemporal side to de Ruijter’s view of society as a machine for regulating access to resources and Habermas’ metaphor of colonization (pp. 2 and 3 above).

Weak and Strong Sustainability

One of the ambiguities embedded in the term sustainability is reflected in the questions: does one need to maintain a portfolio of assets — including some natural assets — that together will ensure non-negative changes over time in income *per capita* or material welfare? and: is there a need to preserve in absolute terms, a certain quality and quantity of natural capital? The first position is typically associated with economists — especially those of the neoclassical type. The latter is associated with environmentalists.

Robert Solow, in a wonderfully lucid lecture (1992) entitled ‘An almost practical step toward sustainability’, puts up an almost convincing case for an optimistic neoclassical view on environment-economy interactions. In his view, the notion of sustainability is an ‘...injunction to preserve productive capacity for the indefinite future’ (Solow 1992:7). Production of necessity uses natural resources, but ‘... I shall ... assume that it is always possible to substitute greater inputs of labor, reproducible capital, and renewable resources for smaller direct inputs of [fixed resources]’. Solow postulates that ‘A sustainable path is ... not necessarily one that conserves every single thing or any single thing. It is one that replaces whatever it takes... What matters is not the particular form that the replacement takes, but only its capacity to produce the things that posterity will enjoy’ (ibid. 15). Some unique and irreplaceable assets should be preserved, Solow agrees, ‘for their own sake’ (or for the intrinsic value they represent), but ‘most ... natural resources are desirable for what they do, not for what they are’ (14). So, we are told to rely on substitution to replace lost assets. Factories may replace

forests. One should not exaggerate the extent to which resources or assets are unique and irreplaceable. Solow presents a message based on hope, faith and love: the hope that technological innovation will continuously reduce environmental claims per unit of product, faith in the ever-present possibility of substitution, and love expressed as a plea to share equitably resources with future generations and hence to work with low discount rates. But is this position not an exaggeration in the other direction? Can Solow offer us assurances that there always will be 'something else'. All he actually offers is the statement that there is a 'vast quantity of raw materials of varying grade, location and ease of extraction' (ibid. p 8). He quite easily assumes that intergenerational trade-offs will be managed well and fairly — but that is really the issue! Meanwhile, the World Bank has more or less adopted Solow's view of sustainability (see e.g. World Bank 1992:8: 'What matters is that the overall productivity of the accumulated capital.... more than compensates for any loss from depletion of natural capital'). We need to develop analytical and practical tools to improve the way societies can handle portfolios of assets with greatly differing degrees of not only risk but simple uncertainty as to what their significance and hence their value will be over time.

Sustainability and developing countries

Both the biosphere and the global economy are made up of a number of open and connected subsystems: ecosystems, economies, markets, etc. Issues of unsustainability, or environmental problems, can manifest themselves at various spatial levels ranging from local to global. Problems may manifest themselves at the global level, but their origins may be very local, or region-specific. Likewise, their solution may require a sub-global approach, because the authority to address these problems normally is at those lower levels: countries or regional associations of countries, enterprises, NGOs and individuals. Also, the vulnerability to environmental degradation or the vulnerabilities of socio-economic systems associated with degradation or its mitigation, may differ across regions, countries, groups and individuals.

From calculations using models on the amount of environmental space (e.g. in Hadj-Sadok 1992, Weterings and Opschoor 1992, Opschoor 1994) one can see that conflicts easily emerge:

- a) on how much environmental space there really is;
- b) on who should bear the cost of staying collectively within that space, or of expanding it;
- c) on how to share the limited space.

To the extent that sustainability refers to disturbing or breaking down global life-supporting systems, the countries of the Northern hemisphere are responsible for, by and large, 70-80% of the environmental damage today. This suggests what a fair minimum share of these countries in carrying the burden of restoring and maintaining sustainability of these global systems should be. This share could even be progressively linked to differing levels of welfare which would mean that the fair and equitable distribution of efforts towards global sustainability would entail even greater shares for the industrialized market economies. The famous Indian development economist, Chakravarty, acknowledges that economic growth may simply 'use up too much space' (1990 p.2). He differentiates between sustainable development in poor countries compared with that in rich countries (ibid. p. 5). In poor countries, sustainable development would be the appropriate induction of technology, know-how and material capital which could enable the population to reach higher standards of living while maintaining their natural capital more or less intact (ibid., p. 8). At the other end of the spectrum he sees countries whose overconsumption gives rise to irreversible damage to the global environment even when these countries themselves appear to have stable levels of environmental quality. The rich countries will have to reduce their environmental pressure drastically (see e.g. Opschoor 1994) — one way or another: through drastic technological change, through much more stringent environmental and resource policies, and through changed patterns of production and consumption, as was urged in Agenda 21 (UNCED 1992, Ch. 4) and is now being discussed, albeit too little, in the contexts of OECD and UNEP. Although this might create environmental space for the South, there may be negative externalities in terms of indirect repercussions on trade possibilities for the other economies. These repercussions, incidentally, have hardly — if at all — been researched and this may be a pointer for future work at ISS.

