

Towards an Ecologically Sustainable Growth Society

Physical Foundations, Economic Transitions, and Political Constraints

Authors: Bruno Fritsch - Stephan Schmidheiny - Walter Seifritz

1. Preface
2. Chapter 7, by Stephan Schmidheiny

1. Preface

This book is the work of three specialists from the field of Economics (B.F.), Business (S.S.) and the Natural Sciences (W.S.). While each chapter concentrates more or less on one or other of these areas, with varying degrees of complexity, it is hoped that the readers whatever their background will find something of value in each section, in particular those outside their own disciplines. The authors believe that such cross fertilization of ideas will become increasingly needed in the coming development of a sustainable growth society and it is therefore their hope that this book, as a first example of its kind, will thereby contribute in an interdisciplinary way to the general understanding of the issues of sustainable growth.

The authors divided their main contributions to the book as follows:

Bruno Fritsch	Chapters 1, 2, 3, 4, 5 and 8
Stephan Schmidheiny	Chapter 7
Walter Seifritz	Chapters 2, 3, 4 and 6

They would like to thank in particular Lloyd Timberlake for his editorial advice and his assistance on chapter 7. Special thanks are due to Irena Kusar for preparing the original figures and diagrams and to the Paul Scherrer Institute for permission to use the illustration, printing and copying facilities during preparation of the manuscript.

They would also like to thank Richard Stratton for assembling, typing and correcting the text, editing and final layout and for his helpful advice and contributions to organising the presentation of the material. Two of us (B.F. and W.S.) and the editors would like to offer grateful thanks to Stephan Schmidheiny for his support and encouragement in the publication of this work.

TABLE OF CONTENTS

7. Ecoefficiency and the entrepreneurial factor	155	
7.1 Sustainable Development	155	
7.2 About Business		157
7.3 Reflecting Environmental Reality	161	
7.4 The Concerns of the Developing World	165	
7.5 Trade and Technology Cooperation	168	
7.6 Farming and Forestry	172	
7.7 Capital Markets		174
7.8 The Corporate Agenda		176
7.9 References to Chapter 7	180	

8. Summary and conclusions	183
8.1 Towards an Ecologically Sustainable Economic Growth	183
8.2 The Key Concept: Ecoefficiency	185
8.3 Conclusions	186
8.4 References to Chapter 8	191

2. Chapter 7. Ecoefficiency and the entrepreneurial factor

7.1 Sustainable Development

The Business Council for Sustainable Development (BCSD)

The preceding chapters strive to show that sustainable growth is possible, both from the points of view of the physical and natural sciences, and from the point of view of economics.

This is a controversial conclusion. Many environmentalists, looking at the damage which they feel has been caused already by economic growth, argue that no further increment is desirable. Others, including some economists in the World Bank (Goodland et al, 1991), argue that further growth in the industrial nations is potentially destructive to global ecosystems. They add that unlimited sustainable growth is impossible for any organic system, and that for all systems there is a size at which efficiency is optimised.

This chapter looks at the problem from a business or entrepreneurial point of view, and thus does not take a stand on the hypothetical feasibility of sustainable growth. But even an entrepreneur without scientific or scholastic economic training can see that sustainable growth is absolutely necessary for the foreseeable future, and that any stance against growth is either an extremely cruel or an extremely ignorant position.

Economic growth is required for three reasons. First, right now over one billion people out of a global population of well over five billion live in poverty, according to the World Bank, unable to meet daily needs for adequate food, clean water, safety, housing, education and health care. (World Bank, 1991). Alleviating this situation will require economic growth over a vast area of the globe. Second, the global population is expected to at least double within the next century, most probably within the next 40 years (Population Concern, 1991). Over 90 per cent of this increase is expected in the developing world. What will meet their needs unless it is economic growth? Third, people do not limit the sizes of their families until they are confident that they can keep their children alive. For this, they require adequate food, health care, education and job opportunities. Some very poor areas of the world have managed to make such "development" available for the poorest, those who are having the most children. But, given the numbers involved, economic growth will be required to slow current population growth rates.

But let us be frank and not hide completely behind the ethics of the needs of the poor. Capitalism, the competitive market system which appears to have resoundingly defeated other centrally planned systems, has a broad foundation of belief. But one crucial belief is the faith of all of those entering the market that he or she can make his or her business grow or prosper. Where this faith is dampened, then the ability of capitalism to deliver its benefits, among which are widespread opportunity, efficiency, and innovation are also dampened. So those who theorise that there has been enough growth in the industrial North, must devise a whole new market system which can deliver opportunity, efficiency and innovation, while the participants in that system remain satisfied with stagnation.

On the other hand, those who believe that the "free", competitive market is the best system for all, must prove that its is compatible with the goal of "sustainable development" - that is, roughly, development which

meets the needs of the present without compromising the ability of future generations to meet their own needs. Or they must show how the system can be refined -lessening its benefits - to be compatible with that sustainable development goal.

Forty-eight company chief executive officers and chairmen and chairwomen of boards, working as the Business Council for Sustainable Development (BCSD), published in 1992 a report to that summer's UN Conference on Environment and Development in Rio de Janeiro, showing how the system must be refined (Schmidheiny et al, 1992). That report found that business is partly moving in the right direction; it found further opportunities for competitiveness in continuing to move in this direction; and it marked innumerable severe challenges, which must be solved by coalitions of business, governments and the public. This chapter picks up some of the main themes of that report.

