
Sustainable Development: Some Unanswered Questions

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Introduction

At the dawn of the twenty-first century, any objective and in-depth analysis of the total long-term impacts of the official development assistance will indicate that these have generally had at best only a marginal impact in alleviating poverty, improving the quality of life of billions of people, and maintaining and/or improving the conditions of the natural environment and the ecosystems.

During the past three decades, the international system has consistently made numerous commitments and pledges that were expected to alleviate poverty very substantially, or even eradicate it completely. For example, at the World Food Conference, convened by the United Nations in Rome in 1974, senior decision-makers from all parts of the world, at the explicit recommendation of the former Secretary of State of the United States, Henry Kissinger, made a pledge that within a decade no child anywhere in the world would go to bed hungry. More than a quarter of a century has elapsed since the world leaders and the United Nations made that commitment, but children continue to go to bed hungry, perhaps even in larger numbers than before. The situation continues to be as grim as ever. In some aspects, and in many parts of the world, the conditions have even deteriorated significantly.

Similarly, the two Development Decades initiated by the United Nations System in the 1970s and 1980s also had somewhat marginal impacts. In fact, the impacts of the First Development Decade was so minimal that Bradford Morse, a former Administrator of the United Nations Development Programme, an institution that was made officially responsible for implementing the two Development Decades, called it formally 'the lost decade' during his own terms of office, when he was responsible for administering the Second Development Decade. While such candour for truth is refreshing and somewhat unusual for a senior international bureaucrat, the fact still remains that the world has made only limited progress in terms of eradicating poverty and improving the quality of life for more than one billion human beings.

In spite of the commitments made by the global leaders, and the continued rhetoric of the international institutions, poverty and hunger have continued to be as pervasive as ever, and have even increased significantly in recent years in many parts of the world. Furthermore, the gulf between the rich and the poor, both between countries and within countries, has increased, rather than decreased, in recent decades. Similarly, the environmental conditions have continued to deteriorate in most parts of the world.

Development Goals and Their Achievement

Consider the following statistics released by the World Bank (2001) on the current development conditions of the world, which by any national or international standard would be considered unacceptable.

- Out of the current global population of 6 billion, 2.8 billion (47 per cent) live on an income of less than \$2 per day, and 1.2 billion (25 per cent) live on less than \$1.00 per day. Some 44 per cent of the world's absolute poor (daily income less than \$1.00) live in South Asia.

- In South Asia, sub-Saharan Africa, and Latin America, the total numbers of poor people have been rising steadily. For the countries in transition in Eastern Europe and Central Asia, the number of absolute poor (income less than \$1.00 per day) has risen more than 20 times in recent years.
- In poor countries, 50 per cent of all children under five years of age and 5 per cent in rich countries, are currently malnourished.
- The average income in the richest 20 countries of the world is 37 times the average income of the poorest 20 countries. This income gap has not decreased in recent decades, in fact, the gap has actually doubled during the past 40 years.

Faced with this dismal global performance in terms of alleviating poverty in the developing countries during the past three decades, various United Nations Conferences during the 1990s, at high decision-making levels, have reformulated international development goals in terms of reduction of poverty and human deprivations. These objectives of international development were also separately agreed to by the countries belonging to the Organization for Economic Co-operation and Development (OECD), that is, the developed world. These new development goals include, *inter alia*, the achievement of the following by the year 2015 (OECD, 2002):

- reducing by half the proportion of people living in extreme poverty (income less than \$1.00 per day). This has to be achieved in a world whose population is estimated to increase by some 2 billion by 2025, with 97 per cent of this increase occurring in developing countries,
- ensuring universal primary education, and
- reducing by two-thirds infant and child mortality.

If the past attempts did not contribute to improvements in these indicators cost-effectively and within a reasonable time frame, as has clearly been the case, some fundamental questions need to be asked and answered: why have such attempts failed miserably and consistently? and what lessons can be learnt from

such failures so that the future development policies do not make the same mistakes?

The main recommendation as to how these international development goals can be achieved, according to the latest high-level UN fora and the leaders of the OECD countries, would be through the implementation of national strategies for sustainable development in every country by 2015. This is in spite of the fact that the UN system as a whole has never defined what is meant by sustainable or unsustainable development in operational terms, nor identified the parameters that should be measured to indicate whether sustainable development is taking place or not. Nor has any single government or any international or national institution done so. No one has ever asked if sustainable development has been achieved in any country of the world, and if so, in which ones, how it was achieved, over what periods, and what have been the impacts on critical issues like poverty alleviation, income distribution, economic growth, overall quality of life, and environmental conservation. Also, no consideration has been given to conduct serious analyses to determine if the past attempts at sustainable development have actually improved the very same international development indicators, which the UN system have now identified as the goals to be achieved by 2015. Nor has the following fundamental question been asked: would the world have been any different now if it had not followed the currently fashionable concept of sustainable development over the past two decades?

It should be noted that the establishment of such arbitrary development goals are not new. It is seldom that good technical and economic analyses are made in order to realistically determine as to how these goals can be achieved, where will the additional funds for such development come from, and who will be responsible for formulating and implementing the development programmes. For example, for the water sector, both the United Nations Conference on Human Settlements (Vancouver, 1976) and the United Nations Water Conference (Mar del Plata, 1977) pledged that every human being should have access to clean water

and sanitation by 1990. The UN General Assembly reconfirmed this goal by declaring the decade of the 1980s as the International Water Supply and Sanitation Decade. More than 10 years after the UN Decade is over, universal availability of clean water remains a goal that appears to be as illusive as ever. The situation in terms of sanitation is even worse.

Serious and objective evaluations and assessments of the reasons as to why the previous development targets were never reached are seldom undertaken. In contrast, there are many superficial and pseudo-evaluations, which have basically concluded that if more money was forthcoming, and if there was more 'political will', the problems would have been solved. No critical in-depth analyses are available to determine if the funds expended could have been used more efficiently, if the institutions concerned (both national and international) were competent to carry out the tasks they were entrusted with, if the right policies and competent and experienced personnel were in place, etc. Instead of considering and answering such difficult and complex questions, the simpler solution has been to declare partial victory, and then set a new target date to achieve the goals, which should have been achieved in the first place many years ago. The new target dates are set a decade or two later, to achieve the same objective as before. Thus, at least for the development target in the area of water supply and sanitation, the international community, having failed to meet the objective of universal water supply and sanitation by 1990, simply decided to extend the target date to a quarter of a century later, to 2015. On the basis of the latest trends, even this goal is highly unlikely to be achieved by the new target date. Thereupon, a cynic might say that the target date will be further postponed to another decade or two in the future.

Sustainable Development

There is no question that in the international political fora, sustainable development has become a powerful and all-embracing slogan during the past 15 years. Every government is for it, as

are all the major international institutions such as the United Nations agencies, World Bank, regional development banks, and OECD, as well as all the environmental and social non-governmental organizations (NGOs). Major institutions have initiated programmes, or specific budget lines, for sustainable development. This is in spite of the fact that there is no agreement at present between the various parties concerned, as to what is meant by sustainable development, whether it works, and if so, under what conditions, what are its impacts (positive, negative, or neutral) on human lives and other appropriate development indicators, and how it can be achieved operationally in a real world, and especially in developing countries.

Contrary to popular belief, the concept of sustainable development is not new. The general philosophy behind the concept has been expounded for centuries, if not millennia. For example, William Shakespeare said in *Hamlet*:

Suit action to the word, the word to the action; with this special observance, that you overstep not the modesty of nature.

Similar thoughts on living in harmony with nature can be found in most religious texts.

The use of the term 'sustainable development' became fashionable around 1980. However, there is very little difference between this and other earlier concepts like ecodevelopment, basic human needs-outer limits, or environment and development that were prevalent during the 1970s. Neither of these concepts could be made operationally possible in a real world, and thus these paradigms slowly disappeared during the early 1980s, only to be replaced with another very similar one, i.e. sustainable development. In fact, one would be hard-pressed to conceptually differentiate between the earlier concept of ecodevelopment with the current paradigm of sustainable development.

Sustainability is unquestionably a popular concept at present, but it means different things to different people. One is reminded of the popular support for the Conservation Movement of the United States in the early part of the twentieth century, when President Theodore Roosevelt correctly said that 'Everyone is for conservation: no matter what it means!' The situation does not appear to be much different at present for sustainable development.

Sustainability: What is It?

The concept of sustainable development, as it is used at present, was basically borrowed from the field of fisheries management in the late 1970s, where it has been used successfully for well over half a century. However, in the case of fisheries, the concept is simple, measurable and implementable. It means that the amount of fish catch should be equal to or less than total reproduction so that fishery in any region can be sustainable ad infinitum.

Before sustainable development became fashionable, the term 'sustainability' was technically used for harvesting reproducible natural resources, e.g. maximum sustainable yield for fisheries. This concept was extended in the late 1970s by a group of environmental scientists meeting in Nairobi under the aegis of the United Nations Environment Programme. The broadened concept of sustainable development was expected to be a 'new' idea for assessing and managing human impacts on the environment and natural resources.

The term was later popularized by the Brundtland Commission report *Our Common Future*, which was published in 1982. The Commission defined sustainable development in a somewhat amorphous way as 'development that meets the needs of the present without compromising the ability of the future generations to meet their own needs'. Not surprisingly, with such a vague, simplistic, internally inconsistent, and static definition, the Commission was unable to specify what was to be sustained. The report made continual references to sustainability, but was totally unable to say how the concept could be operationalized. Sustainability was expected to be achieved in an unspecified and undetermined way, some time in the unspecified future. Nor did the definition include the realization of a reasonable and equitably distributed level of economic well-being, without which no development can be sustainable over the long term. This aspect is especially important for developing countries, where income distribution between the rich and poor has already become a socio-political issue.

Once the concept became popular, dozens of new definitions were offered. Currently one can easily identify more than one hundred definitions of sustainable development without much difficulty.

The concept was promptly embraced by many institutions because of its simplicity and vagueness, which allowed them to define it in a way that best suited their interests and agenda. Thus, even though all the United Nations agencies now champion sustainable development, individual institutions often define it the way it is most convenient and beneficial to them. Thus, the definition of sustainable development often varies from one UN agency to another in some significant ways, even though all the UN agencies embraced this concept early two decades ago.

Sustainability: Some Major Issues

In spite of the present rhetoric, it has to be admitted that operationally it has not yet been possible to identify a development process which can be planned and then implemented in such a manner that it becomes inherently sustainable, however this may be defined. It would be true to say that there has been more success in identifying certain aspects of development which are unsustainable and then taking appropriate remedial steps to reduce or even eliminate those undesirable effects, compared to devising a holistic process that is intrinsically sustainable right from the very beginning.

For example, if sustainable water resources development is considered, it has been known for decades that irrigation without drainage would contribute to waterlogging and salinity, which in turn would reduce the yields of the irrigated area over a period of time. Since the main purpose of any irrigation project is to increase the total agricultural production, clearly any system that does not fulfil this objective over a long-term period cannot be considered to be sustainable. However, the provision of drainage alone will not make an agricultural system inherently sustainable.

There are many other factors, some tangible and others intangible, which, only when considered concurrently, are likely to define the sustainability of the system. Similarly, if extensive use of fertilizers by the farmers increases the nitrate content of groundwater so that its use for drinking purposes is impaired, then this practice has to be considered unsustainable. Again, there are numerous other factors, some known and others unknown, which contributed to the sustainability of using any groundwater system implementation.

While there are many issues that are important for sustainable development, from an implementation point of view, three factors need special consideration.

Short- versus Long-term Considerations

The concept of sustainable development automatically assumes that the process selected would continue over the long term, even though the issue of what constitutes 'long term' has neither been clarified nor featured much in the past or current discussions. The time factor, either inadvertently or because of its complexity, has basically been left fuzzy: no attempt has been made to define or even discuss what is meant by the long term. For example, does sustainability cover 50 years, or 100, 500, 1,000 years, or even more? Some have spoken vaguely of 'several' generations. Even if one considers the lowest figure of 50 years, there is a fundamental dichotomy as to its use in the real world.

Consider irrigated agriculture. Generally the economic planning horizon of the farmers extends to the next cropping season, or at most the next two such seasons. The overriding philosophy of nearly all the farmers anywhere in the world has been to maximize economic returns from their agricultural activities within this short and limited time frame. Thus, the mind set is inherently based on maximizing profits over a continual series of short-term periods without any specific or explicit considerations of their long-term benefits and costs. Though the short-term benefits could have long-term costs (e.g. in terms of soil erosion,

salinity development, etc.), generally short-term considerations have won over the long-term implications. While in some cases this emphasis on short-terms could be due to a lack of knowledge or understanding of the potential long-term impacts of their activities, it has to be admitted that, for financial reasons, small farmers in developing countries, who are generally poor, are mostly forced to consider only the short-term economic implications for their own survival. Large farmers are no different in their perceptions and outlooks either.

Similarly, for large private sector companies, their performances are judged on the basis of their profits every 3 months, and their profit expectations over the next 4 to 8 quarters. The managers of these companies are rewarded on the basis of their quarterly and annual performances. The stock prices of the companies depend exclusively on their quarterly performances. While the politicians can get away with their promises of 'jam tomorrow', provided some sacrifices and hardships are faced in the short term, the private sector managers often will lose their jobs, unless they are capable of showing increasing quarterly profits, irrespective of the long-term impacts of their management practices. No manager will survive in the private sector if he/she is to promise the stakeholders that they will suffer for the next five-ten years in terms of low or no profit, but that their profit pictures thereafter will be magnificent. The market will clobber that company's stock mercilessly, and the President and CEO of that company will simply be fired by its own Board of Directors.

Accordingly, and in spite of the rhetoric of the World Business Council for Sustainable Development, no business can survive if only the long-term implications are considered, and short-term impacts are ignored.

Hence, even if the societal and/or governmental goal is to achieve long-term sustainable development, in reality the main objective of a vast majority of farmers and private sector companies often extends only to short-term benefits, which predominantly dictate their behaviours, perceptions, and

approaches. Thus, any plan for sustainable development that does not specifically consider this fundamental conflict between short-term and long-term consideration and then attempts to identify realistic alternatives to overcome the problem, is doomed to fail. Such plans become primarily academic exercises which gather only dust on the shelves. The situation is very similar for private sector companies as well where short-term considerations often dictate long-term developments.

Externalities

Externalities occur when private costs or benefits do not equal social costs or benefits. People operate primarily on the basis of their own private costs and benefits. If they perceive opportunities which could reduce their costs and/or increase potential benefits, they often take actions which could be beneficial to them, even when they are unlikely to serve the common good. A common example is the discharge of wastes from municipalities and industrial concerns to rivers and other water bodies, which could impair existing water uses of numerous other people sharing the same water system. The private economic benefits due to non-treatment of wastewaters are likely to be significantly less than the societal costs of using polluted water.

Such costs could be internalized, at least conceptually, through taxes, subsidies, and regulations. But in reality, even in developed countries, it has not been possible to internalize the externalities for four important reasons. First, methodologically, calculation of the precise value of externalities has been a very difficult task. Often two experts may disagree in terms of their estimates of the external costs, and even the methods used to estimate them. Second, frequently there are politically powerful individuals and organizations who vociferously defend their own considerable private advantages against a large number of unorganized and disadvantaged individuals, or even the society as a whole, who may be experiencing additional costs, directly and/or indirectly. Third, externalities could develop steadily over time, and thus

there could be a time gap before those affected realize the real costs, which over the years could become very substantial. Finally, regulations to control such externalities in nearly all developing countries have proved to be somewhat ineffective and expensive. Developed countries have had only marginally better success.

Risks and Uncertainties

A major issue confronting sustainable development relates to the risks and uncertainties that are inherently associated with any complex development process. For example, with the increasing population base of the Asian developing countries, there is no question that resources such as land and water have to be used intensively in order to maximize agricultural yields, and thus the total production. The fundamental questions, for which there are no real clear-cut answers at the present state of knowledge, are: up to what level can an agricultural production system be intensified, without sacrificing sustainability, irrespective of how it is defined? What early warnings could indicate the beginning of a transition process from a sustainable to an unsustainable system, or vice versa? What are the parameters that need to be monitored to indicate that such a transition is about to occur from one state to another, or, indeed, is occurring? Clearly, our present knowledge is inadequate even to identify all the parameters that could indicate the passage from one state to the other, and their relative primary considerations. Thus, currently, it is not possible to accurately detect, much less predict, the transition of any sustainable system to an unsustainable one, or vice versa. In addition, all natural systems are variable. For example, a major global concern at present is climate change, especially in terms of changes in the existing precipitation and temperature regimes, both of which are subject to very wide natural variations. Their normal fluctuations could be so great that statistically significant data could be very expensive, or even impossible, to collect in order to state categorically that such variations are normal (that

is within the existing standard deviations), or due to other reasons. When additional factors such as potential climatic changes are superimposed on inherently variable systems the degree of uncertainty in terms of detecting or predicting the transition process from one stage to another increases greatly. One is then confronted with the difficult issue of even identifying the direction of any change, let alone estimating the degree of change with any degree of reliability.

These types of fundamental issues need to be discussed and resolved successfully before the concepts of sustainable development can be holistically conceived and then implemented. Unfortunately, while much lip-service is given to sustainable development at present, most of the published works on this subject are either somewhat general, or a continuation of earlier 'business as usual' undertakings that have only been given the latest trendy label of 'sustainable development'. If sustainable development is to become a reality, national and international organizations will have to address many real and complex questions, which they have not done so far in any measurable and meaningful fashion; nor are there any signs that they are likely to do so in the foreseeable future. If not, and unless the current rhetoric can be translated effectively into operational reality, sustainable development will remain a trendy and fashionable paradigm for some years, and then gradually fade away like the earlier concept of ecodevelopment. It would then be replaced by a new and more fashionable paradigm.

It is indeed a curious irony that we have spent the last two decades discussing and promoting *what is not* sustainable development rather than what it is. We have concentrated almost exclusively on those aspects which cannot be sustained. By trying to define sustainable development in terms of only those factors that could contribute to unsustainability, clearly we have focused our entire attention only on one part of the equation, and have completely ignored the other, which could possibly be as important as the negative aspects, if not more so. Sustainable development, as it is analysed at present, focuses *only on what*

it is not, and then attempts to ameliorate the potential negative effects. This issue is thus not approached holistically. Consideration should first be given to what is sustainable development, and then proceed to consider what is *unsustainable*. Instead, we are hung up exclusively on how to reduce the negative aspects of sustainable development. It is worth noting, even though it is axiomatic, that any significant development project would have many economic, social, and environmental impacts. However, the word 'impact' in the existing development context has primarily, and almost exclusively, negative connotations. While any large development project, irrespective of its nature, will have both positive and negative impacts, current analyses of environmental and social impacts generally consider *only* adverse impacts and their potential amelioration.