If the biosphere provides humankind with a certain volume of environment utilization space, given a definition of sustainability, our institu-

tional capabilities and the state of science and technology, then the issue of the distribution of the access to this space becomes a crucial one (Opschoor 1994, Verbruggen 1995), if environmental security is to be achieved and preserved as a precondition for sustainable global development. This entails the design of new forms of access and property rights and their allocation, based — no doubt — on further international agreements (Verbruggen, 1995; Schrijver 1995). From a development perspective, it may be a hopeful thought that in the preparation of such agreements the position of the countries of the South will improve, as the largest part of environmental assets is in their part of the globe. Whether this is also a hopeful view from an ecological perspective remains to be seen and will doubtlessly depend on: (i) the rate of increase of fair shares in material welfare in what was traditionally called the Second and Third World, (ii) the emergence of environmentally-benign patterns of consumption in the North, (iii) the readiness in the North to take a lead in the design, implementation and global dissemination of cleaner and less resource-intensive technologies, and (iv) convergence in global thinking about how to operationalize sustainability and translate it into effective constraints and incentives. How important the last point may be is illustrated by the fact that the newly-industrializing countries may, in the near future, emit so much pollution and use so many resources that standard views on where the bulk of the environmental claim originates, will have to be revised. For instance, the People's Republic of China now emits only half as much CO₂ as the USA, but in 15 years time it probably will have reached the current US levels and will have surpassed the former Soviet Union as the second largest producer of CO₂. OECD countries, in so far as they are concerned about greenhouse issues, will increasingly have an interest in coming to terms with these industrializing nations, in addition to reducing their own emissions.

To the extent that regional or local life-supporting systems within developing regions and countries are at stake without serious implications for life support at the global level, the sustainability choices could be largely left to the countries concerned. This implies that these countries, such as those in Europe previously, might opt for selling out, irreversibly or reversibly, substantial parts of their present resource base — in fact, that base as well as the remaining absorptive capacity for waste and pollution may well be their comparative advantage in the

international division of labour. There may hence be a need for harmonization of environmental standards in order to ensure that countries are not over-exploiting these advantages in a way that would imply unsustainable intertemporal externalities. This is another area overlooked in current research agendas. The underlying field of natural resource use, management or resources and conflicts over resources is beginning to receive more attention, also at ISS.

Internationally, there is a movement in the direction of the adoption of 'the polluter pays principle' and the implied internalization of environmental costs in prices, see e.g. Agenda 21 (UNCED 1992). This might affect cost levels and prices on world markets and the competitiveness of countries in international markets. There may thus be a significant conflict between terms of trade and market access on the one hand, and sustainability on the other. UNCTAD rightly observes that internalization of environmental costs and benefits takes place in the context of policies that may differ from country to country, depending on differences in development needs, environmental absorptive capacities and time preferences involved. UNCTAD further observes that there is a twofold link between internalization and economic growth. Instruments that constrain economic growth conflict with priorities in developing countries; and economies which are stagnant are less able to implement internalization policies (UNCTAD 1995). At the same time, UNCTAD points out that not internalizing these environmental and resource costs leads to an increasing burden which is passed on primarily to the civil societies in the countries concerned. It hence recommends a strategy of gradual internalization on all fronts, and explores international institutional arrangements to substantiate that strategy (UNCTAD 1995: 9). Again, an interesting item for a development-oriented research agenda.

Growth and Welfare (2): sustainability

In international forums, economic growth is regarded as the engine of 'development as a whole', as it is the basis of sustained increase in consumption, capital formation, health, security, and for redistribution (e.g. UNGA 1994). Accelerating growth will expand society's resource base and hence economic, technological and social transformation; growth thus allegedly increases the range of human choice (ibid.) — we hear the voices of Tinbergen and Keynes again. But — it is said in

these forums — growth must be sustained and sustainable (ibid.:43). Innovation and a change in life-styles will be required; targeted policies are needed to ensure that environmental values are reflected in economic activities. Institutional inadequacies are major obstacles to the design and implementation of environmentally-sound and responsible development projects (ibid.).