7.2 About Business

"Business" is a vague term. In this context, it covers all conceivable commercial activity: commerce, industry, services, farming, and forestry. Many environmentalists argue that business, in its short-term pursuit of profit, is the primary villain on the environmental scene. At first glance, the evidence seems good: all businesses, from peasant farms to multinationals, use natural resources in one form or another. Many use those resources wastefully and inefficiently. Many businesses pollute. Or they aid and abet the pollution of others, as when banks finance dirty factories or products are over-wrapped.

But there are reasons why business operates as it does. Most businesses operate within the laws of the societies in which they are based. In democratic societies, these laws have the sanction of the majority of people because they have been made by representatives of the people. Most people want to pay as little as possible for all products - from candy bars to energy. When offered a choice at the polls, they tend to vote for those who promise to keep prices low. Businesses provide goods and services as cheaply as possible so as to win customers and clients away from competitors. These combined pressures often mean that the environmental costs of our operations are left off of the balance sheets of both business and society.

Thus it is as naive to treat business as something separate from society as it is to treat the "environment" as something separate from business. Business operates within a societal framework, the laws and logic of which determine its coping mechanisms as surely as the ocean framework ultimately determines the coping mechanisms of a fish. This is not to claim that business is not responsible for its actions. Within that framework, entrepreneurs make decisions, take risks and adapt strategies by which they will and should be judged. But before business operations can be expected to reflect environmental truths, the operations of society as a whole must be altered to reflect environmental truths. Since Nature's laws cannot be changed, then human laws, and human economic systems must be changed as necessary to work within those laws. For the violation of those laws eventually puts a stop to all progress, development and growth as the preceding chapters have attempted to show.

Such societal changes can only be brought about by business, governments, and citizens (both in their masses and in their pressure groups: whether environmental or otherwise). Yet before they can work together for change, each sector must itself change. Individual businesses, traditionally and quite rightly competing with one another, must learn to work together on the long term issues that affect all of them. The report to the Rio 1992 United Nations Conference on Environment and Development (UNCED) by the BCSD offers an example of an attempt at such cooperation. Governments must find ways of putting the concept of sustainable development into all decision-making processes and all ministries or departments - so that the Ministry for Industry is just as concerned with sustainable development as the Ministry of the

Environment. And citizens' groups must learn first to work with one another and then to work more efficiently with business and governments, being always careful to focus on issues of high priority.

Those pre-requisites for social change may appear to be hopelessly idealistic that is, until we look at what positive changes have already occurred, due to pressures from all three sectors.

- Customers are demanding cleaner products, as well as products and services which support the development goals of poorer countries. This customer concern comes in rising and falling waves, but there is an overall upwards movement.
- Insurance companies are more amenable to covering clean companies, so as to avoid paying out for environmental damage and accidents.
- Banks are more willing to lend to companies which prevent pollution rather than having to pay for expensive clean-ups, or fight expensive law-suits, or both.
- Employees, particularly the best and the brightest, prefer to work for environmentally responsible corporations.
- Environmental regulations are getting tougher, and will continue to get tougher.
- New economic instruments - taxes, charges and tradeable permits - are rewarding clean companies. Business is calling for the increased use of such instruments as, when well-drafted, they appear more cost-effective and less market-distorting than command and control regulations.

None of these trends is compelling by itself, and the strength of each varies tremendously from nation to nation. But taken together, they produce a powerful effect. From the perspective of business, they are pushing environmental problems up the company hierarchy. Today in the best companies the Chief Executive Officer is also the Chief Environmental Officer. CEOs are learning that the environment is not a limited sector, but has a part to play in every single decision - just as do the *questions of quality and profitability. So CEOs are assuming new responsibility and driving it home throughout the operating divisions of the company. They are beginning to go beyond regulation and seeking creative ways of improving corporate environmental management; they are encouraging their peers to do the same. Business has had the advantage of already coping with the "quality revolution". As long as it focused only on the end of the assembly line, then improving quality meant discarding or fixing rejects - and thus it meant increased costs. But once it examined the total system from design on through, it found it could design quality in at the beginning, minimise rejects and actually save money. Having done the unthinkable in one area improving quality while cutting costs - business can now at least begin to think the unthinkable in another area: decreasing resource use and improving environmental management, while cutting costs.

Again from a business point of view, the concept which best sums up the business approach to sustainable development is the term "eco-efficiency", coined by the BCSD. The Council sought a link between the two ideals of business and environmental excellence. It found that link in the concept of efficiency, which connects business, the environment, and the increasing human needs of this generation and of the larger generations to come. Efficiency keeps companies competitive; it adds most value with the least use of natural resources; and it is crucial in the fight against mass poverty in the world.

So it went further and developed the notion of eco-efficiency to describe those corporations that produce ever more useful goods and services while continuously reducing resource consumption and pollution.

After studying world-wide business trends, the Council agreed that tomorrow's winners will be those who make the most and the fastest progress in improving their ecoefficiency.