To a certain extent this overwhelming emphasis on the negative aspect of all major development projects can be explained by historical developments. During the 1970s and earlier, project analyses primarily consisted of technical and economic considerations: environmental and social issues were mostly not seriously analysed or considered. Because of this general neglect, and some very visible but adverse impacts of certain development projects on the society and the environment, a movement to promote environmental conservation gradually developed in the West. Within a very short period, environmental protection became an important item on the political agenda in the early 1970s in some developed countries, primarily through the activities of environmental pressure groups and NGOs.

Not surprisingly, this negative attitude and perception of environmental protection was reflected in the United Nations Conference on the Human Environment, held in Stockholm in June 1972. A retrospective analysis of the Stockholm Action Plan, as approved by all the UN member countries, clearly indicates its negative approach to environmental management: stop all pollution stemming from any development activity, stop exhausting non-renewable resources, and stop using renewable resources faster than their generation. The emphasis thus was primarily on

controlling the adverse impacts of development—positive aspects did not receive much attention.

Accordingly, environmental impact analysis, which was developed and made mandatory in many developed countries during this era, was exclusively concerned with the identification and amelioration of negative impacts of development projects only; positive impacts were mostly ignored. Because of this inauspicious and incorrect beginning, the term 'impact' has continued to have almost exclusively negative connotations. Sadly, this unfortunate situation has not changed over the past two decades.

Concluding Remarks

It is clear that the development profession is facing a critical problem, of a magnitude and complexity not seen earlier. The development profession, now really has two stark choices: to carry on as before with a 'business as usual' attitude with only some marginally incremental changes, and thus endow our future generations with a legacy of suboptimal development process and management practices, or to continue in earnest an accelerated effort to identify and implement development processes that can successfully meet the expectations of humankind as a whole. Rhetoric and exhortations for sustainable development are no longer enough: paradigms and concepts must be implementable to solve global problems, both cost-effectively and within a reasonable time frame. The net result must be to improve the quality of life of the people of the world as a whole. Fashionable though the current paradigm of sustainable development may be, its usefulness, irrespective of its conceptual attraction and widespread acceptance, can only be marginal unless it can be used operationally and effectively in the real world. The concept of sustainable development must be critically appraised and reassessed. It may then be considered necessary to modify appropriately, or even jettison, the concept, unless it can be

shown that it works in terms of its application to solve complex problems in the real world. We no longer have any soft options left, only hard choices. To quote George Bernard Shaw:

You see what is and ask, 'Why?'
I see what could be and ask 'Why not?'

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Actors, Problem Perceptions, Strategies for Sustainable Development. Water Policy in Relation to Paradigms, Ideologies, and Institutions

Peter Söderbaum

Introduction

Humanity faces a number of environmental and development problems. Climate change, depletion of the ozone layer, loss of biodiversity, chemical pollution, and degradation of water quality are some examples on the environmental side. Individuals in some countries or at some places suffer more than others as a result of the mentioned and other development problems. Poverty is a major issue and the links between environmental issues and poverty are increasingly discussed (Department for International Development UK et al. 2002). Like welfare, poverty, or 'capability deprivation' (Sen 1999) can be understood in multidimensional terms and not reduced to monetary income. While some efforts have been successful in improving human conditions and the state of the environment, the tendency in other areas is rather that things are getting worse

*I have benefited from comments by Asit Biswas and Cecilia Tortajada, both from the Third World Centre for Water Management, Atizapan, Mexico, to an earlier draft of this paper.

(Commission of the European Communities 2001; UNEP 2002).

Why is this so? And what can be done about it? The first UN Conference on Environment and Development was arranged in 1972 in Stockholm and other such meetings have followed. Among UN initiatives that have focused on environmental issues in relation to development, the Rio de Janeiro Conference in 1992 was at least a partial success, with many national and international leading actors involved. In 2002, a 'Stockholm thirty-years on' was organized in an effort to contribute to the Johannesburg summit, held the same year.

In the case of water policy, when summarizing the activities and recommendations of the Stockholm Water Symposium over the years, it has been argued that there is still a need for 'major shifts in thinking' (Falkenmark 2000). The symposium of 2001 pointed to a similar direction (Tortajada et al. 2002; Water Science & Technology 2002). Another result of international co-operative activities is the Ministerial Declaration of a Conference on Freshwater in Bonn (International Conference on Freshwater 2001). Water was seen to be a 'Key to Sustainable Development' and a number of recommendations in terms of governance, capacity building, participation, protection of ecosystems, etc., were made.

Recommendations of the kind mentioned are all meaningful but some actors at the above mentioned Stockholm + 30 conference argued that what is needed is 'action' rather than 'words' or rhetoric (Ministry of the Environment 2002). They referred to a gap between what has been agreed and what has been implemented. Implementing some part of what has already been decided would then be a good strategy. While this way of reasoning should be taken seriously, some fundamental issues may not yet have been sufficiently addressed. Some words and arguments are still missing in the development dialogue. In this sense, one should try to identify areas and actors so far protected from serious dialogue and action. For such 'protected zones' there is a need for more rather than less words and analysis.

Neoclassical Economics as a Protected Zone in the Development Dialogue

As an example, establishment actors tend to avoid a serious debate about the role of economics as a theoretical perspective and paradigm in relation to development. However, mainstream neoclassical economics remains the most important theoretical perspective or paradigm influencing the mindsets of influential actors in present societies. A majority of establishment actors seem to believe that development and welfare can be reduced to economic growth in terms of gross domestic product (GDP), monetary profits for business companies, and so on. Not even the seriousness of present environmental and development problems has led to a questioning of the monopoly of neoclassical economics in most establishment circles. Instead, the tendency is to listen to neoclassical economists and their story about possible marginal failures. As is well known, neoclassical economists connect environmental problems with the possibilities of 'market failure' and 'government failure'. Market transactions may influence third parties negatively and in such cases 'externalities should be internalized' and the 'polluter pays principle' applied. Governments may subsidize activities that degrade natural resources and in such cases subsidies should be removed. The distinction between 'failure' and 'success' is built on the conventional neoclassical idea of efficiency as in Cost-Benefit Analysis, for instance.

Proposals to internalize externalities or remove subsidies with harmful impacts on the environment are all worthy of consideration and the problem is rather that they are too seldom applied in practice. This may in turn be explained by other more fundamental 'failures' in relation to some vision of a healthy development. Most of these potential failures are outside the scope of neoclassical analysis, for example paradigm failure; ideology failure; institutional failure; failure of organizations as actors; and failure of individuals as actors.

Something may be wrong with the kind of paradigms, ideologies, or institutional arrangements that have dominated for some time. 'Paradigm' here refers to conceptual and theoretical perspective, and neoclassical economics exemplifies a paradigm. Institutional theory is another paradigm with origin in economics but nowadays influential in many disciplines, such as economics, economic history, sociology, and business management. While neoclassical economics is useful for some purposes, the near monopoly position of neoclassical economics at university departments of economics in all parts of the world is a considerable problem and an example of 'paradigm failure'. Here pluralism is the key to 'success' for reasons that will be explained.

'Ideology' is used in a rather broad sense to refer to ideas about means and ends or 'means-ends philosophy'. 'Ideology' or 'ideological orientation' is therefore not limited to established political ideologies such as socialism or liberalism but includes various versions of 'ecologism' or 'Green' ideology. It is assumed that an individual is guided by her 'ideological orientation', i.e. patterns of thought and values, and that ideology therefore is not exclusively a collective phenomenon. Neoclassical economics, while being science in some sense, at the same time qualifies as a 'means-ends philosophy' and thereby ideology. In fact, neoclassical economics is more precise as ideology than most established political ideologies mentioned. Neoclassical theory recommends and even imposes a view of human beings as consumers at the expense of all other roles (citizens, professionals, parents, etc.), a view of organizations as firms or business companies at the expense of all other groups (churches, universities, civil society organizations), a specific view of markets in terms of supply and demand while other ideas of markets are not considered or play a negligible role, specific ideas of economics, efficiency, valuation, decision making, social change, and so on. Together these elements form not only a kind of microeconomics but at the same time a very specific ideology or ideological orientation.

Terms such as 'consumerism', 'corporatism', and 'economism' suggest that some actors in society interpret neoclassical economics

as highly ideological. Valuation is dealt within monetary terms as part of the neoclassical efficiency concept, implying that there is a kind of 'monetary reductionism'. Neoclassical economists make reference to 'correct' prices as part of Cost-Benefit Analysis and claim to be able to point out the 'best' or 'optimal' alternative for society from a resource allocation point of view. Proponents of other ideologies are seldom as precise in their reasoning and conclusions. Institutional economics as presented here is for the same reasons science as well as ideology but tries to deal with this 'fact' rather than deny it.

Neoclassical economics is part of positivism as a theory of science and it is argued that objectivity and value neutrality is possible. The neoclassical project from the 1870s onwards has in fact been an attempt to make economics a 'pure' science. Economics is regarded as separate and separable from politics. According to this view, science and university education could not be part of the development problems faced. Researchers and teachers at universities study various phenomena in a value-neutral way. They are looking for 'truth' and nothing else. Nobody can blame them for the development problems. Rather, politicians and perhaps business actors are responsible for such situations. This view tends to dominate in spite of all that has happened in the theory of sciences in terms of a new interest in the subjective aspects of research and human behaviour. Hermeneutics, narrative analysis (Porter Abbott 2002), and social constructivism are examples of this.

Institutional economists, such as Gunnar Myrdal, have questioned the neoclassical position:

Valuations are always with us. Disinterested research there has never been and can never be. Prior to answers there must be questions. There can be no view except from a viewpoint. In the questions raised and the viewpoint chosen, valuations are implied.

Our valuations determine our approaches to a problem, the definition of concepts, the choice of models, the selection of observations, the presentations of conclusions—in fact the whole pursuit of a study from beginning to end.

(Myrdal 1978, pp. 778–9)

Myrdal furthermore speaks of the necessity therefore 'in any scientific undertaking of stating clearly and explicitly, the value principles which are instrumental'. Consciousness about value issues—or in the present terminology—about how ideology might affect a study or lecture then becomes a quality criterion of good research and education.

The reasons to replace neoclassical monopoly with pluralism can now be better understood. If each paradigm or scientific perspective is coloured by values and ideology, then limiting research and education to one paradigm at a university department is not compatible with normal ideas about democracy. Science and universities should not take a stand for one particular ideology, such as the neoclassical 'market and economic growth' ideology, at the expense of all other ideological options. Science should rather illuminate an issue in relation to various possibly relevant ideological orientations. Ezra Mishan (1971) has argued that the use of cost-benefit analysis for decision-making in society should be conditioned upon a consensus among citizens about the rules of valuation built into this analysis. According to Mishan, the polarized debate over environmental issues implies that this consensus no longer exists (Mishan 1980). A Norwegian economist similarly identifies the ideology of cost-benefit analysis as being close to economic growth in GDP terms (Johansen 1977). Such an ideological commitment is acceptable for some but not for others.

The case of neoclassical economics suggests that the mentioned failures cannot be seen in isolation. Paradigm is combined with ideology and both are connected with institutions. Perhaps one should speak of a cluster with elements of paradigm, ideology, and institutions in competition with other clusters of paradigm-ideology-institutions. Neoclassical economics and neo-liberalism are compatible in many ways and with the present growth-oriented market economy as the main institutional arrangement. Proponents of this 'cluster' systematically avoid many issues that are seen here as fundamental. 'Market failure' and 'government

failure' as recognized by neoclassical economists will here be regarded as only a subset of possible 'institutional failures'. As part of a broader view, the 'firm' or business corporation as institution, while celebrated as an 'engine of growth', may not in all respects be well adapted to present needs. The size of business corporations is also an issue, according to David Korten (2001) who questions the growth of transnational companies in power terms and thereby in relation to democracy.

Also organizations other than business companies, for instance civil society organizations, may fail. They may—as much as many other establishment actors—avoid an open discussion about paradigms in economics and ideology. Individuals may fail in professional and other roles and the total lifestyles of individuals can be problematic from an environmental point of view. Fortunately, there are also examples of 'success' and 'good practice' in the above respects.

Implicit in the previous arguments is that sustainable development can be seen as an ideological orientation in competition with other ideological orientations. If the conceptual framework of neoclassical economics is not helpful in guiding us towards sustainable development, then this becomes a reason to refer to 'paradigm failure'. On the basis of a specific definition of sustainable development, it may furthermore be argued that traditional ideologies such as liberalism and socialism have failed to the extent that they have not yet sufficiently 'internalized' values connected with sustainable development.

Sustainable Development

Any distinction between 'success' and 'failure' presupposes a specific value or ideological orientation. Although not completely clear, 'sustainable development', as defined by the Brundtland Commission (World Commission on Environment and Development 1987), and as further articulated during the Rio process and preparations for the Johannesburg conference, is such

an ideological orientation. Implicit in it is a distinction between sustainable development and unsustainable development. A considerable part of activities in Sweden or any other country now follow an unsustainable development path and the challenge ahead is to bring an increasing share of activities closer to a sustainable development path or trajectory.

Building on the Brundtland Commission, it is here suggested that sustainable development is:

- Understood and measured in multidimensional terms where cultural and social dimensions in a broad sense, physical and ecological dimensions of various kinds, and financial or monetary dimensions of various kinds are considered;
- Built on ethical principles where not only present generations in the 'home country' but also present generations in other countries as well as future generations at home and globally are involved, and ethics in relation to non-human forms of life is also considered;
- Built on a precautionary principle, for instance in the sense that there is an ambition to avoid irreversible damage to people and ecosystems even in cases where such negative impacts are uncertain; and
- Built on normal ideas about democracy, such as participation and open access to information.

Non-degradation of the state of the environment or of the natural resource base is a primary condition for sustainable development in broader social and monetary dimensions to come true. As an example, focus can be on non-degradation of the ozone layer and other parts of the atmosphere and hydrosphere that are essential for life on earth. Non-degradation can similarly be an ambition for parts of the built environment and cultural heritage in various parts of the world. But also in relation to the preservation of, say, old buildings, there are difficult ethical and ideological issues involved. Building a new infrastructure such as a dam for electricity and other purposes or a highway for

	Present Generations	Future Generations
'Home region'	X	X
Other regions	X	X

Figure 4.1: A Narrow and a More Inclusive Idea of Ethical Considerations

transportation is normally at the expense of ecosystem services and other functional aspects.

When considering planning options for a specific region from an anthropocentric point of view, ethical imperatives should include relationships between the present and future generations in the same region, between the present generation in the home region and present generations outside the home region, and finally between the present generation in the home region and future generation outside the home region (see Figure 4.1). A focus on a region or river basin should be part of a broader perspective in time and space.¹

The democracy aspect of sustainable development, too, needs to be elaborated upon. Agenda 21, as one of the agreements from the Rio conference, emphasizes local democracy and mobilization of civil society as leading principles. Democracy starts ideally from such a local level with as many persons as possible involved in an interactive learning process. All concerned should have access to essential information and, in addition to dialogue and co-operation, there should be a fair competition between various ideas about a desirable future in local and global terms. Democracy means pluralism and recognition that there are

¹ An early attempt to formulate ecological imperatives for public policy in these terms can be found in Söderbaum 1982. The precautionary principle is addressed in Harremoës et al. 2002.

different ideological orientations in society. Groups that at any time hold ideological orientations that depart from the dominant ideology should be encouraged as long as their opinions and behaviour do not negate democracy itself. Democracy furthermore includes a mutual control aspect. Citizens and specific professional categories such as journalists should watch all kinds of activities and point to behaviour that depart from laws and established norms in society. Specific civil society organizations (so-called non-governmental organizations [NGOs]) may take a leading role in attempts to speed up moves towards a sustainable development-path (Edwards et al. 2001).

For the moment, I will only make one observation. Sustainable development is essentially discussed as a vision for development at the societal or macro level. But in my understanding, to make sustainable development possible for society as a whole, individuals and organizations at the micro level too have to behave and act in a way that is compatible with sustainable development. This means, as an example, that business companies have to replace their one-dimensional focus on monetary profits, shareholder value, and bonus systems in monetary terms for Chief Executive Officers (CEOs) and board members with some multidimensional ideas of performance. Something has happened in positive terms, for instance the recent debate about social responsibility of business and the institution of environmental management systems. Some companies take a leading role in this new development but the main idea of business policy and practice is still one of more or less institutionalized 'monetary reductionism'.

If sustainable development is connected with moves towards a strengthened democracy as suggested above, then a lot remains to be done also at the level of organizations. As an example, small shareholders in big companies could hardly be happy with the present state of affairs in terms of possibilities for environmental or other policies of the company. And we are all stakeholders to the extent that the activities of a company influence the global environment.

Ecological Economics as a Conceptual Framework for Sustainable Development

Ecological economics can be defined as 'economics for sustainable development' or 'economics in the spirit of Agenda 21'. Ecological economics is built on a commitment to work for sustainable development as a basic value premise. It is based upon the assumption that no social science can claim value neutrality. While emphasizing economics and business management, the ecological economist is eager to learn about useful ideas for the purposes of sustainable development from any other discipline. Interdisciplinary approaches and pluralism, that is open-mindedness to alternative theoretical or methodological perspectives, are therefore further characteristics of ecological economics.

Assuming now that 'business as usual' in terms of paradigm, ideology, and institutional arrangements will not be enough to guide us towards sustainable development, then we need to consider ways of consciously modifying or changing our mental maps or conceptual frameworks. The idea is then one of presenting a conceptual framework that is understood by actors in various roles and positions as being more useful in furthering the idea of sustainable development. In what follows, I will point to concepts at the micro level that together form the embryo of a new microeconomics, which in turn opens the doors for new thinking at the macro level. In many ways these ideas are in line with the conceptual framework that is emerging as part of the previously indicated water policy discourse.