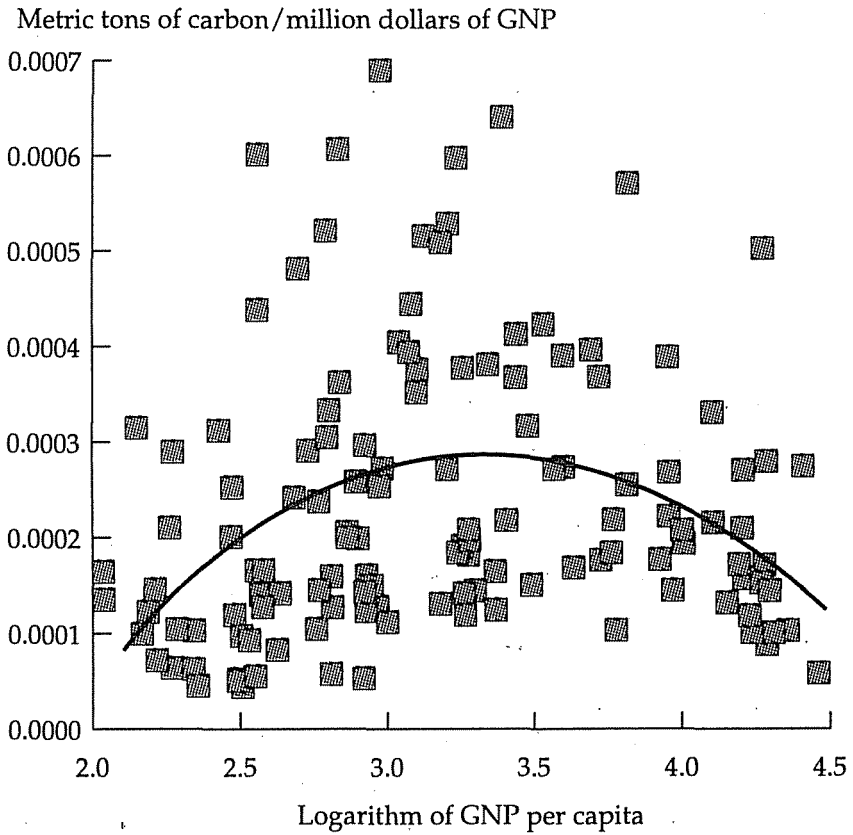
But maybe that is unnecessary. If we kindle the fire of sustained economic growth across the globe will this not automatically result in environmental sustainability? Isn't environmental quality a luxury good that societies will want more of as income levels rise, and will this not automatically generate a demand for new, cleaner and leaner technology to such a degree that Solow's hope and faith will materialize? Will not, to present you with the environmental Newspeak, economic growth induce an endogenous process of 'delinking' or 'decoupling' economic activity from its environmental base? Will not the economy 'dematerialize' by reducing environmental inputs and outputs per unit of consumption? The World Bank (1992:40): 'In many cases economic growth is being "delinked" from pollution as environmentally non-damaging practices are incorporated into the capital stock'.

The relationship between *per capita* environmental pressure (defined here as the aggregate of pollution, depletion and other human activity-related threats to environmental quality) and *per capita* income is sometimes assumed to take on an inverted U-shape (see Shafik & Bandyopadhyay 1992; Selden and Song 1994) referred to as the 'Environmental Kuznets Curve' — accepted jargon since being awarded World Bank recognition (World Bank 1995; see Fig. 2).

Research on dematerialization appears to reveal similar tendencies (see e.g. Malenbaum 1978; Bossanyi 1979; Chesshire, 1986; Larson et al. 1986; Tilton 1990).

Focusing on an aggregated proxy for environmentally-relevant material throughput (Daly 1991) in over 30 OECD and Comecon countries, investigations by the Berlin Science Center (Jänicke et al. 1988, 1989,

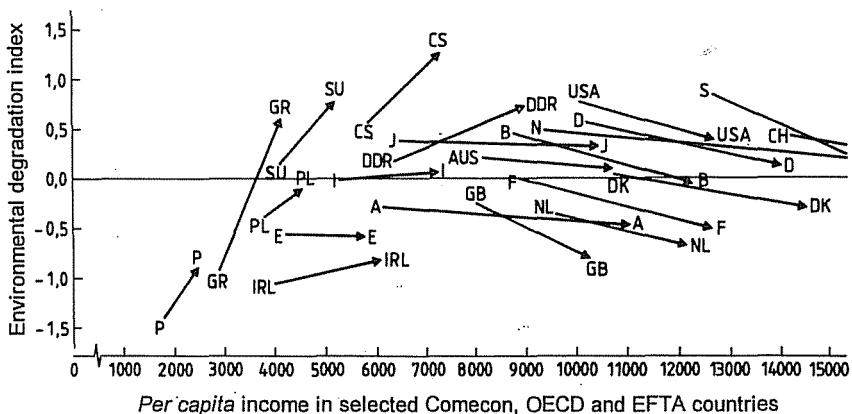
Fig. 2 Kuznets-type curve for carbon emissions, 1989-91 average



Source: World Bank (1995)

1993) report a tendency of declining levels of throughput after certain income levels, also suggesting inverted U-curves (see Fig. 3).