There is academic evidence that this is as true for countries as it is for companies. Harvard Business School Professor Michael Porter researched various aspects of competitive advantage among countries, and he

"found that the nations with the most rigorous [environmental standards] requirements often lead in exports of affected products.... The strongest proof that environmental protection does not hamper competitiveness is the economic performance of nations with the strictest laws."

He noted the successes of Japan and Germany, and that of the United States in sectors actually subject to the greatest environmental costs: chemicals, plastics, and paints.

So there is opportunity in sustainable development, and there is some momentum towards it. If business, governments and citizens can organise themselves individually and cooperatively to accelerate that momentum, what might their agenda be?

At the top of the agenda, would be a set of "arguing and operating principles" upon which all participants could agree. And the first of these might be to adopt the "precautionary principle", which says - in various wordings in various international agreements - that a lack of scientific certainty should not be used as an excuse for postponing measures that prevent major, irreversible environmental degradation.

A second principle might be not to insist on having a certain knowledge, of where society will be many years ahead. In other words, it is obvious that the price of fossil fuels must increase so that they are used more efficiently, so as to encourage the search for "new and renewable" energy sources, and so that these sources will become competitive more quickly. So let us not fail to begin because we cannot agree on how much gasoline will cost in the year 2020, but let us commit ourselves to a process of raising those prices. We can always adjust and refine.

A third principle might be to seek out, wherever possible, "no-regret" policies. These are steps - such as increased energy efficiency or the development of drought resistant crops - which society will not regret even if global warming does not prove to be as threatening as it now seems.

7.3 Reflecting Environmental Reality

The first step is to refine the market system so that it is less distorted in terms of environmental realities. It has often been said that socialism collapsed because it told neither economic nor environmental truth; market economies will collapse unless they can reflect environmental realities.

Today's markets tend to lump the costs of environmental degradation under the term "externalities". These may include anything from, damage to human health by the pollution of a village blacksmith's fire, to damage to the global climate by greenhouse gases. Both are real, but neither is traditionally figured into the costs of doing business.

Thus markets, and business, must include "externalities" in the costs of doing business. These costs are often difficult or impossible to establish with mathematical accuracy, but the work must proceed using presently available knowledge and practices. There are strong precedents for this work. The members of

the Organisation for Economic Co-operation and Development (OECD) agreed to the "Polluter Pays Principle" (PPP). This says that polluters should bear the full costs of any damage they cause.

There are various ways by which environmental costs can be included in the costs of doing business, so that business minimises these costs. The first, and most traditional, mechanism is the command-and-control regulation. These government regulations include such approaches as performance standards for technologies and products, and effluent and emission standards. Regulations have served a purpose, and there will continue to be a need for a regulatory framework in all countries, particularly in cases of health risks or risk of serious, long-term damage. The second mechanism is self-regulation, whereby corporations or sectors of industry regulate themselves through such processes as standards, monitoring and pollution-reduction targets. Self-regulation can be cost-effective to society because business often holds the information on technologies and emissions that governments need if they are to regulate effectively. However this also calls for trust between government and the business community. The third general type of mechanism is economic instruments, whereby governments intervene in the marketplace by way of such things as pollution taxes and charges, tradeable pollution permits, deposit-refund systems (as with glass bottles), performance bonds, resource-saving credits, differential prices (as with unleaded versus leaded gasoline), special depreciation provisions and the removal of distorting subsidies and barriers to market activity. Such instruments, should be developed and tried, as they have the potential for both decreasing business and government compliance costs, and for encouraging polluters to change to cleaner technologies and to develop those technologies, because it always pays for them to clean up more.

The BCSD argued that the best approach was to seek an optimal mix of command-and-control regulations, self-regulation and economic instruments. The proportions of ingredients in the mix should be determined by considerations of efficiency (which measures are most cost-effective for society?); flexibility of response (can business, and the public, still respond with different paths towards the same goal?); confidence in the regulatory environment (does business know enough about the impacts to plan effectively?); gradual introduction (does business have time to respond effectively?); "the level playing field" (do regulations affect all comparable enterprises equally?); and transparency of compliance (can each business be seen to comply with regulations, with there being no free riders or unduly privileged companies?).

Much of this book has dealt with energy, which is appropriate because energy is crucial for human progress. But its use also causes global, regional, and local pollution; and its price rarely reflects the environmental costs associated with its use. But it would be impossible to return to the low-energy scenario of the past, or change energy systems radically without destroying national economies, all of which are based to a great extent on the burning of fossil fuels.

Given the importance of energy as both the basis of economic development and a major threat, through pollution, to economic development, it is absurd that so few countries have anything like a rational energy policy. Energy prices are the first component of markets which must be made to reflect environmental costs. And for this to happen, national energy plans must be developed towards a coherent resource policy with a longer time horizon. The policy should be built on three pillars, with business playing a large supporting role throughout. The pillars are increased energy efficiency; a more sustainable mix of energy sources and consumer patterns; and a long-term energy strategy for developing nations.