Political Economic Person and Political Economic Organization

Economic Man is the cornerstone of neoclassical economics. Economic Man is exclusively related to a market context and the individual is essentially seen as a consumer maximizing utility, subject to a monetary budget constraint. While it is difficult to question a statement that man maximizes utility in some sense, it is equally true that such a statement is rather empty and

uninteresting in relation to present environmental and development issues. Our interest is rather to find out how individuals differ with respect to their ideological orientations and lifestyles. To what extent is the ideological orientation of a specific individual compatible with the sustainable development ideas as previously defined? As an alternative more in line with institutional theory, a Political Economic Person (PEP) is proposed,² i.e. an individual with many roles (professional, consumer, citizen, parent, etc.) and relationships who is guided by a political or ideological orientation. The individual has an identity and is positioned in and interacts with a context that is social, institutional, physical (man-made), and ecological.

While self-interest is a dominant feature of Economic Man assumptions, it is here assumed that a healthy individual has a strong ego but that he or she at the same time is able to more or less internalize the interests of others. Amitai Etzioni speaks of an 'I & We Paradigm', (Etzioni 1988) according to which each individual is part of a number of 'we-categories'. As a person, I may be concerned about my family as one we-category, colleagues at my work-place as another we-category, and my home town, my region, and to some extent even the global society as other we-categories. Our Political Economic Person is a responsible actor who through networks and organizations can influence development processes at various levels.

In business management literature, alternatives to the neoclassical profit-maximizing firm have been available for some time, e.g. a 'stakeholder model' of organizations. Stakeholders are those concerned or those who have something 'at stake' in relation to a specific decision situation or the activities of an organization. Pointing to different categories of stakeholders such as shareholders, customers, employees, board members, CEOs, people living in

² Political Economic Person and other parts of this alternative microeconomics is outlined in Söderbaum 1999 and 2000 and is discussed for instance by Jakubowski (1999, 2000). A concept that is close to PEP, Homo Politicus has been suggested by Faber et al. (2002).

the neighbourhood, etc., is already a step forward in admitting that some conflicts of interest are normally involved in decision-making about investment projects or operational activities. As part of presentations of the stakeholder model, there may still be a tendency to pack together all shareholders, all employees, etc., into homogenous categories even though we all know that not all shareholders (or all employees) have the same interests.

As a complementary model and a way of allowing for such differences between individuals as actors, the Political Economic Organization (PEO) is proposed. A PEO is composed of a number of individuals as PEPs, which means that the organization is regarded as 'polycentric', each individual being represented with her or his particular roles, relationships, and ideological orientation. In a business company or other organization that takes steps in a Green direction by becoming certified according to ISO 14001 and in other ways, some individuals take the lead and become 'environmental entrepreneurs' while others are followers.

While a 'firm', according to neoclassical theory, is presented as something separate and separable from other firms and from consumers, the present network approach suggests that the same individual is an actor within or in relation to more than one organization or network and that individuals as well as organizations may cooperate for specific purposes (e.g. the mentioned 'I & We Paradigm'). The actor (individual or organization) is embedded in various cooperative relationships and networks with other actors. Two organizations as actors may compete in relation to some activities (for example, technological development and market penetration) and cooperate in relation to others (for example lobbying activities in relation to regulatory entities, such as the European Union).

Concepts of Economics and Efficiency

Sustainable development as previously described is not a completely clear vision but it suggests certain directions for

development at the macro and micro levels. Ideas connected with sustainable development may more or less influence the ideological orientations of specific actors in government, business, and civil society. To the extent that sustainable development with its imperatives of democracy is taken seriously, a multidimensional and ideologically open idea of economics and efficiency will emerge. Monetary dimensions will still be important in our market economies but attempts to reduce non-monetary impacts to their alleged monetary equivalents will lose in terms of relevance and legitimacy. In addition to the distinction between monetary and non-monetary impacts, a distinction is made between variables expressed as flows (referring to periods of time) and as positions or states (referring to points in time). This is illustrated in Figure 4.2.

Among examples of monetary flows (category I in Figure 4.2), GDP, the turnover and profits of a business company, and the salary of an employee can be mentioned. The assets and liabilities in monetary terms of a business company at the beginning or end of an accounting period exemplify monetary positions (category II). The discharge of a pollutant such as mercury to a nearby lake is an example of a non-monetary flow (category III) while the content of mercury in fish (as measured in ppm, parts per million) caught in the lake at a specific place and point in time is a non-monetary position (category IV). All four categories of impacts should be kept separate in economic analysis. In relation to sustainable development, non-monetary variables play a crucial role and especially parameters in terms of positions or

	Flow (Referring to a Period of Time)	Position (Referring to a Point in Time)
Monetary	I	II
Non-monetary	III	IV

Figure 4.2: Classification of Variables in Measuring Resources and Impacts for Purposes of Economic Analysis

states are essential for judgements about changes in welfare. How is the stock of fish of various species changing in a lake from one point in time to another? What happens to groundwater quality over time at a place? Such series of positions referring to relevant objects of description will tell us a lot about changes in the state of the environment, and changes in the health of human beings or of ecosystems. In this part our argument is in line with the focus on the 'state of the world' in the annual reports by the Worldwatch Institute (see, for example, Brown 2001).

Cost-Benefit Analysis with its one-dimensional and ideologically closed ideas of values and efficiency at the societal level will no longer be accepted. 'Value' is regarded as equal to 'monetary value' and the analysis is essentially one in terms of monetary flows (category I). From the point of view of democracy, the scepticism in relation to Cost-Benefit Analysis expressed by the World Commission on Dams (WCD 2000) represents an important step forward. In a democracy, scientists (economists) have no right to dictate correct values for purposes of societal resource allocation (Söderbaum 2001a). As an alternative to this 'monetary reductionism', the purpose should instead be one of illuminating an issue for actors of different ideological orientations. Here approaches such as Positional Analysis in terms of multidimensional impact profiles for alternatives considered and a 'matching' idea of decision-making is an option (Söderbaum 2000). The analyst who takes democracy seriously has to consider more than one ideological orientation and formulate his conclusions accordingly.

The ambition of neoclassical economists is to include as many impacts as possible in their monetary analysis. David Pearce, for instance, refers to 'Total Economic Value', which includes 'Actual Use Value', 'Option Value', and 'Existence Value' (Pearce et al. 1989, p. 62). Others prefer the term 'capital' and speak of 'total capital' including 'man-made capital', 'social capital', and 'natural capital'. Some degradation of natural capital can then be made legitimate by increases in other kinds of capital. According to this philosophy everything can be 'traded' against everything else.

The neoclassical conjurer is able to reduce multidimensional complexity to one-dimensional simplicity. Assuming that this was possible there is still the issue of choosing the prices at which trade takes place. Again, there is no acceptable solution for those of us who take democracy seriously.

Views of Market and Non-market Relationships

In any attempt to outline a microeconomics more in line with Sustainable Development, our ideas about markets also have to be involved (Figure 4.3). Here neoclassical economists stick to mechanistic ideas about supply and demand for specific commodities. This model focuses on prices in monetary terms and quantities exchanged and it certainly has some explanatory value. But since the efficiency of markets in allocating resources is an open issue as previously discussed, the tendency to extend monetary business and market thinking to new areas has to be scrutinized carefully. Will we get a better world by, for instance, exchanging 'water use rights' (e.g. Simpson and Ringskog 1997) or 'pollution rights' in markets?

Second, for that part of activities where markets can play a positive role, other models of market exchange than the supply-demand model have to be developed and considered. A market can be regarded as a multifaceted relationship between market

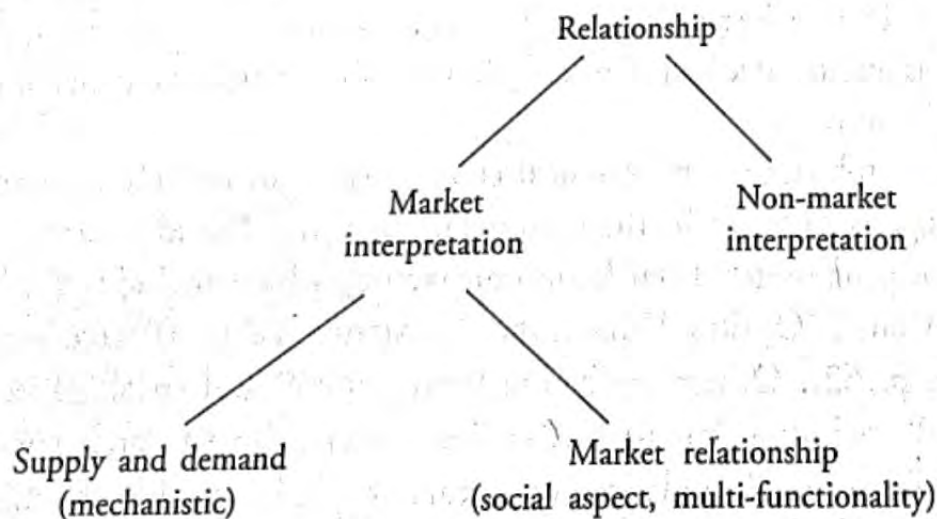


Figure 4.3: Relationships in Market or Non-market Terms

actors where social aspects and history plays a role. As an example, business-to-business market relationships are often better understood if one focuses on market actors (as Political Economic Persons or Political Economic Organizations) and how they relate to each other (commitments, trust, etc.) rather than exclusively on commodities sold or bought at specific prices (Ford 1990). As part of such social relations, the power positions and ideological or ethical orientation of each market actor become relevant. Prices are judged in relation to the ideological orientation of each market actor in terms of their 'fairness' and 'reasonableness', for instance, and not just as a matter of maximization of self-interest by atomistic actors.

The recent debate about the World Trade Organization (WTO) furthermore suggests that there is a 'one-commodity fallacy' in neoclassical microeconomics as well as neoclassical international trade theory. Trade in a national or international context is about much more than quality and quantity of product with connected prices. In the case of agriculture, it has been recognized as part of WTO negotiations that the welfare and culture of individuals and collectivities are influenced in a number of ways, local landscapes and other aspects of natural resources included. 'Multi-functionality' has emerged as a key concept in understanding this complexity (OECD 2000). Others point to a 'public goods' aspect of almost all activities and exchange relationships (Kaul et al. 1999). In my judgement, traditional international economics textbooks will have to be rewritten to become relevant to the world in which we live. But I also recognize the ideological character of present texts and therefore the reluctance in some circles to open the doors for new thinking.

Actors, Agendas, and Arenas for Social and Institutional Change Processes

Institutional theory is helpful in understanding social change processes. An actor-agenda-arena approach based on PEP-

assumptions points to the importance of ideological orientation and the theoretical perspectives or conceptual frameworks used in interpreting various phenomena. Any attempt to get closer to a sustainable development path will involve changes in conceptual framework, language, and connected interpretations. This can be illustrated by reference to the example of an increased number of business companies being certified according to ISO 14001. A business company is itself an 'institution' and for a long time has been interpreted by many as a 'profit-maximizing organization'. Neoclassical economics advocates such an interpretation, and business management literature and journalism tend to point in the same direction. At some stage, as a result of the initiatives of some actors connected with business, environmental management systems (EMS) such as ISO 14001 did appear on the scene as an 'institution' in itself. An increasing number of individuals understand the meaning of an EMS, implying that the institution is strengthened. But the fact that some companies are certified according to ISO 14001 may in turn change our understanding of the business companies being certified. A 'certified business company' is interpreted as being different from companies that are not certified. The institution of 'business company' is then understood in broader terms. It is not only a matter of monetary profits but also of environmental performance. One may speak of a competition between the 'old' interpretation and a newer one.

Three aspects of such institutional change processes are relevant, namely interpretation, legitimacy, and manifestation. An 'institution' becomes strengthened or more established to the extent that it becomes manifested in symbols or concrete behaviour among an increasing number of actors. 'Institutionalization' or 'deinstitutionalization' may take place through all these three processes. Institutionalization here refers to an institution that becomes strengthened and more established among actors, while deinstitutionalization refers to a situation where an institution over time is losing its support and finally may become out-competed by other institutions.

As another example, a specific version of ecological economics can become more institutionalized over time through manifestations in terms of international and regional organizations, journals, articles, conferences, educational programmes, professorships, and so on. Ecological economists contribute to public debate on environmental and development issues and each such contribution is part of a broader evolutionary process where the policies and actions of various actors are shaped.

The present actor–agenda–arena approach³ can be characterized as having the following salient points:

- Political Economic Person assumptions
- Emphasis on relationships between actors who, with their specific ideological orientation or Agenda, appear on specific Arenas
- Emphasis on the conceptual and interpretative aspect of 'ideological orientation'
- Dialogue, search for consensus, conflict resolution, and other aspects of interactive learning
- 'Institution' and 'institutional change' are defined in interpretative, legitimacy, and manifestation terms
- An assumption of heterogeneity of 'ideological orientation' in each conventionally defined actor category (farmers, business leaders, university scholars, etc.)
- An assumption that actors search for commonality in ideological terms by building networks and alliances within and across conventionally defined actor categories.

Only the heterogeneity assumption will be further explained here. In neoclassical theory, more precisely public choice theory, an assumption of homogeneity is made concerning farmers as a category, bureaucrats as a category, etc. This positivistic theory is of some interest but our more normative and interpretative approach suggests that differences within each category (farmers, bureaucrats, or business-leaders) too are relevant. Some farmers

³ See also Söderbaum 2001b.

(business leaders) are concerned about environmental issues while others are not. Actors with a similar ideological orientation but belonging—in conventional terms—to different actor categories may work together as part of a common sustainable development strategy.

'Ecological Modernization' is not Enough

All kinds of measures to improve environmental and social performance at different levels should be encouraged and small changes in the direction of a sustainable society could be part of more radical transformation processes. But the obstacles in front of us should not be underestimated. Here I will make an admittedly simplified distinction between three ideological orientations—with connected response patterns—in relation to environment and development:

- 'Business as usual': According to this view, statements about the existence of environmental and social problems are generally exaggerated. To the extent that such problems exist, they can easily be handled within the scope of a continued emphasis on economic growth, technological innovations, and global market penetration. No change in dominant paradigm, ideology, or institutional framework is needed.

Response pattern: 'If we do not speak about the problems, then perhaps they do not exist.' 'To the extent that they exist, they will be taken care of by the in-built mechanisms of our present market economy.' 'Public Relations campaigns and lobbying will make people focus on traditional parameters and forget about environmental problems.'

- 'Ecological modernization' (e.g. Hajer 1995): Humanity faces environmental and social problems of a serious and, in some respects, new kind. In all organizations, management systems have to be modified to allow for this new situation. While action is needed at all levels, from the individual,

organization, local government, and national government to the global level, presently dominating paradigms, ideologies, and institutions need only be modified and 'modernized' to allow for the new situation.

Response pattern: 'Yes, there are problems but don't worry, things are under control.' 'The social responsibility of business will be reconsidered.' 'Voluntary agreements, environmental management systems, environmental labelling, etc. will do it.'

- 'Major shifts in paradigm, ideology, and institutional framework': Modifying paradigm, ideology, and institutional framework may get us closer to a sustainable development path but this will not be enough. Sustainable development as an ideological orientation has to be taken seriously and a 'major shift in thinking' is indispensable.

Response pattern: 'We need other conceptual frameworks in economics as part of a pluralistic and democratic philosophy.' 'Competition is preferred to the global neoclassical monopoly or cartel at university Departments of Economics.' 'Individuals and organizations alike need to reconsider their ideas of progress as actors privately, professionally, and in society.'

An example of the 'business as usual' attitude is an advertising campaign by the Confederation of Swedish Enterprise (May 2002), in which welfare is exclusively connected with economic growth in GDP terms and where the main concern is Sweden's position when compared with other countries in a 'welfare-league' as measured in GDP terms. Not one word is said about the environment or broader ideas about welfare such as sustainable development. This is not to say that the Confederation of Swedish Enterprise completely neglects the debate about sustainable development—they have in fact recently employed a person to take care of these issues—but to judge from the confederation's advertising, web site etc., sustainable development is not a big issue for them.

The ideological orientation of 'ecological modernization' is described as follows:

Ecological modernization . . . uses the language of business and conceptualises environmental pollution as a matter of inefficiency, while operating within the boundaries of cost-effectiveness and administrative efficiency. (Hajer 1995, p. 31)

Ecological modernization explicitly avoids addressing basic social contradictions. [It] does not call for any structural change but is, in this respect, basically a modernist and technocratic approach to the environment that suggests that there is a techno-institutional fix for the present problems. (Ibid., p. 32)

In the most general terms, ecological modernization can be defined as the discourse that recognizes the structural character of the environmental problematique but none the less assumes that existing political, economic, and social institutions can internalise the care for the environment. (Ibid., p. 25)

This ideological orientation is exemplified by the World Business Council for Sustainable Development (WBCSD), which is a coalition of 140 international companies working for economic growth and sustainable development. While 'sustainable growth' in GDP terms seems to be a top priority, there are also some openings in publications from this organization:

A growing number of business leaders realize that to achieve market success they must honor a changing array of environmental and social responsibilities . . . As business leaders, we understand and respect the workings of the market. But we know that the market is not some ruling entity separate from human activities. (WBCSD 1997, p. 56)

The media and consumers are becoming too sophisticated to allow companies to pretend; they expect real corporate action. (Ibid., p. 51)

Proponents of our third ideological orientation, 'major shifts in paradigm, ideology, and institutional framework', can be found in many professional and other categories but are perhaps best associated with civil society organizations, for instance the French Attac movement with actors such as Susanne George (2000) and René Passet (2000). George and Passet both point to neo-liberalism and neoclassical economics as part of the problem, as does David Korten in his book *When Corporations Rule the World* (2001). In relation to water issues, feminist perspectives may add to our understanding (Shiva 2002; Tortajada 2000). Fiction

writers can provide a different conceptual and ideological perspective (Roy 2001) and thereby contribute to our understanding of issues such as the impacts of dam building. As exemplified by Jeremy Legget's study of climate change negotiations (1999), persons who combine scientific knowledge with journalism can similarly make the behaviour of various actors on the local or international scenes more visible.