Fig. 3 Environmental pressure and welfare, 1970-85 in OECD and COMECON countries



Source: Jänicke et al. (1989)

This suggests an endogenous tendency to de-link with rising income or GDP *per capita*, according to Jänicke et al. (1988).

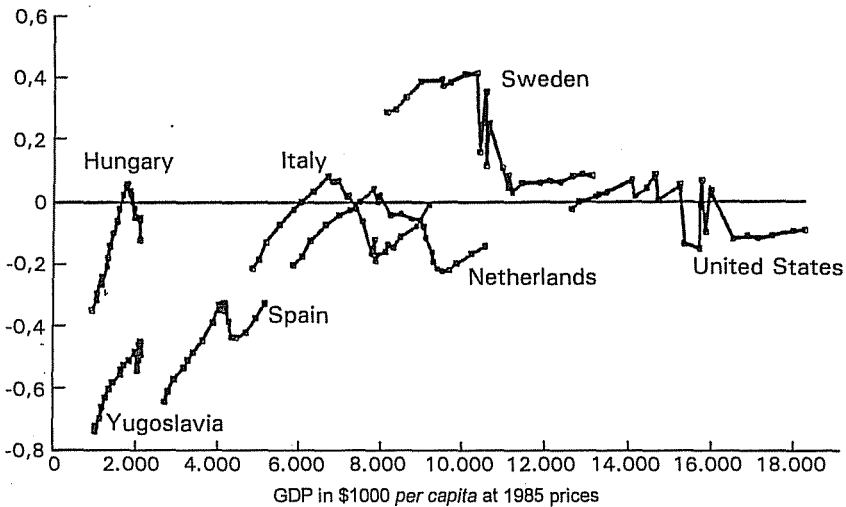
This would obviously be important in the debate on the relationship between economic growth and environmental quality. If such relationships are persistent then eventually economic growth might be compatible with ever-declining levels of environmental pressure. If such a process were to be 'embedded' in the market process, and if the process were persistent, then this de-linking might go far in achieving sustainability whilst maintaining growth in the economy. We might almost automatically end up with the best of both worlds: economic welfare and environmental quality.

However, theoretical considerations as well as more elaborate empirical investigations cast some shadows over these bright prospects.



Theoretically, continued de-linking can go on only as long as the rates of reduction in environmental throughput or intensity per unit of income exceed production growth rates — and this is bound to come to an end and possibly even reverse (Opschoor 1990). If we look at Fig 2, we can see that the empirical basis for the Environmental Kuznets Curve is weak. And to test empirically the de-linking hypothesis on throughput we extended the analysis by taking a longer period of study (1966-90). For a sample of 20 countries, the observed trend to de-link is indeed manifest from 1970 till the early 1980s. However, for several countries environmental pressure appears to have been re-linked with the environment since the mid-1980s (de Bruijn and Opschoor forthcoming; see Fig. 4).

Fig. 4 Developments in aggregated throughput index, 1966-90.
 Three-year moving averages of aggregated environmental index for selected countries



The Environmental Kuznets Curve could not be reaffirmed; the relationship between economic growth and environmental claims can probably better be described as 'N-shaped' or as a series of Ns, in saw-blade sequence. At the moment the OECD countries may be entering a phase of re-linking. Endogenous de-linking does not appear as a process which is stable or persistent under conditions of sustained economic growth. Sustained growth is not necessarily sustainable.

We also looked at the relationships between economic development (growth and restructuring) and environmental pressure as measured by throughput more or less following Jänicke, in Central European countries, from 1970-1991 (Rebergen et al. 1994). As one might expect, the levels of throughput were high in comparison with Western Europe, both in absolute terms and per unit of GDP; the specifics of the sectoral structure of the centrally planned economies and inefficiencies in the price and incentive structure account for much of these high levels. It is interesting to observe that, as in Western Europe, throughput per unit of production dropped in the 1980s, and the centrally planned economies began to decouple before 1989. This may, in part, be due to attempts by the previous regimes to increase efficiency, in part, to a more effective societal concern over environmental issues, and, in part, to the emerging changes in the patterns of production. How these tendencies have been evolving since 1991 I do not know but we expect that on the resources side this tendency might persist whereas on the pollution side it might yield to the need to keep prices low for competitive reasons (Rebergen et al. 1994).