Many studies on energy efficiency reveal tremendous scope for savings, which will buy time for the development of new and renewable energy sources (International Panel on Climate Change, IPCC, 1990). Electricity prices that reflect the replacement cost of new plants would encourage improved efficiency on the demand side and help finance more efficient power plants. From the industrial point of view, the long life of equipment creates investment horizons of 20-30 years, while more efficient equipment becomes

available yearly. Thus, the lower the energy price, the longer old and inefficient technology remains in use - particularly in energy-intensive industries. In the commercial and residential sector, governments and business must work together to improve appliance standards and building codes; provide better information about energy consumption at point of sale; encourage purchasing judgements to be based on the lowest life-cycle cost, rather than lowest first cost; and provide grants and loans for energy-saving installations. Cooperation is also needed in the transportation sector, with business creating the appropriate technologies and systems for efficiency while governments create a framework for action, which includes giving transportation the environmental price tag it deserves. Governments should improve the competitiveness of public transport, and insure that different modes of transportation are allowed to compete on equal terms and that sufficient funds are available for research on energy efficiency.

More sustainable mixes of energy sources and consumer patterns must be constructed in a careful and systematic way to avoid economic disruption. The, most immediate priority is to reduce the environmental impacts of fossil fuels and encourage energy conservation, while reducing the risks of operating existing nuclear power plants in central and eastern Europe. The next generation of work centres on developing clean coal technologies, a balanced nuclear expansion, some form of biomass-based energy, solar energy sources, and further hydro-power development. Over the longer term, business must cooperate in intensive research efforts to make fuel cells a widely-used energy conversion technology. For developing countries, large-scale commercialisation of charcoal and fuels from biomass plantations will be important. Such countries will also want to encourage development of indigenous resources; reform energy pricing policies and remove subsidies; cooperate with industrial countries on energy technologies; and develop energy strategies locally to, meet local needs.

When developing the "optimal mix" discussed above in terms of energy, each country should judge this mix against the double: goal of price-induced conservation, by the consumer, and cost- induced innovation by the producers of energy and energy- consuming products. Cost-effectiveness remains the key to policy selection. A better mix of real energy prices, stricter standards and better information will help save energy world-wide. Business will play a major role in implementing the new policies, which will only succeed if they are cost effective, technically realistic and consistent with agreed global objectives.

7.4 The Concerns Of the Developing World

The concern expressed above for establishing markets which reflect environmental reality applies equally in industrial and developing countries. But given the special problems of the developing world, not least rapid population growth, sustainable growth for the foreseeable future is an absolute human necessity there. Yet how can one intelligently discuss "development" given the - until recently - slow progress of Latin America, the slow and very varied progress of Asia and the virtual lack of development in most of Africa since "development" became a priority after independence.

However, there are at least three basic lessons one can draw from the development experience. First, economic growth is a necessary but not sufficient precondition for improved social equity and for more environmentally sustainable development. Second, deficiencies of natural resources, finance, or human talents are not among the main hindrances to, economic development. Misguided domestic policies and patterns of resource allocation, corruption, socialism, fundamentalism and lack of organisation abilities have provided more serious obstacles. Third, unless the developing regions are put on a sustainable path, their problems will affect all parts of the world.

Where governments have tried to carry out nation-building largely by themselves, with little reliance on the entrepreneurial skills of their people, the result has at best been wealth for a minority and relative poverty

for the majority. Poverty is bad for human beings and it is also bad for business. It is business that turns needs into markets capable of meeting those needs. Business is concerned about mass poverty not because it wants to be charitable, but because business can assist development simply by being more effective, more efficient, more innovative and creating more opportunities for more people.

The search for new paths towards sustainable development must be based on local initiatives and decisions supported by carefully planned and far-sighted international cooperation. Economic progress, social progress, and the sound management of environmental resources must all proceed apace. To strive for the first goal while ignoring the second two destroys the basis of all progress.

The need for international cooperation introduces the difficulty of "conditionality" which refers to the conditions placed on things like aid, trade and debt relief. Conditionality is condemned by most governments in developing countries, but it is daily reality for business people. Business leaders face conditions from, for example, lenders and investors. But these conditions travel both ways, for the lender and investor meet certain conditions too. The substance and form of the conditions are decided by a bargaining process between the two sides. Thus conditionality - as long as it is acceptable to both sides - might become acceptable in development. A better expression might be "reciprocal commitments".

From a business perspective, one can identify five main, inter-connected problems of particular importance to developing countries.

First, rapid population growth cannot be sustained by most developing nations. Of the about 144 million children born each year, 126 million are born in the developing world (Population Concern, 1991). All successful programmes to reduce population growth have included measures to improve standards of living of the poorest and to decrease infant mortality rates, so parents will have the confidence to have fewer children. Business given the chance - can help governments by fostering economic growth in a socially and ecologically sound way, to keep up with population growth. Business can also create jobs, provide training and help absorb, as many people as possible into the modern sector of the economy.

Second, the combined problems of population growth and poverty cause families to move, either to cities or to fragile ecosystems that should not be farmed. Both types of movement create massive environmental and social problems. The causes of this damage can be traced to the causes of poverty: all the factors which hinder poor people from developing their talents and their potential. These include closed markets, weak education systems, and the lack of access to property, credit, and know-how. Many developing countries need to find ways of providing more farmers with access to land and with secure rights to that land. Given secure tenure, the right market signals and the right information, many of the poorest farmers on the poorest lands can produce surpluses for a growing population.