While there is still some room for the third more radical interpretation of sustainable development, actors with 'business as usual' or 'ecological modernization' attitudes tend to dominate the scene these days. Transnational companies and politicians with a neo-liberal orientation have been successful in defining the problems and influencing the development dialogue. There is even a tendency towards the replacement of traditional ideas of business being regulated by national governments and through international agreements between national governments by a situation where business is controlling and regulating national governments. The Transatlantic Business Dialogue (TABD) is an example of this trend. Transnational corporations in the US and in the European Union claim specific rights to accept or not accept political proposals that concern them and also have specific channels to the US government and administration and the Commission of the European Union, respectively.

More power to business organizations that are still essentially governed by monetary principles will neither give us a sustainable society at the regional nor at the global level, nor is it in the interest of business itself. A global world ruled by the international business community is for many of us not much better than the Soviet-type planned economies of the past. Democracy is based on some division of power and does not permit any coalition of organizations to take over leadership and control. Instances of failure and mismanagement by 'big business' in the recent past have led to reactions by civil society in different parts of the world. It is quite probable that at some stage more power to business will undermine the power of business itself.

It is not my intention here to say that business is the only culprit or to make general statements about business actors. Rather, I would like to return to the previous actor-agenda-arena framework and its heterogeneity assumption. Proponents of a radical interpretation of sustainable development can be found in any category of actors and hopefully also among professionals in business. Similarly, universities and professionals as actors within universities differ in their ideological orientations. And a lot remains to be done at universities before one can claim that environmental and development issues are taken seriously. The 'business as usual' attitude is as common in university circles as elsewhere.

Integration of Policy Areas

One theme in this essay has been the need for broader approaches to development policy. In the case of water, the 'international water community' certainly has taken important steps in these directions. It is also recognized that problems related to water quality and availability are linked with all kinds of activities and sectors in society. Water policy has to be 'integrated' with agricultural policy, industrial policy, etc., to reduce pollution from various activities and thereby improve water quality. In this sense, to solve water problems, there is a need for a 'non-water policy' (Figure 4.4). A large number of chemicals such as

	Water	Non-water
'Home region'	X	X
Other regions	X	X

Figure 4.4: A Narrow and a More Inclusive View of Water Policy

synthetic hormones, antibiotics, and pesticides (e.g. Wolfe 2002) continue to pollute surface water and groundwater in different parts of the world in the name of rationality and efficiency. Could these problems be handled at all within the scope of a traditional conceptual framework and development ideology? An increasing number of actors furthermore understand that there is a global aspect of local activities. But at the same time, a lot remains to be done in practical terms. And practice should not be limited to sewage treatment but should include far-reaching preventive measures.

This means that actors at local and national levels need to engage in formulating their 'global water and non-water policies' (Figure 4.4), which in turn points to the need for cooperation in different forms and for international agreements (Porter et al. 2000). While there is always a global aspect of water policy, it is equally true that water policy and water management begin at the local or regional level. A 'regional' level may refer to administrative borders or to a river basin or catchment area. For river basins, sustainable development can be a guiding principle as exemplified by a study for the Ganges–Brahmaputra–Meghna Region (Ahmad et al. 2001).

Recommendations for Johannesburg and Beyond

Strengthening democracy. Social change processes reflect an interplay and, at the same time, a power game between individuals and various collective entities. Listening to many voices and learning from many sources will not only strengthen democracy but also in most cases lead to better problem-solving. Problems related to environment and development are extremely complex and many viewpoints and perspectives should therefore be considered. In the case of water policy and management, voices from civil society, could be important.

University research and education should be seen as part of politics and democracy. Social science—and economics in particular—

cannot be separated from values and ideology: we are all—scholars and other actors—Political Economic Persons in the sense indicated above. Among the criteria for being 'scientific' is the criterion that one openly discusses how values are involved in a study. According to Amartya Sen (1987), economics has for some time followed an 'engineering tradition' rather than its 'ethical tradition' and it is now time to reverse this trend. The economic growth debate over the years (Friman 2002) or the debate about international trade theory and the WTO is not just a matter of truth in some scientific sense but as much a matter of ideology. Such debates cannot be left to economists whose main interest too often seems to be to protect their neoclassical paradigm. Other professionals and politicians have to participate in this dialogue rather than act as if the expertise of university scholars also includes ideology. It is a mistake to believe that science can easily be separated from politics. The concept of research policy should include a possibility for intervention against ideological and scientific monopolies at universities.

In the case of social sciences, the concept of paradigm-shift should be replaced by paradigm-coexistence. Since each paradigm is coloured by values and ideology, only pluralism can be accepted in a democratic society. This means that different theoretical perspectives connected with different ideological orientations will exist side by side. 'Paradigm-coexistence' rather than 'paradigm-shift' in the Kuhnian sense (Kuhn 1970) will be the natural condition. There may still be competition between advocates of various paradigms and as a result of this, 'change in dominant paradigm'.

It may be added here that at least two different perspectives are represented in the International Society for Ecological Economics, with its journal *Ecological Economics*. One is more a part of an 'interface' and 'engineering' tradition with Robert Costanza, Charles Perrings, and Carl Folke as representatives while another is in favour of a more radical interpretation of sustainable development. The Costanza group leaves neoclassical economics and ecology essentially intact and focuses on

modifications to allow for concepts such as ecosystem services and ecosystem resilience (Folke et al. 2002). Ecosystem services are still measured in monetary terms as in neoclassical economics. Richard Norgaard (1989) and the present author can be mentioned as representatives of the other school that is more critical of neoclassical economics and emphasizes a need for pluralism. An interesting observation is that the European Association for Ecological Economics appears to be more radical than its US counterpart.

Further research is recommended in the area of actors, agendas, and arenas. In the introduction, reference was made to the Stockholm + 30 conference. While some of the Swedish contributions to the Johannesburg Summit emphasized efforts to understand 'decoupling' (of environmental problems from economic growth) (Azar et al. 2002) or resilience as mentioned above, i.e. rather impersonal mechanisms, one speaker, Mark Nerfin, as part of a panel discussion focused on actors and the possibility of self-assessment. In addition to other efforts, it is a good idea, he stated, to focus on your own person and organization by reasoning in terms of accountability and similar concepts. Is your lifestyle and the activities of your organization compatible with sustainable development? It is easy to point to the positive part—my university, for instance, being the first in Europe and perhaps internationally to be certified according to ISO 14001, or the undergraduate ecological economics programme that I am in charge of. However, the overall situation of the Mälardalen University still leaves a lot to be desired in this respect, as in other programmes we are still educating economists as if environmental and development problems do not exist or play a minor role.

Self-assessment is of course only part of the story. As students we can focus on other actors, their ideological orientation, roles and relationships, as well as institutional arrangements. Tape-recorded interviews with different actors related to an issue can facilitate self-reflection and sometimes dialogue and action. Here a 'responsibility trap' may be revealed in the sense that each actor tends to limit his or her responsibility as part of traditional ideas

about specialization. 'Environmental issues are outside my concerns and belong to the table of Mr X.' In this way one gets an indicator of how far the policy of 'integrating' various areas has reached in practice.

Another actor category to be approached is that of politicians. What efforts have been made to internalize sustainable development into traditional political ideologies such as liberalism or social democracy? Is 'business as usual' or 'ecological modernization' the best way to describe such attempts? Is there a willingness to reconsider some of the more fundamental premises of present policies?

Like other actors, we are, as scientists and teachers, part of a democratic society and have an important critical role in relation to sustainable development policies. Such a critical role may be more easily accepted if one recognizes that there is no apolitical science. Approaches to management and decision-making are important parts of possible contributions from research as is impact assessment. And in our respective roles, attempts to influence the political agenda by raising the more fundamental issues of paradigm, ideology, and institutions at various arenas are crucial. In fact, the present international consensus on sustainable development among a large number of actors leaves a lot of room for efforts of this kind.

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Rat Catching in Sustainable Development

Alexander Gillespie

Introduction

Sustainable development is a term with many connotations and a subject that has been written about extensively. My broad contention is that there are two parts to the concept of sustainable development: an ethical component¹ and a political² component. These two components make up the core of the debate about what sustainable development should mean. These components are not related to the specifics of what is, or is not, actually sustainable. That debate—ultimately one of environmental limits—is to be found in the specific issues at hand. For example, the environmental limit for sustainability is to be found in the chlorine loading in the ozone layer (the point at which the impact outweighs the absorption capacity), or the carbon loading in the atmosphere (the point at which the increase outweighs the ability of ecosystems to respond naturally), or the point when more fish are taken from a stock and the replenishment level begins to dramatically fall, etc. As such, the real bottom line of what is or is not sustainable is located in each individual arena.

¹ See Gillespie, A., 1997, *International Environmental Law, Policy and Ethics*, Oxford University Press, Oxford.

² See Gillespie, A., 2001, *The Illusion of Progress: Unsustainable Development in International Law and Policy*, Earthscan, London.

In terms of the overall philosophical debate about sustainable development, a different set of issues arises, which are not about specifics, but about deeper and wider background concerns. Against this background, it is important to realize that sustainable development, as an idea, is about the environmental, social, and economic bases of development, where the ideal is to synthesize each one of these into an overall package.

It has been contended that sustainable development is not a new idea, and that ultimately it adds little to the current problems facing humanity. In terms of the politics and ethics of sustainable development, I do not disagree. However, in terms of this debate, about the overall merits of the idea of sustainable development, the discounting view is mistaken and fails to understand the context from which the problem originates. This context shows how development with only an economic focus, firstly, failed the social side of the equation. Thereafter, development with only an economic and social focus failed the environmental side. As such, only now do we recognize that sustainable development, as a yardstick (it can never be anything more) is about three things: the environmental, social, and economic foundations of development. Each one has an independent standing and cannot be subsumed beneath the auspice of either of the other two. It was precisely because of attempts to do so that the earlier failures occurred.

At this point, an attempt will be made to address some important questions raised by others, which implicitly question some of the underlying themes of sustainable development. This questioning has been best done by Bjorn Lomborg in his *The Sceptical Environmentalist: Measuring the Real State of the World*.³ After consideration of possible topics relating to sustainable development, addressing some of the concerns raised in this book would be useful. This is necessary due to the large amount of publicity and support this text has attracted. In addition, the

³ Lomborg, B., 2001, *The Sceptical Environmentalist: Measuring the Real State of the World*, Cambridge University Press, Cambridge.

willingness, with which it has been swallowed by many, is not surprising given the outward appearance of well researched, comprehensive, and value-free text. The text is not all of these things. Rather, despite clearly good intentions and containing many conclusions, it is a text that implicitly threatens many of the key objectives of any kind of meaningful sustainable development. As such, it needs to be answered.

Scepticism

Who are the Sceptics?

Before examining the merits of the *Sceptical Environmentalist*, it is necessary to say a little about the application of philosophical terminology and tools in Lomborg's text. Philosophical scepticism questions our cognitive achievements, challenging our ability to obtain reliable knowledge. This is a very useful and worthwhile goal, for if we are to seek the truth in a responsible manner, we need to confront all challenges and difficulties in which no defensible answer is available. Scepticism can be used for good or bad purposes. It can be used to challenge or support the status quo, or future ideals of where society should be trying to reach. However, if recklessly utilized, it may cause more damage to an area than benefits. Lomborg utilizes his scepticism to defend the status quo, and challenge alternative visions of a future society presented by those who he attacks. In addition, due to the way that this debate has unfolded, the final result will probably reflect an overall damage to the debate about sustainable development, rather than getting any closer to the 'truth' on such matters.

Scepticism, as a philosophical school, emerged in Greek philosophy, and arguably, its earliest (and best) advocate was Socrates, who possessed the ability to question and undermine any dogmatic assertion that was put to him, insisting that wisdom consisted in awareness of the extent of one's own ignorance. The targets of Socrates were those who held dogmatic views, about

things they really knew nothing about.⁴ For this, Socrates was known as the rat-catcher of Athens, as he would attempt to expose those who professed to know more than they actually did.

As such, Socrates' wisdom was to show that it was to possess greater knowledge by acknowledging our uncertainties about what we do not know and acting accordingly, rather than argue mistakingly from what we do not know. This realisation has direct applicability for the *Sceptical Environmentalist*.

Scepticism and Ideals for the Future

Socrates' contribution to this debate did not end with his pointing out uncertainties of others, and leaving the matter there. Rather, he emphasized the importance of knowledge that was properly grounded or tethered, and explained how such knowledge was possible, suggesting that it was necessary for seeking philosophical excellence. As such, it was ultimately possible to gain some type of truth, and (for this instance) build society towards it. In many ways, this aspect becomes a debate about visions of what society should be trying to achieve in the future. A good example of this is provided by some of the more memorable debates between the Sceptics and the Stoics in antiquity. In a very rough explanation, the Stoics built many (but not all) of the foundations which ultimately evolved into what we now recognize as human rights. Their primary adversaries were the Sceptics, who argued against ideas such as 'universal' ideals in which all people were equal under one set of laws, due to problems of relativism.⁵ Of course, this debate continues 2000 years on in the human rights literature (as it has done through Western philosophy in general since the Renaissance) with the

⁴ See Annas, J. and Narnes, J. (eds), 1985, *The Modes of Scepticism: Ancient Texts and Modern Interpretations*, Cambridge University Press, Cambridge; Barnes, J., 1985, *The Toils of Scepticism*, Cambridge University Press, Cambridge.

⁵ Gillespie, A., 2001, 'The Roots of the Human Rights Debate in Antiquity', *Netherlands Journal of Human Rights*, (1999) vol. 17: 3, pp. 233-58.

language of cultural relativism and all of its implications bandied about.

The intention here is not to discuss the merits of the human rights debate, but only to point out that much of the sceptical tradition is to focus negatively on ideal models for society. Such discussions have large implications for the debate about sustainable development in general, as much of the vision of meaningful forms of sustainable development is about a better, idealized world, than what we have now. This debate is very important, as we are ultimately talking about blueprints (as humanity has done for thousands of years) of what a future society should, or should not be like.⁶ The foundations for the debate in this instance, relate to the current diagnosis of the environmental and developmental state of humanity, and ideals of how progress is to be achieved from this point in time. Unlike Lomborg's view, although substantial progress has been achieved in developmental terms over the past century, the current challenges before us are much larger than he would have us believe, and importantly, that the mechanisms the international society has surrounded itself with, have the potential to worsen, not cure, these problems. The title of my recent book, *The Illusion of Progress: Unsustainable Development in International Law and Policy*,⁷ encapsulates this overall thesis. Lomborg's thesis

⁶ For the idea of progress, see Edelstein, L., 1967, *The Idea of Progress in Classical Antiquity*, John Hopkins Press, New York; Van Doren, C., 1967, *The Idea of Progress: Concepts in Western Thought*, Praeger, New York; Hilderbrand, G., 1949, *The Idea of Progress: A Collection of Readings*, University of California Press, California; Meltzer, A. (ed.), 1995, *History and the Idea of Progress*, Cornell University Press, New York; Marx, L., 1998, *Progress: Fact or Illusion*, University of Michigan Press, New York. With regard to the closely linked idea of Utopia, see Manuel, F., 1979, *Utopian Through in the Western World*, Harvard University Press, Cambridge Mass; Manuel, F. (ed.), 1965, *Utopias and Utopian Thought*, Souvenir Press, Boston; Buber, M., 1949, *Paths in Utopia*, Routledge, London; Mumford, L., 1922, *The Story of Utopias*, Viking, New York; Berneri, L., 1950, *Journey Through Utopia*, Routledge, London; Herman, A., 1997, *The Idea of Decline in Western History*, Free Press, New York.

⁷ Gillespie, *The Illusion of Progress*.

is different to mine. He argues: 'things are getting better'⁸ although he also acknowledges that 'things are not everywhere good, but they are better than they used to be'.⁹ In many respects, I do not disagree with him on these broad conclusions. However, I do disagree on the mechanisms that caused this progress (and what we can extrapolate from it) and, perhaps more importantly, on the progress in the so-called indicators for the future, if we maintain the current international mechanisms that ultimately govern these areas in international terms.

Scepticism and the Risk to the Subject at Hand

The final point about scepticism that needs to be stressed is one which Socrates himself pointed out, in that if it is wrongly used, the overall discipline will be damaged. Thus:

There is a danger lest they should taste the dear delight [of scepticism] too early; for youngsters, as you may have observed, when they first get the taste in their mouths, argue for amusement, and are always contradicting and refuting others in imitation of those who refute them; like puppy dogs, they rejoice in pulling and tearing at all who come near them And when they have made many conquests and received defeats at the hands of many, they violently and speedily get into a way of not believing anything which they believed before, and hence, not only they, but philosophy and all that relates to it is apt to have a bad name with the rest of the world.¹⁰

The risks with regard to the debate about sustainable development in this context is that the general public, rather than actually take the time to study and examine the merits of the current altercations, may take the broad conclusion of Lomborg's thesis that things are actually getting better, and disengage from the need to change accordingly. The follow on from this is that political justifications for inaction or actions in a certain, perhaps non-beneficial, direction become increasingly entrenched.

⁸ Lomborg, *The Sceptical Environmentalist*, p. 3.

⁹ *Ibid.*, pp. 4, 5, 87.

¹⁰ Jowett, B. (ed.), 1935, *The Dialogues of Plato*, Oxford University Press, Oxford, Vol. III, pp. 244-5.

In the case of Lomborg's text, this problem is magnified as he attempts to put himself across as a non-political commentator, without any specific agenda. In fact, it is arguable that this is a bit of a deception, as although Lomborg may not himself subscribe to any particular view, the majority of the conclusions from his work clearly parallel the work of many similar authors, who often reach comparable conclusions.¹¹ The work in question referred to here is the 1995 collection on *The True State of the Planet*,¹² and his *Earth Report 2000: Revisiting the True State of the Planet*, both edited by Ronald Bailey.¹³ Lomborg's similarity to these works is not just in the subtitle of his own '*Measuring the Real State of the World*' (which is clearly used as a play on the Worldwatch Institute's annual series 'State of the World'). This is not to suggest that Lomborg has plagiarized these pieces. Lomborg's work is generally much better researched, presented, and argued than these earlier texts. However, there are clear overall

¹¹ With regard to specific topics which appear in both Lomborg's book and Bailey's books, similarities in conclusions can be noted. For the food conclusions, read Bailey's chapter, 'The Progress Explosion: Permanently Escaping the Malthusian Trap', in Bailey's 2000 edited collection, at pp. 1–25. With regard to the fisheries connection, see De Alessi, M., 2000, 'Fishing for Solutions: The State of the World's Fisheries', in Bailey's 2000 edition, pp. 86–114 and Jeffreys, K., 1995, 'Rescuing the Oceans', in Bailey's 1995 edition, pp. 295–338. For the climate chapter, read the contribution by Spencer, R., 2000, 'How Do We Know The Temperature of the Earth? to the *Earth Report 2000*. For some analysis of the Kyoto Protocol, see Taylor, J., 2000, 'Soft Energy Versus Hard Facts', in Bailey's 2000 edition, pp. 116–54) (although note that Lomborg takes a more optimist view on the long-term potential of renewables) and Goklany, I., 2000, 'Richer is More Resilient: Dealing With Climate Change and More Urgent Environmental Problems', in Bailey's 2000 edition, pp. 155–7. For chemical risks, see the chapter by Safe, S., 'Endocrine Disruptors: New Toxic Menace?' in Bailey's 2000 edition, pp. 190–202.