Finally, we began looking at the environment-growth relationship in some developing countries. We (Rebergen and Opschoor forthcoming) analysed 9 countries: 2 low-income countries, 4 low to middle-income countries and 3 upper middle-income countries and we applied some rather arbitrary but at least uniform throughput indicators. In these countries we observed strong shifts in the economic structure (the sectoral composition of GDP) from 1970 to 1990 with more industry and even heavy industry. Throughput increased, in relation to average income, especially in low and low middle-income countries, and seems indeed to have related to changes in the economic structure. Throughput per unit of GDP increases in low-income countries but seems to decrease in middle-income countries. There may thus already be some

relative delinking in the latter countries, possibly as a result of leap-frogging: the use of newer, cleaner technology than industrialized countries would or could have done at similar levels of income. Nevertheless, due to ongoing economic growth the overall throughput levels showed increased environmental deterioration. More research is needed, especially on throughput evolution in developing countries, and on how this can be decomposed into growth effects, the impacts of structural change in the economy, positive externalities of environmentally-oriented innovation in industrialized countries, changes in policies in developing countries, etc.

The above observations (which have been only partially tested) deal with what could be called endogenous restructuring and the sustainability thereof. Another question may be what effects could be expected, in terms of changes in the sustainability of the economy, in relation to structural adjustment programmes and stabilization programmes promoted and imposed by the World Bank and the IMF. We scanned the vast literature on the subject (Opschoor and Jongma 1996). The upshot of this was that the environmental repercussions of stabilization programmes are basically indirect, unpredictable in direction and depend on the period during which the programme was carried out. No general statements can be made on the impact of structural adjustment programmes on sustainability either, except that they run the risk of short-term impacts on the size and effectiveness of environmental policies and that if they lead to net increases in environmental efficiency, these may be outweighed by the effects of long-term growth rate enhancement. Macro economic policies may be a necessary condition for development and for stimulating more interest in sustainability, but they are certainly not a sufficient condition for sustainable development to emerge.

This type of empirical work is very much in its early stages and has not been applied widely enough — nor is it verified adequately. Yet, others seem to be deriving similar results with different data sets (e.g. Horvath 1996 on energy throughput for 145 countries). Much more systematic, quantitative analysis needs to be done in this area, especially focused on these relationships as they unfold in developing countries and economies in transition.

Development Theory and Sustainability

The 'living space' and the environmental space are increasingly occupied by economic forces whereas political institutions are not developing at the same pace and may even suffer from atrophy. This is referred to as the emergence of the global market, or globalization and it is one form of global change — a form of change compared with which development seems to be a relatively weak force. We have also seen that problems related to equity and participation on the one hand, and sustainability on the other will not be resolved automatically by economic growth. These problems need explicit societal and policy attention and call for institutional development. Moreover, they are linked and need to be addressed from an integrated perspective. Development theory needs to understand change and how to influence that change. This understanding covers multidimensional issues and hence requires a multidisciplinary approach.

This view is far from original. Preparing this inaugural address in 1996 at ISS, as an academic trying to establish an international programme for research on 'Human Dimensions of Global Change', it comes as no less than a wake-up call to learn that in 1961, 35 years ago, the then Rector of ISS, Egbert de Vries, already attempted to develop a trans-disciplinary theory of social change, and to apply it to changes occurring in Asia, Africa and Latin America. His methodology is centred around concepts such as 'prime movers', (economic, technological, cultural and spiritual forces), 'catalysts' (such as reward awareness, tension between generations and mass movements) and 'inhibitors' (including fear of risk taking, deference to the existing order and rejection of individual deviation). And a decade earlier, in 1951 he had already alerted us to the seriousness of food supply problems for a rapidly-growing world population. He indicates the need to develop strong local systems of access and property rights to land, to regard land and water as capital goods in need of supervision and legislation against neglect and abuse, and a planning approach focused on 'balanced development' in the various main sectors of the economy, etc. Already in 1951 de Vries developed a capital approach to natural resources, based on the observation that natural goods and complexes such as forests, provide services to humankind and 'functions' (see also de Groot 1992) and that the direct economic functions of such systems

(e.g. wood production) may be secondary to their true societal functions (e.g. soil protection). This isn't even obvious to many economists, developers and policy makers today! He observes and demonstrates humanity's or Western neglect for land, or the soil (de Vries 1951, p.53ff) — notions that stand for the whole of natural resources. Conceptually, this neglect is reflected in the economists' notion that land or natural resources are not part of capital; they may belong to the factors of production but they are not produced by humans. They are therefore a separate set of goods to be analysed with separate economic tools. In the wake of the Second World War, he analysed the role of resource scarcity for international security. Today, this would be referred to as 'ecological security'. And 36 years before Brundtland, he wrote about social, political and technical impediments to a more efficient and sustainable use of natural capital (without using those phrases — see e.g. pp. 146-7). And he linked this to the exchange rate between resource-exporting and resource-consuming countries, and hence to issues of equity and distribution of purchasing power (p. 189-90).