Debt is the third major problem, though one that appears to be easing in some parts of the world. The combined external debt of the developing world at the end of 1991 was US\$1.35 thousand billion (World Bank, 1991B). The interest payments on this debt alone account for about a third of total exports of the developing countries. These debts have been a major impediment to economic growth, reducing poverty and improving environmental conditions. But several Latin American nations have improved their debt position by changing the macroeconomic and political framework to attract foreign and local investment, encourage internal saving and encourage the return of "flight capital".

This leads to the fourth major concern in the developing world; economic and financial systems based on a modern form of mercantilism, in which governments attempt to manage and manipulate businesses, banking and the markets in general. If governments can open markets in socially sustainable ways, they can then harness entrepreneurial energy for development. This means having relatively few rules, but

seeing to it that those rules are clear, enforced and applicable to all. This is at least a beginning in the effort to achieve an attractive investment climate. Such a climate requires not only free, open markets, but also macroeconomic stability, clear property rights, and political stability. Unless these conditions are largely satisfied, which will be difficult to achieve in many countries, sustainable development will simply not be possible. This is why the structural adjustment programmes developed by the World Bank and the International Monetary Fund, complimented by other institutional reforms, can be helpful.

The fifth area of action crucial to the developing world concerns the development of small and medium-sized businesses. Encouraging the growth of such enterprises also encourages equity of opportunity in economic development, because many jobs in the developing world are in these enterprises. Such enterprises are flexible, react quickly to needs and demands, and show talent for innovation.

7.5 Trade and Technology Cooperation

The problems of developing nations lead directly to the issue of the role of trade in sustainable development. Unless nations trade, they cannot develop; and unless nations develop economically, they cannot protect their environments, clean up environmental damage, or make efficient use of resources.

The ideal of "Free trade" is today under attack from two different camps: those who would intervene for the sake of the environment, and those who are motivated to intervene on the basis of theoretical concepts, such as reciprocal trade, negotiated trade, and managed trade. Free trade has a role to play in the establishment of sustainable development. It would be a great tragedy if the sustained efforts on the part of the General Agreement on Tariffs and Trade (GATT) suffered a reversal.

The goals of internalising environmental costs and making polluters pay remain valid internationally, but also must remain the responsibility of individual governments. Industrial nations are introducing increasing numbers of standards, regulations and economic instruments to internalize environmental cost. If these are not coordinated through international negotiation, they will sometimes constitute non-tariff barriers to trade.

Developing countries should be allowed longer phase-in periods, according to their individual states of development. Goals such as environmental protection and sound resource management cannot be secured by unilateral trade measures. They can be achieved through the negotiation of international environmental agreements. Carefully drawn, these need not threaten trade or the trading system. If such treaties are not forthcoming, the pressure for trade barriers will mount.

To limit the growing conflicts between trade and environmental issues, it is important to identify legitimate points of contact between trade and environment, and to distinguish environmental problems that extend beyond national boundaries. Solving these problems requires cooperation among sovereign states. Restraints on international trade have figured in several recent environmental agreements on such issues as protection of the ozone layer and the transfer of hazardous wastes. Such agreements can and should be made compatible with existing international trade rules. Threats of trade restrictions against countries that do not comply with international environment standards simply reflects the failure of cooperative negotiations. The international trading system is rule-based, not power-based, and it is important to business and governments that it stays that way.

GATT has had a hard enough time negotiating trade-offs between free-trade and social issues, such as farmers' welfare. Factoring in trade-offs for environmental welfare would prove all that much more difficult. The instruments available to GATT to deal with environmental issues are limited; but these should not be allowed to become a loophole to be used by protectionists. Negotiators should consider whether and how GATT's dispute-settlement mechanisms can be used to settle environmental conflicts arising through trade.

GATT law would be improved by being more securely based in the following fundamental principles. First, requirements of prior notification are needed so that all environmental regulations with potential trade impacts become internationally unambiguous. Second, environmental measures that restrict trade should only be legitimate, provided they are backed by strong scientific evidence. Where environmental threats are particularly serious or irreversible, GATT should adopt the precautionary principle. Third, trade restrictive measures should not go beyond what is absolutely necessary to produce a desired environmental result. Fourth, every time an environmental goal can be achieved without a measure affecting trade, trade-related measures should be avoided.

Increasing market access in both industrial and developing countries is a necessary, though by no means sufficient, condition for development. But developing nations that rely largely on agricultural exports must take a hard look at their real costs. Poor countries may be exporting a portion of their own "sustainability" if they are producing export crops by over-using soil, water, and forest systems, and thus reducing future productivity. The issue of trade is closely linked with the issue of "technology transfer" - the movement of the technology required for economic development from where it exists to where it is needed. This transfer has long been a contentious issue in discussions between industrial and developing countries, and was a major issue at the 1992 "Earth Summit" in Rio. But "technology transfer" does not adequately capture the nature of the challenge posed by sustainable development. The more appropriate term "technology cooperation" entails a broader range of objectives, focused on business development and emphasises building up the infrastructure, wealth-generating capacity, and the competitiveness of a country. It works best through business-to-business long-term partnerships that ensure that both parties benefit by commitment to the continued success of the project.