¹² Bailey, R. (ed.), 1995, *The True State of the Planet*, McGraw Hill, New York.

¹³ Bailey, R. (ed.), 2000, *Revisiting the True State of the Planet: Earth Report 2000*, McGraw Hill, New York.

similarities in many of the conclusions. In itself, this is not a problem, but, a difficulty appears when the texts are forwarded into the public debate. Here, unlike with Bailey's work, Lomborg attempts to overlook the political considerations behind his work, and suggests his work is value-free. This is not the case. This becomes problematic as those who do not deal with the text in detail obtain only part of an ultimately biased picture and accept it without recognizing the full vista with which it is connected.

Interpreting Environmental Problems

It is not my intention to demonstrate the factual mistakes in the data and its interpretation with regard to Lomborg's various chapters.¹⁴ This task has already been done much more adequately by those intimately connected with the specific problems. However, one example will be provided as an illustration of the types of countercharges that have been laid against him. With regard to the population growth debate, Lomborg tries to dismiss the claim that population density in some countries is problematic (and that, rather, the issue is economic poverty, not overpopulation) by comparing numbers of countries with a similar national density ratio.¹⁵ The difficulty with his analysis is that it fails to utilize the more useful and accurate indicator of density, which is how much land remains after excluding areas unsuited for human habitation or agriculture, such as deserts and inaccessible mountains. For example, according to this calculation, the population density of Egypt goes from 68 persons per square kilometre (which he highlights) if the unirrigated Egyptian deserts are excluded, to an extraordinary 2,000 people per square kilometre (which he fails to note).¹⁶

¹⁴ Rennie, J., 2002, 'Misleading Math about the Earth', *Scientific American*, January, pp. 59–62. cf. B. Lomborg, 2002, 'The Sceptical Environmentalist Replies', *Scientific American*, May, pp. 9–10.

¹⁵ Lomborg, *The Sceptical Environmentalist*, p. 45.

¹⁶ Bongaarts, J., 2002, 'Population: Ignoring Its Impact', *Scientific American*, January, pp. 65–6.

Sustainable Development and Evolving Environmental Problems

My first substantive concern with the *Sceptical Environmentalist* is that it gives misleading snapshots of complex environmental problems. This can be seen with regard to examples of air and water pollution.

Air Pollution

One of the more recurrent assertions in Lomborg's analysis is that the air quality in a number of cities in developed countries is getting better, and in some instances, is much better than in earlier centuries. In particular: 'London air has not been as clear as it is today since the Middle Ages.'¹⁷ He asserts that air pollution has decreased by more than 90 per cent in London since the 1930s.¹⁸ In support of this he cites a collection of statistics, as well as the reknowned extreme smog of 1952 which killed approximately 4000 people. He goes on to suggest that around this period, air pollution was so bad, that it killed at least 64,000 extra people each year.¹⁹ Although this assertion can be broadly supported as a historical fact²⁰ (although the 64,000

¹⁷ Lomborg, *The Sceptical Environmentalist*, p. 164.

¹⁸ *Ibid.*, p. 11.

¹⁹ *Ibid.*

²⁰ In 1880, 2200 Londoners died in a single incident when coal smoke from home heating and industry combined to form a lethal toxic smog. A further 500 died in a similar situation in 1873. The next notable case was in 1951, when the (very cold and stable) weather conditions in early winter trapped the pollutants over the capital. The smog extended for 30 km around London, and visibility was reduced to 1–5 metres. The pH level of the air was between 1.6 and 2—roughly the equivalent of the chemical make-up of sulphuric acid (ten times what the WHO currently recommends as safe). This smog was linked to the deaths of 1850 people. The following year, at the same time and under similar conditions, two further smogs killed 4700 people. In the London winter of 1962, 750 more people were directly

figures needs to be checked), the assertion that he goes on to extrapolate—that air pollution has declined by a radical extent overall, can be disagreed with. Rather, what would be more accurate to suggest is that the type of air pollution that Lomborg implicitly fingers from an historical perspective—sulphur dioxide, from large-scale power stations and domestic heating—has fallen dramatically. However, to extrapolate from this that air pollution in general has fallen in London (or other major cities in the developed world) is mistaken.

That is, although sulphur pollution from traditional sources has clearly dissipated,²¹ and moderate reductions have been made with nitrogen oxides (but hardly the type of vast reductions he suggests),²² the overall problem of air pollution has not disappeared. Rather, one source of air pollution has been largely replaced by another, which is typically manifested as very small

killed. Similar results were recorded in the Meuse Valley in Belgium in 1930 (63 deaths) and Donora in Pennsylvania in 1948 (28 deaths, 14,000 ill). For a discussion of these issues, see World Resources Institutes, UNEP and World Bank, 1999, *World Resources: 1998–1999*, Oxford University Press, Oxford, p. 63; McCormick, J., 1997, *Acid Earth*, (third edition, Earthscan, London, pp. 5, 32. See Pearce, F., 1992, 'Back to the Days of Deadly Smogs,' *New Scientist*, December 5, pp. 25–6, R. Read, 1991, 'Breathing Can Be Hazardous to Your Health', *New Scientist*, 23 February, pp. 26–9; Hamer, M., 1984, 'Ministers Opposed Action on Smog', *New Scientist*, 5 Jan, p. 3; Anon, 1986, 'Pea Soupers and Westland Helicopters in 1955', *New Scientist*, 2 Jan, p. 12.

²¹ Taken as a whole, the 21 Parties of the 1985 Helsinki Protocol on the Reduction of Sulphur Emissions reduced 1980 sulphur emissions by more than 50 per cent by 1993. In the whole of Europe, including non-Parties to the Protocol, the sum of emissions was 43 per cent lower than in 1980. Four non-parties achieved a 30 per cent reduction (or more), 11 Parties achieved reductions of at least 60 per cent and two of these had reductions above 80 per cent. By 1994, a 50 per cent average reduction for the 21 Parties had been achieved.

²² Holdren, J., 2002, 'Energy: Asking the Wrong Questions', *Scientific American*, January, pp. 63–5.

airborne particles. Airborne particles are referred to as suspended particulate matter (SPM), total suspended particulates (TSP), or black smoke, depending on the type of measurement used.²³ Particulates in the atmosphere may be divided into two principal size groups, fine particles (up to 2 microns in diameter) which come from combustion processes and from coagulation and condensation of gases and vapours, and larger particles (coarse particles 2 to 100 microns in diameter). It is the smaller sized particles that represent the greatest danger to human health.²⁴ Moreover, because fine particulate matters (PMs) are typically by-products of combustion particles, they are more likely to contain carcinogens.²⁵ Many of these fine particles penetrate deep into the lungs and cause inflammation, resulting in the release of molecules called cytokines. These could, in turn, trigger changes in the heart's blood vessels.²⁶ Like traditional air pollutants, they can kill vast numbers of people (although unlike the episodic events that Lomborg cited, SPM pollution tends to be more slowly acting; however, it eventually reaches the same conclusion). For example, in the United States, death rates increase in almost direct proportion to the level of particulate pollution. Life expectancy may be 2–3 years shorter in communities with high PM than in communities with low PM.²⁷ Much of this

²³ Whatever the name, the source is the same. Thus, when coal and certain other fuels burn, they emit substances, including carbon particles (if combustion is inefficient) and SO₂ gas. In addition, the high temperature of combustion cause nitrogen in the air to combine with oxygen, yielding nitrogen oxide (NOx) gases. Shaw, R., 1987, 'Air Pollution by Particles', *Scientific American*, August, p. 84.

²⁴ Anon., 1993, 'Deadly Urban Air', *New Scientist*, 29 May, p. 11; Hamer, M., 1996, 'Clean Air Strategy Fails to Tackle Traffic', *New Scientist*, 31 August, p. 6.

²⁵ Boyce, N., 2000, 'Hold Your Breath', *New Scientist*, 5 August, p. 5.

²⁶ Day, M., 1998, 'Taken to Heart', *New Scientist*, 9 May, p. 23.

²⁷ People living in the most polluted city—Steubenville, Ohio—had a 26 per cent risk of dying young compared with residents of the cleanest city (Portage, Wisconsin). WHO, 1999, *Protection of the Human Environment*:

damage appears to begin at a young age. For example, children's DNA can be damaged by compounds called polycyclic aromatic hydrocarbons which are produced when fuel burns and coat PM10s (particulate matter upto 10 microns in diameter). Some of this damage is done when the foetus is in the womb.²⁸ In the early 1990s, PM10s were considered to be killing up to hundreds in Paris,²⁹ thousands in the UK,³⁰ and tens of thousands in Europe. Research in New Zealand suggests that nearly an equal number of people die annually from SPM related illnesses (399 people over 30 years of age die prematurely), as are killed in vehicle accidents (454).³¹

That SPM pollution is a problem is not news to Lomborg. Rather, he accepts that SPM pollution is a distinct (relatively new) problem.³² My concern here is not that he argues that particle pollution is being increasingly controlled in developed countries³³

Air Quality Guidelines, WHO, Geneva, vol. 3, p. 39. Boyce, N., 2000, 'Hold Your Breath', *New Scientist*, 5 August, p. 5; UNEP, 2000, GEO 2000 Report, Earthscan, London, p. 168.

²⁸ Edwards, R., 1996, 'Smog Blights Babies in the Womb', *New Scientist*, 19 October, p. 8.

²⁹ Patel, T., 1996. 'French Smog Smothers Hundreds', *New Scientist*, 17 February, p. 7.

³⁰ The original figure was 10,000 people in the UK each year. Hamer, M., 1994, 'Dying from Too Much Dust', *New Scientist*, 12 March, p. 5. In 1998, this figure was lowered to 8100 per year. See Day, M., 1998, 'City Dwellers Dying for a Breath of Fresh Air', *New Scientist*, 24 January, p. 16. Cf. Hamer, M., 1997, 'Lies, Damned Lies', *New Scientist*, 29 November; M. Hamer, 1996, 'Cars Must Go to Meet Clean Air Targets', *New Scientist*, 18 May, p. 12; Anon., 1999, 'Not So Clean', *New Scientist*, 23 January, p. 5; Editor, 1994, 'Smog Alert', *New Scientist*, 25 June, p. 3. Editor, 1995, 'Britain's Last Gasp', *New Scientist*, 13 May, p. 3.

³¹ New Zealand Press Association, 2002, 'Vehicle Pollution Major Killer', *New Zealand Herald*, 22 March, p. A8.

³² 'It is only within the last decade that we have realised how dangerous airborne particles actually are.' Lomborg, p. 167.

³³ Lomborg, *The Sceptical Environment*, p. 169.

(he overstates his case)³⁴ but his failure to recognize the contradiction in his overall position that air pollution in developed countries is rapidly declining. Indeed, Lomborg notes that particle pollution is estimated to cause roughly 135,000 premature deaths in the USA each year—or almost 6 per cent of all deaths. In the UK, a similar number of deaths is estimated at 64,000.³⁵ The interesting thing about this 64,000 figure is that it is exactly the same as the historical example figure of deaths he cites, from which apparently there has been a massive decline. Either there is a mistake in the text, or Lomborg has failed to point out a key concern (and this applies to many areas of sustainable development in general)—although elements of one section of an overall environmental problem may have been addressed, often they have been replaced by equally vexing problems which have emerged with a changing society under the same broad banner. In this instance, the problem of taking away traditional sources of air pollution (large-scale coal-fired power plants and domestic heating with inefficient fuels), has largely been replaced by other sources—such as the transportation sector, or more particularly, exhausts from motor vehicles, and diesel exhausts in particular.³⁶

The other area with regard to air pollution in which Lomborg makes a similar mistake is not with the sources of air pollution, but with regard to its impact upon nature. In particular, Lomborg seizes upon the 1980s debate, in which acid rain (as it was initially known) was supposed to be having a detrimental

³⁴ Typical limits for SPM 2.5s in Los Angeles are 20 micrograms and 16 micrograms in New York. The limit set by the Environmental Protection Agency is 15 micrograms. Although British levels are similar, sites in London record averages of up to 32 micrograms. Pearce, F., 2002, 'Big City Killer' *New Scientist*, 9 March, p. 8.

³⁵ Lomborg, *The Sceptical Environmentalist*, p. 168.

³⁶ World Resources Institute, UNEP and World Bank, 1999, *World Resources: 1998–1999*, Oxford University Press, Oxford, p. 63; UNEP/WHO, 1994, 'Air Pollution in the World's Megacities', *Environment*, vol. 36, no. 2, p. 11; Pearce, F., 1999, 'Burning Rubber', *New Scientist*, 10 April, p. 14.

impact on forests. Lomborg discounts this, suggesting that while acid rain did harm lakes it 'did very little if any damage to forests'.³⁷ Although he accepts that damaged trees exist in Europe, he suggests that: 'in reality [such a problem is] simply a non-specific expression that applies to numerous specific, familiar diseases, and the reason why we have started worrying about it is that we have started monitoring this loss'.³⁸ However, rather than downplaying such a threat (as Lomborg's analysis would suggest), in 2000 the European Commission report on the State of Europe's Trees suggested that two-thirds of the trees were sickly, and only 36 per cent of all broadleaf and conifers are healthy. One in five European trees show signs of damage, having lost at least a quarter of their leaf canopy. The rest are visibly dropping more than usual.³⁹ At this point the question becomes: what is causing the damage? The answer is probably a cocktail of pollutants, which reveals a much more complex problem than when it emerged in the 1980s. As such, Lomborg is correct in that a linear causal relationship between acid rain and its effect on forests (as traditionally argued and understood) has not come to fruition. However, this is not to say that the problem has gone away. Rather, the nature of the impact of the problem, due to an evolving understanding of cumulative contributions of diverse pollutants (i.e., damage is linked not only to acidification, but also to critical loads of nitrogen and low-level ozone) suggests a much more scientifically complicated situation.

When viewed from this broader perspective, it is possible to examine not only the effects upon forests, but upon ecosystems in general. Lomborg largely omits this broader picture. A good example is the eutrophication of ecosystems, where although

³⁷ Lomborg, *The Sceptical Environmentalists*, p. 13.

³⁸ *Ibid.*, p. 180. For a scathing commentary on this analysis, see Lovejoy, T., 2002, 'Biodiversity: Dismissing Scientific Processes', *Scientific American*, January, pp. 67-9.

³⁹ Jones, N., 2000, 'Crisis Time for Europe's Ravaged Forests', *New Scientist*, 28 October, p. 6.

progress is being made (and especially due to the strong international air pollution regime and its long term targets)⁴⁰ as of 1998, in central Europe more than 90 per cent of ecosystem areas were exposed to critical loads of pollutants which cause eutrophication. This situation is widespread. In 70 per cent of the countries where the Long Range Transboundary Air Pollution convention and Protocols apply, more than half of the ecosystem areas are affected by eutrophication. The situation has shown little improvement since 1990. Moreover, the percentage of ecosystem areas exposed to eutrophication has increased since 1990 in about half of the countries in the area.⁴¹

Ocean Pollution

A second example of Lomborg presenting a distorting picture relates to pollution of the oceans. To prove his thesis that the health of the oceans is actually much better than suggested, he utilizes accidents from oil tankers, eutrophication of coastal waters, and pollutant levels in shellfish and fish. With regard to declining accidental oil spills,⁴² and the threats to the oceans posed by oil spills, he is broadly correct (that the amount entering the ocean from this source has declined).⁴³ However,

⁴⁰ Once the Gothenburg Protocol is implemented, the area in Europe with excessive levels of acidification should shrink from 93 million hectares in 1990 to 15 million hectares in 2010. Excessive levels of eutrophication should also fall from 165 million hectares in 1990 to 108 million hectares in 2010. UN/ECE (2000), 'The 1999 Gothenburg Protocol to Abate Acidification, Eutrophication and Ground Level Ozone', http://www.unece.org/env/lrtap/multi_h1.htm; Wettestad, J., 1997, 'Acid Lessons? LRTAP Implementation and Effectiveness', *Global Environmental Change*, vol. 7, no. 3, pp. 235-49.

⁴¹ EMEP, 2000, *Transboundary Acidification and Eutrophication in Europe*, EMEP, Geneva, p. 11.

⁴² Lomborg, *The Sceptical Environmentalist*, p. 191.

⁴³ This improvement has been due to increasingly safe vessel designs ('1991 MARPOL Amendments Enter into Force', *IMO News*, vol. 2, 1993, p. 2. This ideal eventually appeared as Regulation 25A in Annex 1.

what he fails to point out is that although (as of 2002)⁴⁴ tanker and pipeline spills put 150,000 tonnes of oil into the ocean (well down from this historical percentage contributions) a further 38,000 tonnes come from oil well leaks. However, the lion's share of oil pollution in the ocean (480,000 tonnes) comes from run-off from land spills and emissions from small boats used for recreation.⁴⁵ As such, once more, Lomborg has given a false impression that the environmental threat has been dealt with. Although this is partly correct in that one original source has been confronted, in reality, a different problem remains as the source has changed. Moreover, in this instance, the new source is not being well confronted, as unlike international tanker accidents, which fall squarely within a well formed body

See also 1994 Year Book of International Environmental Law, Year Book of International Environmental Law, vol. 5, pp. 184–5, enhanced international and regional co-operation in dealing with oil accidents at sea. This process began with the 1969 International Convention Relating to Intervention on the High Sea in Cases of Oil Pollution Casualties. For the Regional Agreements on Oil Pollution, see the 1969 Agreement for the North Sea; the 1976 Protocol Concerning the Mediterranean; the 1978 (Kuwait) Protocol; the 1981 (Abidjan) Protocol; the 1981 (Lima) Agreement, the 1981 (Jeddah) Protocol; the 1983 Protocol on the Wider Caribbean Region; the 1983 Agreement for the North Sea; the 1986 Protocol for the Eastern African Region; the 1986 Protocol for the South Pacific Region; and strong supplementing international liability regimes. See for example the 1969 Convention on Civil Liability for Oil Pollution Damage; 973 UNTS. 3; 1971 Convention on the Establishment Fund for Compensation for Oil Pollution Damage, 11 ILM, (1971), 284; International Convention on Liability and Compensation for Damage in Connection With the Carriage of Hazardous and Noxious Substances by Sea (1996), 35 ILM, 1406).