What is striking in these studies is de Vries' global orientation, his multidisciplinary approach and his concern for natural resources as the ultimate basis for development and the satisfaction of human needs and aspirations, and his early focus on social *change*. We may wish to study these works by de Vries again — to re-search them.

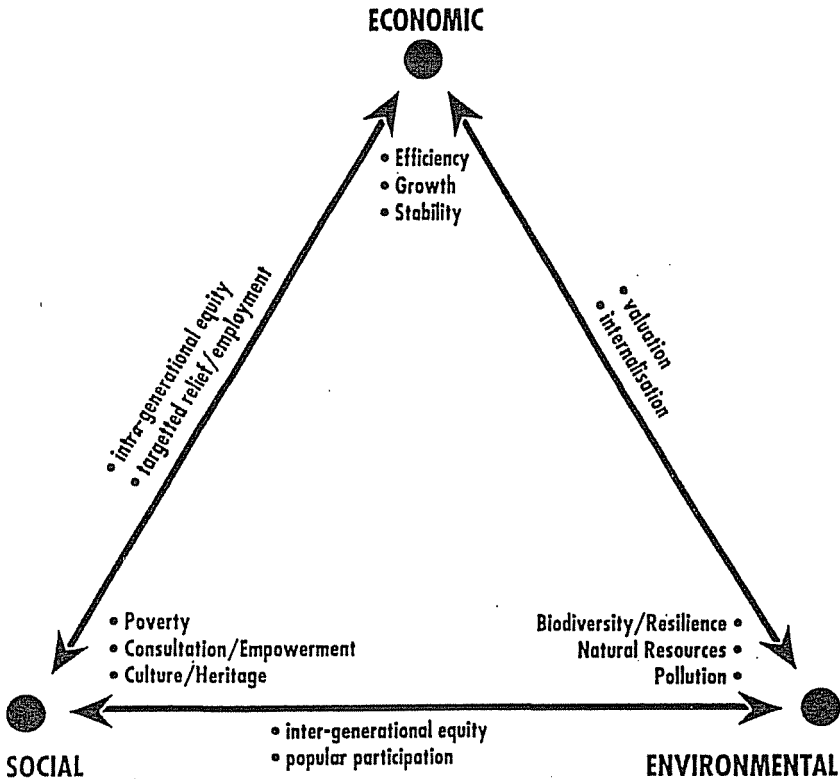
Indeed, and perhaps even more so than in 1961, the current stage in the development of the world economic and political system requires new, more integrative and transdisciplinary modes of analysis, and even theories, as well as an awareness of the need to combine conceptions based on rationality and contextual approaches open to institutional and historical analysis. I have listed some examples of global change earlier, including notions that seem to belittle the significance of environmental change (Giddens 1996). Gamble et al. (1996) rightly include environmental situations in their research agenda for a new political economy. The question now is which social and economic institutions are needed to reproduce existing patterns of social and economic life in the long run — this they refer to as the political economy of the environment. They see this as a separate issue from that of the political economy of development, which is concerned with inequality, vari-

ations in development trajectories and responses to emerging economic structures, etc. I see these two as inextricably linked and would propose that development studies, especially in its economic subdomains, should elaborate a new political economy of sustainable development that looks at global and regional, social, institutional and structural change in terms of equity as well as sustainability issues. 'Operationalising sustainable development ...will have to begin not just at the technological and economic levels, but more at the institutional level with changed strategies of arming people (with their social, cultural and historical plurality) to take the challenge and responsibility of ecological sustenance' (Kadekodi 1991:29). The socio-cultural dimensions should no longer be denied, ignored or otherwise suppressed in the analysis of change and of the responses to, and the preconditions for development, or in the design of development alternatives. Nor should the environmental dimensions; hence the UNDP-based Office for Development Studies wishes to seek the linkages between economic, social and environmental aspects in an effort to enhance 'sustainable human development'. For ISS, this integrative approach could be a challenge to take up, but if it does, it will have to expand its environmental or sustainability-oriented knowledge base.

How — if at all — can this reoriented study of development and change be enriched by ecological or environmental economics? I think by broadening the area of study to encapsulate the physical environment as an infrastructure for human change and development (James et al. 1989) and by focusing on what this means empirically (i.e. in the sense of what happens with the interrelations between society and its environment) and normatively (i.e. what should this mean if we allowed less reduction of who counts in societal decision-making and how we could rearrange institutionally to incorporate these concerns).