The "software" of a technology is as important as the hardware. Software here refers not only to the know-how, operating, and maintenance skills associated with the technology, but also to adaptations appropriate to the cultural context and experience of the receiving organisation and the society that is going to use it. Software also includes the communications and other training tools to be provided by the technology's originator.

Technology cooperation for sustainable development is becoming a major focus of business, governments, and multilateral organisations. Such cooperation is a complex set of links. First, there is a desire to transfer technology that will encourage competitive advantage and environmentally sound development. For example, governments of industrial countries are realising that it may be cost-effective to protect their own environments by spending money to prevent damaging emissions that arise outside their own borders. Multinationals are also recognising the need to be as clean abroad as at home. Second, participants want long-term partnerships for technology cooperation, as these are the primary means of international business development. Elements of such partnerships include a long-term commitment to business development, to the training of employees, to adapting, improving and upgrading technologies, and to introducing new management systems. Key in this context is the adaptation and orientation of technology to the local needs of people and markets in developing countries.

Third, the provision of technical and management training is essential for safe, efficient and environmentally sound operations. Basic education determines the skills and attitudes of the work-force. Advanced education sets the orientations and attitudes of professionals and managers. Training improves and motivates everyone. Investments by governments in education and training is the most critical factor in developing this capacity. Fourth, this training should produce innovators. Making this link involves the integration of personnel from foreign subsidiaries and joint ventures into relevant research and development activities, through training and personnel exchanges inside the company. The purpose is to join the development of technology with technology cooperation.

The final link in the chain of cooperation is that of sustainability itself. Innovation should be linked to the goal of sustainable development and all the management changes, new products, new processes and new infrastructure which go with it.

Creating technologies for sustainable development will require massive efforts and investment over many years. This will be devised within a new mental framework that is only now beginning to form. It will amount to another industrial revolution. This long process should begin at once, and multinationals are expected to lead the way.

7.6 Farming and Forestry

Farming and forestry are central to sustainable development because of the large numbers of people working in both areas, the amounts of assets involved and the extensive, direct impacts both have upon renewable resources and the environment. They are obviously important to industrial and developing nations, but more important to the latter because they provide greater numbers of people with livelihoods and, usually, a greater proportion of the Gross National Product. National and international strategies for the use of such resources must be changed to follow the principles of more open, competitive markets and drastically reduced trade restrictions. There should be more access to key production factors such as credit, land, and know-how. Effective property rights, land tenure and land-use policies should be encouraged. Improvements should be made in education, research and management training, particularly in the developing countries. Business can best contribute to these efforts within the framework of the market economy, with a mix of economic instruments, clear performance-based regulations and corporate stewardship based on international standards.

It is often assumed that wealthier countries do more damage to the environment than poorer countries, but in the case of agriculture, the opposite may be the case. Understanding the reasons for this is essential to achieving the goal of sustainable farming, which involves sustaining a growing population, sustaining farm incomes to keep farmers in business, and sustaining the earth's ability to continue providing food.

Sustainable agriculture has several prerequisites: open markets and clear trade rules; success of GATT's efforts to eliminate the trade subsidies and barriers that distort free agricultural trade; increased food production on existing farm land rather than the clearing of forests and cultivation of fragile soils; and research to develop "Best Management Practices" tailored to local farming conditions; Sustainability is low in many developing countries for many reasons. Poor farmers may lack secure property right, access to credit and access to markets. The difficult soils and ecosystems require more research into suitable new technologies, plants and inputs, along with management practices tailored to poor farms. These countries usually lack extension-agent programmes to train farmers - and farmers to train extension workers about the true nature of their problems; such work must be expanded to, become more client-oriented. Fertilisers and crop-protection chemicals, where these are available, may be used inefficiently and dangerously because of subsidies or lack of training, or both. Infrastructure is poor, so that food spoils or cannot be transported and marketed effectively. And people and their farms are crowded onto fragile soils and inappropriate forest areas. In almost all of these areas, technological solutions are far ahead of political, economic and social solutions.

About three quarters of the planet's forest land are now owned by governments. Government forestry has concentrated on providing raw materials to, large industries, often in pursuit of export markets. But governments have rarely been effective at running forestry enterprises. The growing opportunities and responsibilities for private business in forestry require it to analyse the market conditions and the principles of sustainable use of this renewable resource.

Forests provide many benefits; but in exploiting them, both governments and private business have tended to focus on the more obvious material values of forest products - usually the timber or the forest soil - to, the exclusion of forest ecosystem and social services. This is because forest services have rarely had a market value. As a consequence, developing country forests have declined by nearly half over this century. Forest products must be harvested in ways which allow forests to renew their supply, which means retaining their ecosystem processes and social services. Elaborating the principles of sustainable forestry, implementing them and developing appropriate inventory and accounting techniques will require much more research and development, training, education and management skills. Increased, systematic international cooperation is needed.

Many characteristics of private business make it suitable for involvement in sustainable forestry. These include the effective control of assets; financial resilience; the ability to use resources efficiently due to market competition; resources for afforestation; access to markets; and access to technology and research capability. Private forestry enterprises should strive to meet their commercial objectives while benefiting the local society, economy and ecosystems. Occasionally the provision of social and ecological benefits from forestry can earn income, because demand for them enters the market place (recreation, water supplies and land reclamation). But more often maintaining these benefits is a necessary cost.