⁴⁴ Lomborg's foundation citation in this area is from 1985. Lomborg, *The Sceptical Environmentalist*, p. 189.

⁴⁵ Anon., 2002, 'Dead in the Water', *New Scientist*, 1 June, p. 7; Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP), 1990, *The State of the Marine Environment*, UNEP, Nairobi.

of international law, pollution from land-based sources are not.⁴⁶

Another example of utilizing deceptive statistics deals with his assertion that with regard to pollution in coastal waters from heavy metals and persistent organic pollutants, studies in Denmark and the United Kingdom, show that: 'concentrations of harmful substances such as DDT (Dichloro diphenyl trichloro ethane), PCB (Polychlorinated biphenyls), dieldrin, and cadmium have fallen drastically in coastal seas'.⁴⁷ Although this may be correct for the situation he cites (and he chooses concentrations in shellfish and fish), a different outcome may be obtained if looking at marine mammals (typically small cetaceans, which are tragically good species at bioaccumulation of pollutants).⁴⁸ This problem has been detected mostly around key Northern countries⁴⁹ although it is also evident in the waters surrounding tropical countries and in the Southern hemisphere.⁵⁰

⁴⁶ See Gillespie, A., 2002, 'Environmental Threats to Cetaceans and the Limits of Existing Management Structures', 6 *NZ Journal of Environmental Law*, 97-139.

⁴⁷ Lomborg, *The Sceptical Environmentalist*, p. 195.

⁴⁸ Reijnders, P. and Simmonds M. (ed.), 'Report of the Workshop on Chemical Pollution and Cetaceans', *Journal of Cetacean Research and Management: Chemical Pollutants and Cetaceans, Special Issue*, vol. 1, pp. 3-14; Parsons, E., 1999, 'Immune Level Abnormalities', *Veterinary Record*, vol. 144, pp. 75-6; Troisi, T., 1996, 'Toxic Effects of PCBs on Marine Mammals', *Soundings*, vol. 2, no. 8, pp. 1-2; Colborn, T., 1996, 'Epidemiological Analysis of Persistent Organic Pollutants in Cetaceans', *Reviews of Environmental Contamination and Toxicology*, vol. 146, pp. 91-172; Edwards, R., 1999, 'Sea Sickness: Deaths of Harbour Porpoises are Linked to PCBs and Mercury', *New Scientist*, 18 December, p. 12; Beland, P., 1996, 'The Beluga Whales of the St. Lawrence River', *Scientific American*, May, pp. 58-65.

⁴⁹ Simmonds M., 2000, 'Cetacean Contaminant Burdens: Regional Examples', SC/51/E 13; Report of the Scientific Committee, IWC/53/4, p. 61.

⁵⁰ See Parsons, E., 2002, 'The Impact of Pollution on Humpback Dolphins', SC/54/SM5; Ministry for the Environment, 1997, *The State of New Zealand's Environment*, MFE, Wellington, vol. 9, p. 132.

With such considerations in mind, a problem arises when it becomes apparent that in certain places, people are consuming cetaceans (which represent a very strong pathway for POPs to enter into the human body) that contain concentrations of POPs that continue to accumulate and bio-magnify up the food chain to dangerous levels. For example, in the Arctic where POP contamination can be 10–20 times higher than in most temperate regions, indigenous people who rely on traditional diets are likely to be more exposed to several toxic substances than the majority of people elsewhere in the world. Along the west coast of Greenland, in Nunavik, Canada, and in Nikel on the Kola Peninsular of Russia, blood levels of, *inter alia*, DDT are only a small fraction lower than the levels that are known to have caused neurological defects in babies. Detrimental PCB contamination is a strong problem at Nunavik, and in northwest Greenland, where fetal and childhood development may be at direct risk. This conclusion is not surprising in Greenland, where more beluga and narwhal is consumed than anywhere else, as 95 per cent of women exceed the Canadian guideline limit for PCB contamination (five parts per million). Such problems, which have been associated with the consumption of POP infested products (typically cetaceans), have not been restricted to the Arctic.⁵¹

A similar body of evidence is also now developing in Japan in regard to general toxicity problems arising from seafood (in general, and whale meat products in particular) which may contain several sorts of environmental toxins at levels above the safety limits prescribed by most national and international authorities. For example, 2002 samples from the Tokyo market revealed dolphin meat which contained 2000 micrograms of mercury per gram. This is 5000 times higher than the 0.4

⁵¹ Arctic Monitoring and Assessment Programme, (AMAP) 1997, *Arctic Pollution Issues: A State of the Arctic Environment Report*, AMAP, Oslo, pp. 3.28, 5.1, 5.6, 5.7, and 5.16; Swiss Coalition for the Protection of Whales/ Global Survival Network (GSN), 1999, *Polar Exposure: Environmental Threats to Arctic Marine Life and Communities*, GSN, London, p. 16.

microgram safety level.⁵² This situation has led to a series of resolutions from the International Whaling Commission (IWC), and a number of sovereign countries, recommending limits on how much cetacean products should be consumed.⁵³

Sustainable Development, Risk, and the Precautionary Approach

Lomborg clearly dislikes the idea of any 'catastrophe' or 'environmental surprise' landing on the doorstep of humanity. His argument against this can be seen via his discussions about climate change, and later about the precautionary principle. With regard to climate change, the basis of Lomborg's position derives from the scenarios offered by the Intergovernmental Panel on Climate Change (IPCC), which has moved away from its previous 'best guess' scenarios for future emissions. Rather, the IPCC has prepared a number of future emission scenarios. Each of the future predictions is highly dependent on demographic change, social and economic development, and the rate and direction of technological change. Within each one of these sectors, dozens of inter-relating issues overlap. The result is a series of future emission scenarios which range, for 2100, from 770 GtC to 2540 GtC. There is no single most likely or 'best guess' scenario with the current scenario literature, as far too many uncertainties and variables make this impossible. Thus, each option is equally possible, depending on how humanity responds to the various considerations.⁵⁴ The consequence is that

⁵² Anon., 2002, 'Bad Catch', *New Scientist*, 23 March, p. 5; Coghlan, A., 2002, 'Its Madness', *New Scientist*, 1 June, p. 17.

⁵³ See IWC Resolution 2000-6, 'Resolution on POPs and Heavy Metals', IWC, 52nd Report, 2001, p. 67; See Appendix 5, IWC Resolution 1999-4, Resolution on Health Effects from the Consumption of Cetaceans; see IWC, 50th Report, 1999, p. 53.

⁵⁴ IPCC, 2000, *Emission Scenarios*, Cambridge University Press, Cambridge, pp. 1-15.

the higher the build-up of greenhouse gases, the worse the knock-on effects of enhanced climatic change.

Unlike the IPCC, which adopts the classical point that Socrates did, and suggested that certainty in this area is not possible due to so many uncertainties, Lomborg adopts the opposite position. He argues that all but the lower scenarios for temperature increases are largely unrealistic, and subsequently tends to overestimate the speed of global warming. As such, Lomborg suggests that a more realistic basis to work from is the lesser scenarios.⁵⁵ Accordingly, he surmises that many of the problems with climate change will be of a much lesser magnitude and subsequent impact, and as such, should be ultimately downgraded as a serious risk facing humanity (especially in comparison to other problems).⁵⁶ He goes so far as to suggest that climate change will produce overall positive benefits, such as general increases in global biomass, due to the so-called fertilization effect,⁵⁷ and lengthened growing seasons for agriculture⁵⁸ (although he conceded there may be some effects on developing countries, but these should be offset by overall increases elsewhere).⁵⁹ His conclusion of the overall output of agriculture is broadly in congruence with accepted analysis in this area,⁶⁰ but the uncertainty in this area is high. This is especially so when additional macro-economic considerations, like future trade flows in food stuffs are added,⁶¹ in addition to the vulnerability of individual agricultural

⁵⁵ Lomborg, *The Sceptical Environmentalist*, p. 287.

⁵⁶ *Ibid.*, pp. 318, 322, 323.

⁵⁷ *Ibid.*, p. 299.

⁵⁸ *Ibid.*, p. 28.

⁵⁹ *Ibid.*, pp. 288–9.

⁶⁰ IPCC, 1996, *Climate Change 1995: Impacts, Adaptations and Mitigation*, Cambridge University Press, Cambridge, p. 9.

⁶¹ IPCC, 2001, *Climate Change 2001: Impacts, Adaptation and Vulnerability*, Cambridge University Press, Cambridge, p. 9; Reilly, J., 1994, 'Climate Change and Agricultural Trade', *Global Environmental Change*, vol. 4, no. 1, pp. 24–36.

sectors (i.e. depending on how adverse to risk they are).⁶² Finally, and perhaps most importantly, all of the scenarios are dependent on the actual climate changes. The more serious the changes, the greater the impacts upon agriculture that may be expected, and rather than any form of positive increases, negative impacts⁶³ may predominate overall. The negative impacts may be concentrated in certain regions.⁶⁴ For example, in 2001, UNEP suggested that harvests of vital crops like rice, wheat, and corn could plummet by over a third (a 10 per cent drop for every 1 centigrade increase) in some regions over the next one hundred years, causing mass starvation in some regions.⁶⁵

The important point of the above discussion is that uncertainty is rife in this area—as with other areas related to sustainable development. Moreover, the uncertainties of impact may become magnified with additional uncertainties, such as environmental surprise, being added into the equation.

With regard to climate change, it is possible that the Earth may respond in unanticipated ways to forced climate change. In

⁶² IPCC, 1998, *The Regional Impacts of Climate Change: An Assessment of Vulnerability*, Cambridge University Press, Cambridge, p. 6.

⁶³ IPCC, *Climate Change 2001*, p. 4; Joyce, C., 1991, 'World's Rice Crop Vulnerable to Changing Atmosphere', *New Scientist*, 12 January, p. 16; Nowak, R., 2002, 'How the Rich Stole the Rain', *New Scientist*, 15 June, p. 6; Mulvaney, K., 1998, 'Eaten Alive', *New Scientist*, 18 July, p. 12; Holmes, B., 1998, 'Unwelcome Guests', *New Scientist*, 18 April, p. 15; Copley, J., 1999, 'Off Their Food', *New Scientist*, 3 April, p. 23; Kleiner, K., 1998, 'Dying for a Change', *New Scientist*, 5 September, p. 8; Pain, S., 1988, 'No Escape from the Greenhouse', *New Scientist*, 12 November, p. 38; Bazzar, F., 1992, 'Plant Life in a CO₂ Rich World', *Scientific American*, January, pp. 18–24; Gribbin, J., 1995, 'Plants Issue their Own Global Warming', *New Scientist*, 30 September, p. 21; Fajer, E., 1992, 'Is Carbon Dioxide a Good Gas?', *Global Environmental Change*, pp. 301–10.

⁶⁴ IPCC, *Climate Change 2001*, p. 4.

⁶⁵ Pearce, F., 2001, 'Global Warning', *New Scientist*, 17 November, p. 4; Pearce, F., 1992, 'Grain Yields Tumble in Greenhouse World', *New Scientist*, 18 April, p. 4; Rind, D., 1995, 'Drying Out', *New Scientist*, 6 May, pp. 36–41.

the literature on climate change this is known as 'surprise'.⁶⁶ Within the official literature, the IPCC warned in 1990 that despite their predictions: 'The complexity of the system means that we cannot rule out surprises'.⁶⁷ The IPCC 1996 report also emphasized the possibility of 'surprises and unanticipated rapid change'.⁶⁸ The Third Assessment Report in 2001 by the IPCC added that the potential for large-scale, and possibly irreversible impacts, poses risks that have yet to be reliably quantified. These possibilities are very climate scenario-dependent and a full range of plausible scenarios has not yet been evaluated. Examples include significant slowing of the ocean circulation that transports warm water to the North Atlantic, large reductions in the Greenland and West Antarctic Ice Sheets, accelerated global warming due to carbon cycle feedbacks in the terrestrial biosphere, and releases of terrestrial carbon from permafrost regions and methane from hydrates in coastal sediments.⁶⁹ These risks may be more pronounced if the carbon more than doubles (above pre-industrial levels) in the longer term.⁷⁰

The obvious way to factor in the extreme 'surprise' events, in addition to the uncertainties with regard to the large-scale risks that climate change represents, is to proceed with a precautionary principle/approach and seriously contemplate strong climate mitigation policies (as the responsible scientific community cannot rule out such catastrophic outcomes at a high level of

⁶⁶ Streets, D., 2000, 'Exploring the Concept of Climate Surprise,' *Global Environmental Change*, vol. 10, 97-107; Pain, S., 1992, 'Runaway Greenhouse Warming Cannot Be Ruled Out', *New Scientist*, 15 February, p. 19; Leggett, J., 1992, 'Running Down to Rio', *New Scientist*, 2 May, pp. 37-42.

⁶⁷ IPCC, noted in Milne, R., 1990, 'Pressure Grows on Bush to Act on Global Warming', *New Scientist*, 2 June, p. 5.

⁶⁸ IPCC, noted in Pearce, F., 1995, 'Global Warming Jury Delivers Guilty Verdict', *New Scientist*, 9 December, p. 6.

⁶⁹ IPCC, *Climate Change 2001*, p. 7.

⁷⁰ IPCC, *Climate Change 1995*, p. 4.

confidence).⁷¹ However, Lomborg argues against the precautionary principle being applied in this area. He did this because he believed that everyday society deals with issues which may have impacts on it of a negative or positive nature (he cites the advent of the Internet affecting personal contacts, though superfluous, as an example) but it does not apply (nor need to apply) the precautionary principle. He then goes on to extrapolate that: the environmental area has been able to monopolise the precautionary principle is in essence due to the Litany and our fear of doomsday. Of course, if large scale ecological catastrophes were looming on the horizon we might be more inclined to afford the extra margin of safety just for the environment. But as is documented in this book, such a general conception is based on a myth.⁷²

At this point, Lomborg makes the mistake of failing to know the history of one of the 'large scale ecological catastrophes' (which he only very briefly examines in his text)⁷³—that of ozone depletion. The point of this example is that following the proposal of the scientific hypothesis of ozone depletion in 1974, there was not actual 'proof' of ozone depletion until over a decade later. During this time, the theoretical risks of ozone depleting substances were continually downgraded (for a number of reasons). However, when it was eventually discovered (the thinning ozone layer over Antarctica), it was shown that nature was responding in completely unanticipated ways, and as such 'surprised' humanity. In particular, rather than providing a neutral sink for the chlorine based chemicals to safely nestle,⁷⁴

⁷¹ Schneider, S., 2002, 'Global Warming: Neglecting the Complexities', *Scientific American*, January, pp. 61–3.

⁷² Lomborg, *The Sceptical Environmentalist*, p. 350.

⁷³ *Ibid.*, pp. 273–4.

⁷⁴ Gribbin, J., 1979, 'Monitoring Halocarbons in the Atmosphere', *New Scientist*, 18 January, pp. 164–7; Eggleton, A., 1976, 'Will Chlorofluorocarbons Really Affect The Ozone Shield?', *New Scientist*, 20 May, pp. 402–3; Anon., 1976, 'Upper Atmosphere Chemistry: The Arguments Continue', *New Scientist*, 10 June, p. 564; Anon., 1976, 'Aerosols and Ozone: Good News and Bad', *New Scientist*, 20 May, pp. 395.

it was shown that when the chemicals finally accumulated at the Poles, rather than being beneficial, the special circumstances of the area catalysed the situation into being very detrimental. As such, the unique natural conditions, more than being some form of excuse for the ozone depletion (as initially suggested),⁷⁵ provided an example of where nature behaved in a completely unpredictable way and exacerbated an anthropogenically caused problem.⁷⁶ As if this omission of prediction was not enough in itself, predictions that a similar destruction would not occur in the Arctic due to warmer temperatures and less stable air masses, and different chemical mixes, were repeatedly shown to be wrong in the 1990s.⁷⁷ As such, the thinning of the ozone layers over

⁷⁵ Anon., 1986, 'Ozone Hole is Normal,' *New Scientist*, 4 September, p. 22.

⁷⁶ Specifically, the particular uplifting of air currents after the dark Antarctic winter, whereby ozone-poor air from lower altitudes is swept into the stratosphere via a 'polar vortex' culminating with extremely cold temperatures and stable air masses, to form the perfect platform for ozone depleting substance destruction of the ozone layer. This isolation allows temperatures to fall to the point where icy polar stratospheric clouds form. The first spring sunlight triggers photochemical reactions which release active chlorine from otherwise inert compounds on the surface of ice crystals in the clouds. This contains chlorine that destroys the ozone layer. Later in the spring, warm air dissolves the vortex and the stratosphere returns to more normal conditions. Anon., 1987, 'US Spy Plane Set to Examine Origins of Ozone Hole', *New Scientist*, 30 July, p. 22, Gribbin, J., 1987, 'An Atmosphere in Convulsions', *New Scientist*, 26 November, pp. 30-1; Stolarski, R., 1988, 'The Antarctic Ozone Hole', *Scientific American*, January, pp. 20-5; Verma, S., 1989, 'As Antarctica's Ozone Hole Grows,' *New Scientist*, 7 October, p. 9; Joyce, C., 1987, 'Chlorine Clears the Ozone Layer Down South,' *New Scientist*, 8 October, pp. 18-19; Anon., 1987, 'Lab Experiments Back Theories of Ozone Depletion', *New Scientist*, 3 December, p. 28.

⁷⁷ Final Report: Second Session of the First Meeting of the Open Ended Working Group of the Parties to the Montreal Protocol, UNEP/OzL.Pro.WG.1(2)/4, p. 15; First Meeting of the Parties to the Montreal Protocol, Helsinki, 2-5 May. UNEP/OzL.Pro.1/5, 6 May 1989, Paragraph

the Arctic and the Antarctic was the first time that non-linear responses became apparent in international environmental issues. That is, a 'runaway effect', which was not only completely unexpected,⁷⁸ but has also managed to confound predictions, and has provided a large part of the justification for the international community to act, in the future, in a precautionary manner when dealing with such issues.