Munasinghe and McNeely have proposed a framework for positioning approaches to sustainable development in the form of a triangle with social, economic and environmental concerns as its angles (Fig. 5).

Fig. 5 Approaches to Sustainable Development



Source: Munasinghe and McNeely (1995)

At the corners, the main concerns or objectives are said to be: efficiency, growth and stability in the economic corner, biodiversity, resilience, resources and pollution in the environmental corner, and poverty, empowerment, culture and heritage in the social corner. The main issues along the environment-economy axis are those of valuation of environmental change; along the social-environmental axis they are internalization of environmental costs, and inter-generational equity and participation; and along the social-economic axis the main concerns are intra-generational equity, relief and employment. Basically,

along the social-economic axis, one finds concerns and issues that were and are very much on the agenda of development studies. Adding the environmental angle introduces concerns that one may judge on their significance. If behind resilience and resources one reads: sustainability, then I think the relevance of this extension goes without saying, and this induces a research agenda that to begin with is concerned with how we value environmental degradation and resource supply changes, if only to get an indication of what our true sustainable consumption or income is. Secondly, and perhaps even more importantly, it is concerned with how we can provide signals to the socio-economic processes that would render them sufficiently susceptible to the environmental repercussions and the derived socio-economic effects, of economic change and development, for instance by internalizing these environmental values in market prices. Thirdly, it would lead to a series of research questions on the inter-generational distribution of the costs and benefits of socio-economic change and development. Of course this picture is not an all-inclusive one; I would like to add at least:

- concerns about institutional aspects along the social-economic axis,
- issues related to environment and trade,
- environmental and economic dimensions of international security
- empirical relationships between growth and sustainability along the environment-economy axis (see above).

Given lack of time I will say a little about only one item: valuation.

Development means at least a more efficient use of the resources a society has access to and the enhancement of society's overall resource base. This resource base is wider than produced capital and human capital — it also includes natural resources. In our national accounting systems when we try to derive a measure of income a society is generating, we have to deduce costs from revenues and amongst these cost elements we ideally include depreciation of capital stocks. This turns out to be rather difficult: economists sometimes only have very crude estimates of capital stocks — of stocks of produced capital only, at that — and estimates of their depreciation are often non-existent or unreliable, and the situation is even worse when it comes to human and natural capital, let alone the depreciation of these two forms. Solow, in the lecture I have already cited, proposes as an 'almost practical step

toward sustainability' changing social accounting practices to incorporate depreciation for the reduction or depletion of natural capital including environmental quality stocks. These depreciations should occur in reference to proper prices, shadow prices if necessary. Pyatt (1995), in discussing a similar position, rightly observes that this begs the question of deciding on a value system which allows one freedom or choice to be traded off against another...and also assumes something about our understanding of nature, since we do not have complete knowledge of what is being lost when specific natural assets are sacrificed. As the environmental economics literature shows, these are fundamental questions, as even the applicability of economic valuation is limited. Solow's recipe is easier to proclaim than carry out. Nevertheless, improving our techniques of valuing stock changes in the environmental area is an important field in environmental economics, with tremendous relevance for development studies and development policy. Two examples taken from recent first steps in this direction by the World Bank may illustrate this.

The first has to do with the calculation of what the Bank now refers to as 'genuine savings'. Genuine savings are a society's savings in the traditional sense (i.e. production less consumption), corrected for the changes of produced assets and natural resources, and of health and education (World Bank 1995: 53). In a framework of weak sustainability it is non-negative net savings that a society should be striving for.

The real picture is rather worrying: some regions in the world may be structurally losing savings or moving towards that situation. Thus, the income they generate may not be sustainable at all. More work needs to be done in valuing the resource costs, in order to arrive at more accurate estimates of genuine savings. And other branches of economics may be asked to produce estimates of changes in the human capital stock.

At an even more fundamental level, societies or policy-makers may be interested in the value of the capital base itself, rather than in the value of the changes in that capital base. This would entail, *inter alia*, the valuation of natural wealth as well as produced assets and human resources. Again, crude first estimates exist (World Bank 1995; Sera-

geldin 1995) and they disclose some very interesting differences across countries and regions.

It is the results of valuation exercises like these that may tell planners something about how societies or economies are performing in terms of their resource management and the sustainability of their economic activities. There is a world of policy issues as well as research questions concerned with how policy-makers and societies could try to influence societal processes and make social agents behave in a more sustainable way. Environmental economics makes a contribution by analysing and developing instruments for economic and environmental policies aimed at achieving sustainable development (such as market-based instruments or economic incentives to use efficiently no more than a sustainable quota of natural resources and management approaches such as common property resource use) and the design of tools and institutions for resource management. It is both interesting and gratifying to observe that, contrary to what some might expect, these instruments are increasingly being applied in developing countries and are actually increasingly being refined and even designed there.