Governments should reduce their roles in forestry production, which have been proven to be inappropriate, and transform the production forestry sector into a market area promoting sustainable development. A government's policy framework must include recognising the economic, social and ecological values of forests; treating forests as renewable capital rather than stock resources; ensuring business access to the right kind of land for forestry - which entails neither compulsory acquisition of private or communal property (adverse social impacts) nor the clearing of natural forests for plantations (adverse environmental impacts); and providing clear performance-related regulations of conduct.

7.7 Capital Markets

Capital markets will play an important role in the search for sustainable development. This is an often neglected point. Such development requires increased long-term investments that respect environmental - criteria and development needs in both industrial and developing countries. Most of the investment will come from capital markets.

As nations begin to internalise environmental costs, the ways in which capital markets value corporations will begin to change. Increasingly, firms that further the cause of sustainable development will be perceived as more valuable in the market place. The emerging capital markets in the developing world are becoming powerful tools for development. Making them more open, efficient, and competitive should be a high priority for business and governments. Internalising environmental costs would produce more accurate signals for individual investors, bankers, institutional investors, and insurance companies. It is therefore essential that the criteria and values of sustainable development become an integral part of the information process, so that sound investment and lending decisions can be made.

The World Commission on Environment and Development (WCED, 1987) argued that sustainable development is not a static state but a process of change in which the exploitation of resources, the direction of investments and the orientation of technological development, and institutional change are made consistent with future as well as present needs. Capital markets have an important role in this process. The aims of sustainable development will only be served in the capital and banking markets by a significant change in the way the environmental potential of corporations world-wide is assessed for investment or lending purposes.

There are clear signs that the financial community is beginning to take environmental issues into account. This is partly because legal changes in the US and Europe in some circumstances transfer environmental liabilities to others besides those which directly caused the damage. Banks, for example, may in some cases be pursued by the authorities if their borrowers have caused environmental damage but cannot pay. Furthermore, the increased concern over the insurance risks inherent in unsustainable development has made insurance companies more sensitive to the needs of investing in sustainability. The recent growth of "green" funds, and the support of these investment vehicles from some large pension funds, shows that many investors are becoming more aware of social and environmental issues as important vectors for economic development.

The combination of behavioural and structural change suggests that capital markets may play a large role in redrawing the world economic and environmental map.

7.8 The Corporate Agenda

This chapter has thus far focused mainly on government action because governments, particularly where they represent the priorities of the larger society, as in democracies, must set the framework in which businesses operate. And as argued at the beginning of this chapter, business must take a leadership role in helping government set that framework. And business must be aware of the opportunities for improved competitiveness - also listed above - inherent in ecoefficiency. But what can business do on its own within the improving framework?

Perhaps the first step is to take to heart the lessons of the "quality revolution": that business is able to manage fundamental changes in both planning and action; and that it is able to move in tandem toward objectives that at first appeared to be opposed - in this case, increasing quality while lowering costs. The tools and processes used in the quality revolution, along with the experience gained and the results produced, provide a foundation on which business leaders can build a sustainable future.

In general, over the past 20 years business has tended to be over-cautious and conservative in its approach to the environmental challenge. Society can no longer afford this. It is time for businesses to take the lead. Change by business is less painful, more efficient, and cheaper for consumers, for governments, and for businesses themselves. By living up to its responsibilities, business will be able to shape a reasonable and appropriate path towards sustainable development.

Integrating the principles of sustainable development into corporate operations, and making enterprises eco-efficient, is a multi-faceted process. Chief Executive Officers must recognize that there can be no long-term economic growth unless it is environmentally sustainable. They and their colleagues must confirm that products, services, and processes must all contribute to sustainable development. Companies must maintain credibility with society, which is necessary to sustain business operations. They must create open dialogue with stakeholders, thereby identifying problems and opportunities as well as building credibility through their responses. They must provide meaning for employees beyond salaries, which results in the development of capabilities and growth in productivity. And they must seek, within the above framework, to maintain entrepreneurial freedom rather than face regulatory coercion.

Individual leaders can make a difference, but they cannot transform these goals into realities without a critical mass of other committed individuals. When viewed within the context of sustainable development, environmental concerns become not just a cost of doing business, but a potent source of competitive advantage. Enterprises that embrace the concept can effectively realise the advantages in more efficient

processes, improvements in productivity, lower cost of compliance, and new market opportunities. Businesses with vision may expect to reap advantages over competitors who lack it. Companies that fail to change will become obsolete.

More than ever before business is being challenged by a much broader and more diverse group of people who have a stake in corporate actions. Broadly, these "stakeholders" include not only customers, employees and shareholders, but also suppliers, government, neighbours, the wider community, and public interest groups. Involving these people, with all their differing views and concerns, usually leads to better decisions and more universal support for their implementation. Prosperous companies in a sustainable world will be those that are better than their competitors at adding value for all their stakeholders, not just for customers and investors.