Sustainable Development and the Technology Question

Lomborg is clearly a technological optimist (for certain, but not all, technologies)⁷⁹ when it comes to environmental problems.⁸⁰ Indeed, with many of the problems he cites as solved, he suggests that, in essence, they have been bypassed by simple application of newer, more efficient technologies. This analysis applies to food shortages and the Green Revolution,⁸¹ the ozone problem,⁸² and

14; Toon and Turco, R., 1991, 'Polar Stratospheric Clouds and Ozone Depletion', *Scientific American*, June, p. 40-7; Pearce, F., 1997, 'Nature Fuels Loss of Arctic Ozone', *New Scientist*, 7 June, p. 11; Editor, 1996, 'Disaster in the Stratosphere', *New Scientist*, 16 March, p. 3; Anon., 1996, 'Hole Over Britain', *New Scientist*, 16 November, p. 11; Hecht, J., 1999, 'Polar Alert', *New Scientist*, 12 June, p. 6; Editor, 1987, 'The Ozone Zone', *New Scientist*, 12 November, p. 8; Farman, J., 1987, 'What Hope for the Ozone Layer Now?', *New Scientist*, 12 November, pp. 50-4; MacKenzie, D., 1988, 'Coming Soon: The Next Ozone Hole', *New Scientist*, 1 September, p. 38.

⁷⁸ Gribbin, J., 1987, 'An Atmosphere In Convulsions', *New Scientist*, 26 November, p. 30-1; Anon., 1988, 'Farman Calls for Tighter Controls on CFCs', *New Scientist*, 24 March, p. 23.

⁷⁹ Lomborg casts a sceptical eye over the possibilities of modern renewable technologies, such as wind and solar over the short term, Lomborg, *The Sceptical Environmental*, p. 19.

⁸⁰ 'Technology makes it possible to achieve growth as well as a better environment . . .', *Ibid.*, p. 176.

⁸¹ *Ibid.*, p. 62-5.

⁸² 'It is worth pointing out that the implementation of the CFC ban was strictly profitable. It was actually relatively cheap to find substitutes for CFC (e.g. in refrigerators and spray cans).' *Ibid.*, p. 274.

air pollution. With the last problem, he suggests sulphur dioxide pollution has declined because of, *inter alia* (in a historical context): 'a move away from siting power plants in urban areas and the use of taller smoke stacks'; and in a contemporary context: 'cars pollute much less than they used to, partly because of catalytic converters but also because diesel vehicles now use low-sulphur fuels'.⁸³ Finally, with regard to mitigating climate change he suggests:

We should be much more open towards other techno-fixes [as opposed to just new renewables such as wind and solar power]. These suggestions range from fertilising the ocean (making more algae bind carbon when they die and fall to the ocean floor) and putting sulphur particles into the stratosphere (cooling the Earth) to capturing carbon dioxide from fossil fuel use and returning it to storage in geological formations.⁸⁴

The difficulty with this type of analysis is that although sometimes technology can quickly solve environmental problems and has a central role in sustainable development,⁸⁵ in a number of other situations, the new technologies that are designed to solve one problem may quickly create another. For example, with the ozone situation, it is true that the original ozone depleting substances (typically chlorofluorocarbons) were replaced by hydrochlorofluoro-carbons (HCFCs) and hydrofluorocarbons (HFCs).⁸⁶ However, these replacements have not been clear-cut. That is, although HCFCs have a lesser impact upon the ozone layer than their predecessors, they still have a detrimental impact (and have been subsequently restricted).⁸⁷ Likewise, with regard to HFCs, although they have no effective ozone depleting

⁸³ *Ibid.*, pp. 169–70.

⁸⁴ *Ibid.*, p. 323.

⁸⁵ See UNDP, 2001, *Human Development Report 2001: Making New Technologies Work for Human Development*, Oxford University Press, Oxford.

⁸⁶ Report of the 11th MOP, UNEP/OzL.11/10, 7 December 1999, p. 8.

⁸⁷ Anon., 1990, 'Scientists Warn of Perils Posed by Substitutes for CFCs', *New Scientist*, 30 June, p. 7.

potential, they are listed chemicals under the Kyoto Protocol due to their extreme global warming potential.⁸⁸

A second example of this type of problem deals with Lomborg's comment on 'tall stacks' as a way of (historically) reducing air pollution. Lomborg is correct on this ground, and the building of tall stacks as a measure to defeat local air pollution was actively pursued in a number of countries after 1950. For example, in 1955 only 2 stacks in the US were taller than 180 metres. By 1980, all stacks being built were taller than that. By 1975, at least 15 stacks in the world were taller than 300 metres. Although this option was cautiously supported by some early international policy suggestions in this area, the support for this policy disappeared when it became apparent that these tall stacks merely turned a problem of local air pollution to one of transboundary air pollution. Thus, by the early 1980s, the 'tall chimney principle' was abandoned at an international conference, as the transferring of pollution from local to regional neighbours was deemed unacceptable.⁸⁹

Working from Lomborg's list, a third example of this problem can be seen in his reference to diesel fuel. While it is possible to control aspects of diesel pollution, it is important to realize the original source of this current problem. That is, diesel engines were initially enthusiastically embraced as an alternative to conventional engines. This was because they produce only about 10 per cent as much carbon monoxide and hydrocarbons as conventional vehicles fitted with catalytic converters. Emissions of nitrogen oxides are also thought to be two-thirds less than in conventional cars, and their emissions of volatile organic compounds are also much reduced. Moreover,

⁸⁸ Decision X/16. Implementation of the Montreal Protocol in Light of the Kyoto Protocol. Report of the 10th MOP of the Montreal Protocol, UNEP/OzL.Pro/10/9, 3 December, pp. 30-1.

⁸⁹ Swedish Ministry of Agriculture, 1982, The 1982 Stockholm Conference on the Acidification of the Environment, Stockholm, p. 19.

they burn 25 per cent less fuel, and the fuel is typically cheaper than petroleum.⁹⁰

Despite these advantages, it was later revealed that diesel vehicles emit between 10–100 times more SPMs than conventional cars.⁹¹ In the United States, diesel engines account for up to 70 per cent of smoke emissions in some areas. In the UK (as Lomborg himself notes) although diesel cars make up only 6 per cent of the total vehicles, they contribute with 92 per cent of all vehicle emissions.⁹² Aside from the recognized SPM threats, in the late 1990s a compound discovered in the exhaust fumes of diesel engines, which may add considerably to the mutagenic activities of particles, is 3-nitrobenzanthrone—possibly the most carcinogenic ever analysed from vehicle exhausts.⁹³ Lomborg's retort to this collection of problems is that it is technologically possible to capture all of the pollutants that diesel engines create, via the equivalent of catalytic converters, or in this instance, particle traps. Although this is correct,⁹⁴ the traps have proved less than fully successful with vehicles which cannot generate enough heat to burn off the captured pollutants. As such, their applications have often been limited to typically larger vehicles, or vehicles which can generate enough heat to operate efficiently (i.e. they do not necessarily operate well while the engine is cold).⁹⁵

⁹⁰ Gould, R., 1989, 'The Exhausting Options of Modern Vehicles', *New Scientist*, 13 May, pp. 20–5; Joyce, C., 1980, 'Foggy Future for Diesel Cars', *New Scientist*, 9 October, p. 79; Patel, T., 1995, 'France Counts the Cost of Cheap Diesel', *New Scientist*, 22 April, p. 10.

⁹¹ Joyce, C., 1980, 'Foggy Future for Diesel Cars', *New Scientist*, 9 October, p. 79.

⁹² Cited in Lomborg, *The Sceptical Environmentalist*, p. 170.

⁹³ Pearce, F., 1997, 'Devil in the Diesel', *New Scientist*, 25 October, p. 4.

⁹⁴ Hamer, M., 1997, 'Fighting for Air', *New Scientist*, 19 April, pp. 14–15; Anon., 1997, 'Delightful Diesel', *New Scientist*, 7 August, p. 11; Davis, B., 1999, 'Just Add Water', *New Scientist*, 13 March, pp. 36–39; Coghlan, A., 1998, 'Clean Burn', *New Scientist*, 11 April, p. 17; Hamer, M., 1994, 'Cleaner Diesels Take to The Road', *New Scientist*, 26 November, p. 22.

⁹⁵ Thisdell, D., 1999, 'Clean Burn', *New Scientist*, 24 April, p. 12; M.

The final example in this area (I am not going to consider his other idea of having more particle pollution as a way to offset climate change) relates to his suggestion to sequestration via putting lead into the ocean, so as to increase the growth of plankton, and subsequent removal of carbon dioxide from the atmosphere. Although this idea has received theoretical attention,⁹⁶ it is important to note that there is 'considerable quantitative uncertainty' in this area due to a number of reasons.⁹⁷ In particular, it has been shown that massive amounts of seeding would be required to make relatively small reductions in carbon dioxide build-up⁹⁸ and that dumping extra iron into the oceans may disrupt ecological cycles. On the ecological side, seeding the oceans may actually encourage the bacteria that produce methane and nitrous oxide;⁹⁹ it may also disrupt the nutrients patterns near the surface of the ocean and detrimentally affect biological activity (such as with fisheries).¹⁰⁰ Finally, rather than resulting in an explosion of algae in the longer term, the planktonic animals that feed on the algae obtain a massive free lunch in the short term.¹⁰¹ Due to such limitations,

Hamer, 1998, 'Clean Bill of Health for Particle Trap', *New Scientist*, 21 February, p. 6.

⁹⁶ See Fell, N., 1993, 'Can Algae Cool The Planet?', *New Scientist*, 21 August, pp. 34–7; Brown, W., 1990, 'Flipping Oceans Could Turn Up the Heat', *New Scientist*, 25 August, p. 11; Pearce, F., 2000, 'A Cool Trick', *New Scientist*, 8 April, p. 18.

⁹⁷ IPCC, 1995, *Climate Change 1994: Radiative Forcing of Climate Change*, Cambridge University Press, Cambridge, p. 17.

⁹⁸ 160,000 square kilometres of ocean, seeded with iron for a month over a 100-year period would only sequester an additional 2–11 per cent of extra carbon than would have been taken by the natural process. Jones, M., 2002, 'Don't Rely on Plankton to Save the Planet', *New Scientist*, 16 February, p. 16.

⁹⁹ Jones, N., 2001, 'A Risk Too Far', *New Scientist*, 20 October, p. 7.

¹⁰⁰ Gribbin, J., 1991, 'A Technological Fix That Does Not Work', *New Scientist*, 16 March, pp. 46–7.

¹⁰¹ Holmes, B., 1994, 'No Quick Fix For Climate', *New Scientist*, 26 February.

sequestration in the ocean has received little attention within the climate change regime. Moreover, the Kyoto Protocol has limited emissions by sources and removals by sinks to land-use change and forestry activities, limited specifically 'to afforestation, reforestation and deforestation'.¹⁰² As such, the Kyoto Protocol does not apply carbon accounting for 'techno-fixes' with regard to the ocean.¹⁰³

Sustainable Development and Security

One of Lomborg's themes is that the world is becoming increasingly 'secure'.¹⁰⁴ When looking at the possibility of conflict over limited resources (such as water), he forthrightly discounts the event in the past (as a catalyst for conflict) or even in the future, as: 'water co-operation is highly resilient'. He suggests that war over resources such as water makes: 'little strategic or economic sense. Rather, it is to be expected that increased water will help increase the focus and attention needed to solve the remaining substantial water issues.'¹⁰⁵ The difficulty with this analysis is threefold. First, Lomborg assumes that conflicts are rational, and can be examined via either traditional, strategic or economic objectives. In fact, many of the current conflicts of the world are beyond these goals, in which evils like ethnic hatred, religious dogmatism, or totalitarian goals take precedence, and accordingly, the normal limitations of rational people (and international humanitarian law) do not necessarily apply. Second, Lomborg's tight focus on conflict over water fails to recognize that conflicts are typically about multiple issues, in which numerous concerns are all interwoven. Nevertheless, if viewed with Lomborg's tight prism, his point is correct (about water being the only cause of conflict). However, when considering

¹⁰² Kyoto Protocol, Article 3 (3).

¹⁰³ IPCC, 2000, *Land Use, Land-Use Change, and Forestry*, Cambridge University Press, Cambridge, p. 5.

¹⁰⁴ Lomborg, pp. 84–85, 328.

¹⁰⁵ *Ibid.*, p. 157.

other natural resources, it appears clear that within the last fifteen years, conflicts have involved, along with other considerations, 'honey pot' resources, as opposed to the 'shrinking pie' resources. This can be seen in Colombia (oil, gold, cocoa), Peru (cocoa), Sierra Leone (diamonds), Liberia (timber, diamonds), Sudan, (oil), Angola (oil, diamonds), Republic of Congo (oil), Democratic Republic of Congo (Zaire—copper, diamonds, gold), Cambodia (timber, gems), and Myanmar (timber, tin, gems).¹⁰⁶

The above highlighted conflicts point to the third overall difficulty in Lomborg's analysis—that he fails to fully distinguish between the nature of conflict at the turn of the new century. That is, although the number of wars has clearly fallen (from 36 wars in 1989) to 27 at the end of the century (an apparent progress), 26 were internal 'civil' wars, as between opposing nation-states. It is these dynamic and often the fanatical forces that rise from it, replete with the end of the (ironic) stability of the Cold War, that has turned traditional ideas of security on their head. One of the best indicators of this is the reknowned 'minutes to midnight' clock which is set by the Directors of the Bulletin of the Atomic Scientists. The clock symbolizes how close humanity is to nuclear conflict and possible extinction. Extinction is probable if a full-scale nuclear exchange occurs. If the clock were to strike midnight, it would be the end point. This fictional clock, which was first set at seven minutes to midnight in 1945, is now back at exactly the same place as when it started—seven minutes to midnight. This is not something to consider an achievement. At the end of the Cold War, the clock was significantly wound back, but since then, it has moved forward—three times since 1991. The last move happened in April 2002, when the clock was moved from nine minutes to seven minutes.¹⁰⁷

¹⁰⁶ Pearce, F., 2002, 'Blood, Diamonds & Oil', *New Scientist*, 29 June, pp. 36–40.

¹⁰⁷ *Bulletin of Atomic Scientists*, 2002, 'Seven Minutes to Midnight', April.

The clock is also moving forward because of the failure of the United States, and subsequently the international community, to accept the Comprehensive (Nuclear) Test Ban Treaty; the failure of the international community to make the (nuclear) Non-Proliferation Treaty meaningful, and tied to specific targets; the failure of the United States to maintain the Anti-Ballistic Missile Treaty, and the failure of the international community to agree to adequate verification procedures for chemical and biological weapons. In addition, there is the problem of nuclear terrorism (since 1991 there have been 18 cases of theft of weapon grade uranium or plutonium from the former Soviet Union), madmen flying jet airliners into civilian targets, and continuing border skirmishes between the known nuclear powers Pakistan and India, including an attack on India's parliament. Of late, we may also throw into the equation the highly volatile situation of a nuclear armed, provocative, and surrounded Israel.

Poverty and Prosperity in Sustainable Development

One of Lomborg's central suggestions is that a large part of the overall improvement of the state of the world is due to an ever-increasing global market. His basic point is that *on average*, the world is growing richer,¹⁰⁸ the number of people in absolute poverty has dropped,¹⁰⁹ less people are starving,¹¹⁰ most people live longer¹¹¹ and are better educated, and there are fewer

¹⁰⁸ 'We have all become much richer than in all previous history', Lomborg, *The Sceptical Environmentalist*, pp. 70–1.

¹⁰⁹ Fallen from 1.3 billion to 1.2 billion at the end of the decade. *Ibid.*, p. 72.

¹¹⁰ The proportion of people starving has fallen from 35 per cent in 1970, to 18 per cent in 2000, and is expected to fall to 12 per cent in 2010. *Ibid.*, p. 61. He correctly notes that the improvement has not been shared by sub-Saharan Africa. pp. 5, 61, 65.

¹¹¹ 'But the important thing to stress is that more than 85 per cent of all the world's inhabitants can expect to live for at least 60 years—more than

accidents¹¹² now as compared to 30 years ago.¹¹³ To continue these trends, he suggests:

... it is necessary to have an open economy in order to facilitate international trade, investment and economic freedom, because this encourages the exchange of technology and administration.¹¹⁴

... if we want to leave a planet with the most possibilities for our descendants, in both the developed and developing world, it is imperative that we focus primarily on the economy and solving our problems in a global context rather than focusing... on the environment in a regionalised context. Basically, this puts the spotlight on securing economic growth, especially in the third world, while ensuring a global economy, both tasks which the world has set itself within the framework of the World Trade Organisation...¹¹⁵

... we need to confront our myth of the economy undercutting the environment. ... only when we get sufficiently rich can we afford the relative luxury of caring about the environment.¹¹⁶

Lomborg expects that if this path is followed, there will be a good outcome for all countries.¹¹⁷ He also suggests that the countries which are following the economic medicine prescribed for them are generally doing very well in overcoming their difficulties, and responding to financial irregularities much faster and with greater strength than expected (and he cites Latin America, and in particular Brazil which shows good potential for 'stable development').¹¹⁸ In following the trajectory of such development, the poorer countries will eventually eclipse their

twice as long as people were expected to live on average just a hundred years ago. Incredible progress', *Ibid.*, p. 53. With regard to the sub-Saharan difference, (largely put down to AIDS), see Lomborg, p. 51-2.

¹¹² *Ibid.*, p. 84-5.

¹¹³ *Ibid.*, p. 79-113, 328.

¹¹⁴ *Ibid.*, p. 72.

¹¹⁵ *Ibid.*, p. 324.

¹¹⁶ *Ibid.*, p. 33.

¹¹⁷ 'On the whole, we have no reason to expect that this progress will not continue'. *Ibid.*, p. 330.