Environmental and resource economics and the study of development and change do have an interface; one that is expanding rapidly, and on which one may work productively and perhaps even effectively.

Conclusion

Like Haroun and Mr Butt, we have zigzagged over quite a lot of slippery ground — and through a fascinating landscape. I would like to review briefly some of the landmarks we have encountered.

It goes — though not quite — without saying that social change and development are much broader concepts than economic growth. Change and development relate to: (i) the patterns of consumption and production (the economic structure), (ii) the underlying socio-cultural patterns and structures, (iii) the institutional features of societies, as well as (iv) technology in the widest possible sense. Growth and development must be seen in relation to the dynamics of population size while this entire complex is linked with an environmental infra-

structure including natural assets. The realization that development studies is in fact cutting slices out of this complex pie, is one of the thoughts underlying this address. Another is that some of the processes subsumed by the notions of global change and liberalization show the emergence or evolution of tendencies to affect negatively the social sphere, i.e. economic growth without adequate checks and balances in terms of social desirability, access, participation, entitlement and control, or the movement of the economic process into an ecological danger zone seen from the perspective of future generations or those excluded from the moral community. There is a clear need to curb these processes of change.

Almost by definition, societies respond or react when such problems emerge or intensify, but we have seen that social and environmental problems may not be automatically resolved by allowing the engine of economic growth to work at full speed. It is a fallacy that economic growth as such would automatically generate more equitable distribution or more sustainable patterns and levels of production and consumption.

Societies, if they are to be or become sustainable, require one or more of the following:

- technological innovation and enhanced knowledge;
- changed patterns of production and consumption, or an ecological restructuring of the economy and of life-styles;
- institutional reforms.

Development, as induced change or transformation, may thus orient itself towards e.g.:

- enhancing formal institutional capacities to reorient and control these globalization processes, e.g. by correcting endemic market failures to achieve endogenously socially desirable levels of performance;
- enhancing informal institutional capacity to regain and maintain some form of control over living space (in Habermas' words);
- changing the sectoral composition, the patterns of production and consumption, in other words the life-styles and technologies used.

This is an agenda of social and economic restructuring — clearly the emphases would have to differ from one context to another, to take into account differences in ecological, cultural, economic and institutional points of departure. From the environmental perspective, and in search of sustainable economic processes, it is absolutely clear, even obvious, that development is a notion that has relevance to poor and rich countries alike. In developing countries, there may be a need to focus on increases in produced and human capital in an endeavour to raise living standards and accelerate growth of production and the development of markets. If these economies are confronted with changes in their international economic environments and/or need to expand their activities in that environment, they may have to structurally adjust — according to IMF recipes or otherwise. The former planned economies are going through a period of fundamental transition which appears to have its own socio-political and economic dynamics, and again seems to indicate the need for drastic structural reorientation and a search for markets. Both types of economies will eventually run into environmental constraints, if they haven't already. Whether they will respond to that, and if so, how, and what the socio-economic repercussions of that will be, is one of the burning issues of the decades ahead of us. The industrialized market economies have already passed that point and have, to a large degree, externalized the environmental scarcities they caused. That cannot continue, especially if the rest of the world exercises its right to the remaining natural capital — the North will have to make space for that. Hence for reasons of fairness, both to its own future generations and to other users of the environmental utilization space, the North will have to adjust fundamentally its patterns of production and consumption, and to invest in what institutional and technological innovation is required to produce enough decoupling to allow itself and the rest of the world population fair and satisfying standards of living. What it entails amounts to a deep process of reorientation and development away from over-exploitation; 'ecological restructuring' it is called (Simonis 1989).

My final words today will be a comment on a quote from one of ISS's previous Rectors, de Vries. Forty-five years ago he wrote: 'All in all the last century has not been one of progress for the world, in the perspective of the management of natural wealth. Almost nowhere else the failure of the individual profit motive at the expense of collective

interests is as manifest as in that area...That is the price Mother Earth has had to pay for the individualistic, imperialistic and capitalistic conquests of the last century' (de Vries 1951). To respond responsibly and effectively to this, he proposed a dialogue between the life sciences, technology and the social sciences, and pleads for some form of weak sustainability as a minimum condition. This entails societal intervention in the processes of resource exploitation that will curb economic forces, accompanied by drastic technological innovation with the aim of preservation for future generations (p. 201). This will only come about sufficiently in some form of international agreement and as an international approach (p. 203) based on an ethic of 'stewardship'.

My comment is that these words have not lost a bit of their relevance — far from it. Perhaps ISS rectors should be listened to more!

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