Stakeholder involvement is only one aspect of effective corporate leadership in sustainable development. Commitment to a vision must translate into strategies and action plans. This often involves reorganising, restructuring, and redesigning many processes and detailed systems within a corporation. For example, companies in the "sunset" industries need not face the same fate as the materials they provide, if they can develop environmentally sound substitutes. Old constraints can be turned into new opportunities, such as diversifying from power supply into energy conservation. And new business opportunities can be created by applying corporate assets to a new service, such as environmental protection.

Three other trends in evolving management culture can be identified. First, the traditional roles and responsibilities of boards of directors and top management are evolving to integrate the internal and external dimensions of a business, and to provide new vehicles for stakeholder participation. Second, organisational structures are evolving toward broad network designs that are being stimulated by advancing communications and computer technology. These enable new policy messages to be communicated throughout large, decentralised multinational organisations. This helps support the creation of a corporate culture of sustainable development. Third, an organisational learning culture is being developed, which involves middle management. This culture is based on an appreciation of the need to constantly re-think and be open to relearning the fundamentals of every aspect of business. The ability to tolerate uncertainty, design new strategies, coach, and use statistical tools for managing processes are among the skills required to manage change for sustainable development.

A vision and implementation strategy for sustainable development is most useful if the resultant actions can be reported, thereby offering chances for feedback and improvement. The baseline standard for reporting is stated in the International Chamber of Commerce principle of "compliance and reporting" that is to encourage business to measure environmental performance, to conduct its own regular environmental audits and assessments of compliance, and periodically to provide appropriate information to the Board of Directors, shareholders, employees, the authorities and the public.

A new management and corporate vision will focus attention on new products and processes. Business is now far more efficient than it has ever been. But overall waste and pollution emissions from industry in Northern nations continue to increase. Under pressure from new management attitudes towards extended corporate responsibility, increasing consumer expectations, and tighter regulations, companies are recognising that environmental management now requires the minimisation of risks and impacts throughout a product's life cycle, from "cradle to grave". This is leading to the industrial ideal of an economic system based on "reconsumption" - the ability to use and re-use goods in whole or in part over several generations.

More companies are realising that the pollution they produce is a sign of inefficiency, and that waste reflects raw materials not sold in final products. A growing number of companies are beginning to adopt the logic of pollution prevention. This allows companies to start to take control of the process of environmental

change in a manner that makes economic and operating sense, rather than seeing their own processes controlled by tightening regulations and expectations.

Environmental considerations must be fully integrated into production process, affecting the choice of raw materials, operating procedures, technology, and human resources. Pollution prevention means that environmental concerns become, like profitability, a cross-functional issue that everyone promotes. Unfortunately, many small companies -especially in developing countries - are least able to bear the cost of environmental inefficiency and also least able to mobilise the resources to improve their raw material yields.

There are four main possibilities of preventing pollution. The first is good housekeeping, that is, operating machinery and production systems in the most efficient manner, a basic task of management. Second is materials substitution-replacing a damaging material with a more benign one, which offers the prospect of completely eliminating a given pollution problem. Third, through manufacturing modifications companies can considerably reduce emissions. An example would be simplifying production technology through lowering the number of process stages. Fourth is resource recovery; emissions can be reduced by keeping the polluting agents within the production system, and re-using them in the same or other processes. Some industries have already established complex Industrial ecosystems" whereby the waste from one process becomes the feedstock of another.

As companies become, better at preventing pollution and husbanding resources, attention is shifting from problems caused by production to those caused by the product itself. Corporate environmental responsibility no longer ends at the factory gate. It extends from cradle to grave in a management process called product stewardship. Managing a product life cycle for minimal environmental impacts poses tough conceptual and operational challenges for business. Each step in the life of a product has implications for the environment, often giving rise to a number of issues. Business, research institutes, and governments are working to develop life-cycle analyses (LCAs) or "eco-balances" to evaluate the cradle-to-grave implications of different product options. Life-cycle analysis implies life-cycle responsibility. A combination of increasing external pressures and growing internal commitment has made some leading companies ensure that their products are made, used and disposed of in the most environmentally compatible ways.

As gatekeepers between manufacturers and consumers, retailers have many opportunities to exert pressure in favour of sustainable development. In addition to picking up the trends that lie behind millions of separate consumer decisions each day, the retailer can also act as an educator, providing data and analysis to help the customer make better informed choices.

But sustainable development means more than reducing pollution and life-cycle responsibility. In the years ahead business will be challenged to move toward "zero pollution emissions" from production plants and to redirect product development to meet social needs, including those of the poor. The goal is to make the manufacture, use and disposal of products more compatible with sustainable development.

7.9 References to Chapter 7

Goodland R et al. (eds)(1991) Environmentally Sustainable Economic Development: Building on Brundtland. Paris: UNESCO.

Intergovernmental Panel on Climate Change (IPCC) (1990) Formulation of Response Strategies. World Meteorological Organization, Geneva.

Population Concern, (1991) 1991 World Population Data Sheet London: Population Concern.

Schmidheiny S (1992) Changing Course: a Global Business Perspective on Development and the Environment. MIT University Press, Cambridge, USA.

World Bank (1991) World Development Report 1991. Oxford University Press, Oxford.

World Bank (1991b) World Debt Tables 1991-92, External Debt and Developing Countries. World Bank, Washington D.C.

World Commission on Environment and Development (1987) Our Common Future. Oxford University Press, Oxford.