¹¹⁸ *Ibid.*, p. 76.

environmental problems (as did the wealthier countries before them).¹¹⁹ Even if they cannot eclipse such problems and actually face difficulties in the future, they will be able to confront them via their economic prosperity. For example, with regard to possible water shortages in the future (despite strong progress in the past)¹²⁰ Lomborg suggests that shortages may be circumvented via both changing the national utilization of water, and via desalination plants. In particular:

we can have sufficient water, if we can pay for it. Once again, this underscores that poverty and not the environment is the primary limitation for solutions to our problems Desalinisation [sic] puts an upper boundary on the degree of water problems in the world.¹²¹

However, before even utilizing desalination plants, it may be possible to reduce water usages within an economy, via moving from high water utilization schemes, to low water uses. In principle, this means a movement away from agricultural production, as agriculture is typically water intensive (ironically, often the varieties that were heralded with the Green revolution).¹²² Consequently: 'It is reasonable to expect that the most water-scarce nations will shift their availability away from agriculture and towards more valuable output in services and industry'.¹²³ Moreover, any shortages in food availability from this shift in production should be offset via 'extra imports by extra production in the water abundant countries, particularly the United States'.¹²⁴

Similar conclusion, that economic prosperity (often mixed with a strong dose of technological optimism) will solve the problems facing humanity, is repeated with overall problems like climate change,¹²⁵ and interconnected problems like malaria,¹²⁶

¹¹⁹ *Ibid.*, p. 176.

¹²⁰ *Ibid.*, p. 21.

¹²¹ *Ibid.*, p. 153.

¹²² *Ibid.*, p. 62-3.

¹²³ *Ibid.*, pp. 155, 158.

¹²⁴ *Ibid.*

¹²⁵ *Ibid.*, p. 317.

¹²⁶ *Ibid.*, p. 292.

food production,¹²⁷ and, to a degree, even with AIDS.¹²⁸ It is at this point that Lomborg has again overstated his case. In doing so he fails to understand the political economy of sustainable development. That is, although I fully concur with Lomborg's general conclusion that economic development is needed in multiple countries, I disagree with his understanding of the current economic situation, and his interpretation of the future economic prosperity for all countries, premised on the restrictive view of development that he presents.

Current Development Situation

At the United Nations Millenium Summit, world leaders agreed on a set of quantified and monitorable goals for development and poverty eradication by 2015. As Lomborg correctly points out, clear progress in moving towards these goals has been made in a number of countries and regions. However, although he does concede there are differences in the rates of success, these differences are actually more distinct problems than he concedes. Behind the record of overall progress lies a more complex picture of diverse experiences across regions in both overall indicators, and differentiation with regard to aspects of their implementation. Although the economies of some countries are clearly growing, the economies of other countries are clearly shrinking. In the period 1990–9, 10 countries saw their economies contract by more than 5 per cent per year. Only 6 countries grew at more than 5 per cent; East Asia grew much more; South Asia a little, America and the Middle East scarcely changed, and sub-Saharan Africa sunk. A large part of this growth, especially in developing countries, can be attributed to external (private sector) investment which is limited to a small clutch of countries. For example, in 1997, 10 countries took three quarters of the world's foreign

¹²⁷ 'It is now well recognised that failure to alleviate poverty is the main reason why undernutrition persists'. *Ibid.*, pp. 101, 66.

¹²⁸ The problem of AIDS is 'primarily caused by political and social factors'. *Ibid.*, p. 15.

investment; China took a quarter, while the poorest countries received little investment.¹²⁹

In terms of the Millennium Goals, the 2001 Human Development Report, brought out by the UNDP, points out that although 66 countries are on track to reduce under-five mortality rates by two-thirds, 93 countries, with 62 per cent of the world's population, are lagging far behind or slipping. Similarly, while 50 countries are on track to achieve the safe water goal, 83 countries, with 70 per cent of the world's population, are not. More than 40 per cent of the world's population are living in countries on track to halve income poverty by 2015. Yet they are only in 11 countries (that include India and China with 38 per cent of the world's population), and 70 countries are far behind or slipping. Without China and India, only 9 countries, with 5 per cent of the world's population, are on track to halve income poverty.¹³⁰ In terms of overall development (via the comprehensive UNDP Human Development Index), Zambia had a development standard less than it had in 1975. Romania, the Russian Federation, and Zimbabwe have development standards below their 1980 levels. Development in Botswana, Bulgaria, Burundi, Congo, Latvia, and Lesotho are lower than their 1985 development levels. Belarus, Cameroon, Kenya, Lithuania, the Republic of Moldova, South Africa, Swaziland, and the Ukraine all have development levels lower than those at the start of the 1990s. Finally, Namibia and Malawi have development levels below those prevalent in these countries in the mid 1990s. Shocking results can be seen with smaller, specific indicators. For example, in 27 countries, there has been a net decline (greater than 5 per cent) in the enrolment of girls in secondary schools since the mid-1980s.¹³¹

As it stands, of the 4.6 billion people in the developing world, more than 850 million are illiterate, nearly a billion lack access to improved water sources, and 2.4 billion lack access to basic

¹²⁹ Editor, 2002, 'The Chips Are Down', *New Scientist*, 27 April, p. 31.

¹³⁰ UNDP, *Human Development Report 2001*, Oxford University Press, New York, p. 1.

¹³¹ *Ibid.*, pp. 10, 15.

sanitation. Nearly 325 million boys and girls are out of school, and 11 million children under the age of five years die from preventable diseases each year. Around 1.2 billion people live on less than \$1 per day, and 2.8 billion on less than \$2 per day. Such problems are all present in the OECD countries, with more than 130 million being classified as income poor and adult functional illiteracy rates at 15 per cent.¹³²

Finally, it is important to note the often widening inequalities between the richest and the poorest, both between countries and within countries. With regard to world inequality, in 1993, the poorest 10 per cent of the world's people had only 1.6 per cent of the income of the richest 10 per cent. The richest 1 per cent of the world's people received as much income as the poorest 57 per cent. Nearly 25 per cent of the world's people receive 75 per cent of the world's income, and in the United States alone, the richest 10 per cent of the population have a combined income greater than that of the poorest 43 per cent of the world's people (around 2 billion people).¹³³ In total, the richest 20 per cent of the world spend 86 per cent of its wealth.¹³⁴

In terms of inter-country inequality, a study of 77 countries with 82 per cent of the world's population shows that between the 1950s and the 1990s inequality rose in 45 countries, and fell in only 16. In the remaining 16 countries, no trend was evident.¹³⁵ In the United States, over the past two decades, following 60 years of moving towards a more equal society, the trend has been thrown into reverse. Close to 40 per cent of the national wealth is now owned by the top 1 per cent of households, very close to where it was in the 1920s, after having fallen to a far more equitable 20 per cent in the 1970s.¹³⁶

¹³² *Ibid.*, pp. 9–10.

¹³³ UNDP, *Human Development Report 2001*, Oxford University Press, New York, p. 19.

¹³⁴ Editor, 2002, 'The Chips Are Down', *New Scientist*, 27 April, p. 31.

¹³⁵ *Ibid.*, pp. 16–7.

¹³⁶ Editor, 2002, 'The Chips Are Down', p. 32.

The above situation suggests that although overall progress in certain indicators may be apparent over the last 30 years, this has not been evenly shared. In certain countries, the situation is worse, not better. Even within many of the wealthier countries, a chasm of inequality between the citizens is often developing. The question, however, is not only one of the current situation, but what will happen in the future, when global population growth moves from a current six billion, to close to ten billion, and much of this growth will be in the countries which are already suffering? That is, will the progress of humanity, overall—and in this context, in economic terms—be better or worse?

Climbing Out of Poverty?

It is essential to attempt to answer this question, as many of Lomborg's predictions rest on the assumption that as countries generally—and individuals within countries—gain more wealth, they will move away from the environmental threats that may surround them. For example, countries with water shortages will be able to solve their problems through (expensive) applications like desalination. I find this suggestion unrealistically optimistic. The countries that currently utilize desalination plants (such as Kuwait, Saudi Arabia, and Libya) are, in relative terms, quite economically (but not necessarily developmentally) wealthy due to their oil reserves. Conversely, many of the countries facing water stresses are already very poor, and by 2025 their numbers (often paralleling large population growths) will be greatly expanded. This list includes countries such as Ethiopia, Malawi, Haiti, Burkina Faso, Somalia, Rwanda, Algeria, and Burundi. The economic options for these countries are few, to say the least. To expect that they will advance to the economic positions of more resilient, but equally water-vulnerable countries such as Singapore, Egypt, Oman, or Kuwait, etc., within less than 25 years is highly unlikely. This is especially so given the current directions in the international arena, pertaining to considerations such as debt, trade, and markets.

As I have discussed these areas in detail elsewhere,¹³⁷ I shall only apply my analysis of these factors to the areas that Lomborg has advocated. First, it is necessary to say something about Lomborg's rosy view of the current economic situation. This is clearly mistaken, as in reality, often countries which are suggested as making stable progress at the time of printing a book end up being on the verge of collapse six months later. The current example of this is Latin America. In this region, following the economic meltdown of Argentina in the middle of 2002 (as of July 2002, their currency was at three quarters of the value it was at the beginning of the year) it seems quite possible that a domino effect may be seen in a number of other Latin American countries (notably Brazil, Uruguay, Paraguay, Venezuela, and Peru).¹³⁸ The key country in this pact is Brazil (the largest economy in Latin America), which despite Lomborg's earlier prognosis, is facing a debt situation (which, in terms of the public debt to GDP ratio, has risen from 49 per cent in 1999 to 55 per cent in 2002). This situation has caused leading market analysts (such as Morris Goldstein, of the Institute for International Economics) to predict a 70 per cent chance of debt default by the end of 2003.¹³⁹ The importance of debt in this area, as with multiple other developing countries cannot be underestimated (although Lomborg suggested that the debt crisis in this region had been largely dealt with). Despite repeated international attempts to solve the worst areas of the debt crisis, the overall problem has not only remained but (in total terms) has grown from 50 billion in the early 1980s to

¹³⁷ For a full examination of these issues, see Gillespie, A., 1999, 'Ideas of Human Rights in Antiquity', *Netherlands Quarterly of Human Rights*, vol. 17. no. 3, pp. 233-58.

¹³⁸ *The Economist*, 2002, 'A Region Prays It Will Not Slide Down Argentina's Slope', *Economist*, 29 June. Also, 'Here We Go Again', in the same issue, pp. 13; 41-2; Reuters, 2002, 'Region in Turmoil', *NZ Herald*, 28 June, p. B1.

¹³⁹ Goldstein, G., Noted in *The Economist*, 2002, 'Spreading the Risk', 29 June, p. 74.

over 1.9 trillion in 1999. As such, the debt problem is not only getting worse, it is continuing to threaten the long-term development of dozens of countries—in both economic and ecological terms.¹⁴⁰

Free Trade, Free Markets, and Need

The second area that Lomborg has unwarranted faith in is with the international trading regime. Undoubtedly, international trade can be the engine for vast amounts of good results. However, when poorly structured, it may work in the opposite direction. Lomborg's idealism on free trade is clearly seen with regard to food questions. In particular, he suggests that any countries that may be detrimentally effected by climate change in terms of agricultural output, or those that may have to diversify due to water shortages, should be able to make up their shortfalls via purchasing through international trade. Given the economic predicament of many of the most likely affected countries, it is unclear exactly how they will achieve the necessary funds to achieve such goals. Despite the implicit assumptions in Lomborg's text that somehow those with more will help those with less, the reality is—and can be expected to continue as the markets evolve without any rules to the contrary—that in an international market place, the food will go in the direction of those who can pay the top price. Moreover, if a proper free trade in food is agreed, and the current subsidies in many developing countries are removed, food prices can be expected to rise.¹⁴¹

The above conclusion—that price, not need—is exactly the same with many of technological developments that Lomborg hangs his hopes on. For example, with the much heralded hopes of genetically modified (GM) crops and possible future food

¹⁴⁰ For a full discussion of this, see Gillespie, A, 1999, 'Ideas of Human Rights in Antiquity', *Netherlands Quarterly of Human Rights*, vol. 17, no. 3, pp. 233–258.

¹⁴¹ Bongaarts, J., 2002, 'Population: Ignoring Its Impact', *Scientific American*, January, pp. 65–6.

shortages,¹⁴² the bottom line is that GM crops will not feed the world any more than existing food supplies do, when they are tied to the vagaries of the free market and are tied to the financial directives of those with more money.¹⁴³ A very similar conclusion is to be found with some of the lesser problems that poorer countries face, such as malaria, which Lomborg suggests should be focused on, over and above other problems such as climate change. The difficulty here is not that problems such as malaria should not be concentrated on (far from it). Rather, the difficulty is that (despite a few notable public sector attempts) drug companies are reluctant to fund research on vaccines and drugs for a disease that occurs mostly in countries unable to pay for treatment. Of course, new drugs is just part of the answer. International efforts to the use of insecticide-treated bed nets and combinations of existing drugs, have strong potential in combating this disease. Such a basic control programme would cost roughly \$2 billion per year. However, global spending on this (despite a World Health Organization, and United Nations General Assembly initiatives in this area) is less than \$100 million per year. Set against the economic cost for Africa—an estimated \$12 billion per year—this is a massive saving, but Africa, by itself, cannot afford it. And those who can are less than forthcoming.¹⁴⁴

Theoretical Property and the Real World

A final example in which Lomborg places theoretical market mechanisms at the centre of his utopian vision is that of world fisheries. While admitting that some of the global fish stocks are over-harvested, he applies (in addition to fish farming)¹⁴⁵ the traditional argument that the solution to the classical 'tragedy

¹⁴² Lomborg, *The Sceptical Environmentalist*, 96, pp. 342–8.

¹⁴³ Editor, 2002, 'Feed the World?', *New Scientist*, June, p. 15.

¹⁴⁴ Honigsbaum, M., 2002, *The Fever Trail: In Search of the Cure for Malaria*, Farrar, New York. See also, Editors, 2002, 'A Death Every 30 Seconds', *Scientific American*, 4 June.

¹⁴⁵ Lomborg, *The Sceptical Environmentalist*, p. 108.

of the commons' problem is to be found if 'ownership can be established over fish'.¹⁴⁶ I do not disagree with these conclusions, but unless they are tied into broader international legal and political debates, they fail to recognize the next stage of the debate and add little to the real problems the international community is currently facing.

The political difficulty with this theoretical analysis is that, in the real world, vast areas of the ocean are beyond the sections in which either Exclusive Economic Zones apply or strong fisheries agreements exist. As such, by the end of the twentieth century, the problem of protecting the open oceans became not so much one of 'ownership' of the resources, as one whereby some countries, or individuals within them, sort to actively violate the conservation objectives of national, regional, or international oceanic management regimes. This problem became even more complicated as the owners of vessels went 'flag shopping' (to fly the flag of countries which are not parties to fisheries agreements, and thereby avoid its conservation requirements).¹⁴⁷ This problem is typically recognized as Illegal, Unregulated, and Unreported (IUU) fishing, which may be consuming as much as 30 per cent of total fishery catches. In certain instances, such IUU may threaten the sustainability of parts of the resources of which international agreements are built upon. This has become a distinct problem within the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR),¹⁴⁸ the Commission

¹⁴⁶ Ibid., p. 107.

¹⁴⁷ FAO, 2000, *The State of the World's Fisheries and Aquaculture*, FAO, Rome, p. 13.

¹⁴⁸ CCAMLR Newsletter, No. 19, December 1997, p. 2. Also, Anon., 1996, 'Toothfish Pirates', *New Scientist*, 9 March p. 13; Anderson, I., 1998, 'Pirates Ahoy', *New Scientist*, 5 December, p. 8; *Illegal and Unregulated Fishing in the Convention Area*, CCAMLR XIX-2000, Commission Report, Para 5.1-5.1.6; See Associated Press, 2000, 'Antarctic Fishing Out of Control', *NZ Herald*, 6 November; See *Illegal and Unregulated Fishing in the Convention Area*, CCAMLR XVII-1998, Commission Report, Para 5.3. (8) Year Book of International Environmental

for the Conservation of Southern Bluefin Tuna (CCSBT),¹⁴⁹ and the Indian Ocean Tuna Commission (IOTC).¹⁵⁰ Given this reality, the problem is not of establishing theoretical 'ownership' regimes for fisheries, but mechanisms with teeth in international law, which actually protect them.

Conclusion

Scepticism is something we should all adopt. It is a wonderful philosophical tool when applied with skill. However, when applied badly, it has the potential to create more damage than good. In this area, I fear the *Sceptical Environmentalist* has done the latter. I fear this because of problems in Lomborg's advocacy with respect to data, misleading interpretations of problems, a failure to understand uncertainty, risk, and the precautionary principle, a simplistic analysis of the possibilities of technology

Law, 1997, pp. 267–8. (9) Year Book of International Environmental Law, 1998, pp. 265–6, 306–7. CCAMLR XVIII–1999, Commission Report, Para 5.2.

¹⁴⁹ See CCSBT, Report of the Third Resumed Annual Meeting, Canberra, 18–22 February, Item 11.3; CCSBT, Report of the Fourth Annual Meeting, 1996, Canberra, 8–13 September 1997, Agenda Item 8; CCSBT, Report of the Fifth Annual Meeting, Tokyo, 22–6 February 1999, Agenda Item 7, F Attachment; Action Plan Concerning Promotion of Accession to, and Cooperation with, CCSBT by Non-Member States and Entities; CCSBT, Report of the Resumed Fourth Annual Meeting, Canberra, 19–22 January, 1998, Agenda Item 2; CCSBT, Report of the Sixth Annual Meeting, Canberra, 29–30 November 1999, Agenda Item 4; CCSBT, Fifth Annual Meeting, Second Part, Tokyo, 10–13 May 1999, Agenda Item 6.

¹⁵⁰ See Appendix VII, Report of the Second Session of the Scientific Committee, Report of the Indian Ocean Tuna Commission, Report of the Fourth Session, Kyoto, 13–16 December 1999. IOTC/S/04/99/R[E], Paragraph 24; Appendix IX, Resolution 99/02, Calling for Actions Against Fishing Activities by Large Scale Flag of Convenience Longline Vessels, Appendix VIII, Resolution 99/01.

in these areas, and a superficial view of security. Finally, his analysis of the political economy with regard to differentiation within overall results relating to 'economic progress', problems of international debt, the structure of free trade, or the lacunas in international policy (with regard to property debates) is lacking. Unless all of these problems are addressed, there will be misleading analysis and discussions of sustainable development, and faulty foundations may be laid or further entrenched.