Sustainability and Sustainable Development

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1.   Introduction

The aim of this chapter is to provide a framework for discussing the fundamental questions:
- Why do we need sustainable development?
- What are sustainability and sustainable development?
- What roles do corporations play in pathways towards sustainable and unsustainable futures?
- What is the difference between the sustainability of a corporation and the promotion of sustainability by a corporation?
- In broad terms, how can corporations implement sustainable development?".

The reasons why there is a need for sustainable development are summarised in Section 2. Then the concepts of sustainability and sustainable development, in forms that can be readily applied to both the planet and human society, are introduced in Section 3. The role of corporations in sustainable development is outlined in Section 4. In Section 5 a framework for understanding sustainability and pursuing sustainable development is presented. This framework sets out explicitly the underlying ethical assumptions, broad goals, measurable objectives and action measures for implementation, and integrates ecological, social and economic aspects of sustainability. Section 6 outlines a broad strategy for implementation of sustainable development, drawing upon examples from the possible role of corporations.

2.   The need for sustainable development

Human societies have made amazing technological achievements in the past two centuries. However, the achievements have blinded us to our limitations. The Biosphere 2 experiment in the USA has shown that, despite the expenditure of hundreds of millions of dollars, we cannot as yet keep an artificial ecosystem, including small group of people, alive in a self-sustaining manner under an airtight dome on the surface of the Earth. Despite the expenditure of billions of dollars and roubles, we cannot as yet keep alive in a self-sustaining manner a single astronaut in a satellite orbiting the Earth. Despite our skyscrapers, aircraft, cars, agro-food industries and computers, we humans are totally dependent for our survival upon the continued functioning of natural systems.

Unfortunately, many of us, especially those living in cities, are in a state of delusion that we are somehow independent of nature. We tend to forget about the free but essential services that nature provides for us. For instance, plant life provides the oxygen that we breathe and, directly and indirectly, the food that we eat. (Even human meat eaters depend on plant-eating animals.) The natural, bio-geochemical cycles ensure that water, carbon, oxygen and essential elements,

replaceable by artificial ones, but only at enormous economic cost. For instance, we could continue to sacrifice our topsoil and in theory grow all our food by hydroponics. However, in practice this would be extremely expensive – we cannot live off tomatoes and lettuces alone.

Over the past four decades, many important books have been written by scientists and other scholars about the adverse impacts of humans on their life support systems: e.g. Carson 1962; Commoner 1972; Birch 1975; Ehrlich & Ehrlich 1990, Boyden et al. 1990; McMichael 1993; World Resources Institute 1994; Brown et al. (various years). In addition, warning statements have been issued to humanity by large groups of eminent scientists (e.g. Union of Concerned Scientists 1992; Science Summit 1993). On a large scale the principal impacts of humans on the environment are:

- changes, possibly irreversible, to the composition of the atmosphere and therefore to Earth's climate;
- destruction of stratospheric ozone and therefore increased damage to living organisms from ultraviolet light in sunshine;
- degradation of topsoil and increases in desertification;
- loss of biological diversity;
- damage to photosynthesis and nutrient cycles;
- widespread pollution of air, rivers and oceans; and
- depletion of artesian water storages.

In the socio-economic aspects of sustainability, there are several major areas of concern, especially when we consider international trends over the past 20-25 years:

- A large body of evidence that the gap between the rich and the poor has been increasing, both between countries and within many countries. This gap has even increased in countries that were recently regarded as great powers – such as the USA, Britain and the former Soviet Union.

- Human rights violations are still endemic in many countries. Although there has been great progress in human rights in most developed countries, there are still quite serious problems in some, such as the USA and Australia. Grounds for concern include the racial composition of prison populations, the unaccountability of internal security agencies, the funding of dictatorships in developing countries by government agencies in developed countries, and the denial of basic human rights to refugees and illegal migrants.

- Debt and economic slavery are still prevalent. With the erosion of minimum working conditions and wages in several developed countries, the rise of sweatshops appears to be a growing problem in the USA and Australia.

- A large proportion of the world's population has inadequate diet, nutrition and access to drinking water.

- A large proportion of the world's children live in poverty. Ethnic groups, indigenous people and other minorities in nominally rich countries are generally at risk.

- Preventable and treatable diseases are prevalent. In the poor countries, infectious diseases are still widespread, while in 'rich' countries the diseases of civilisation -- diseases of the circulatory system, cancer and mental illness -- are prevalent, while minorities still suffer severely from infectious diseases.

- A large proportion of the world's population is still illiterate.

- There are still many refugees, resulting from war, political persecution, environmental destruction and economic hardship.

- Despite significant overall advances during the 20th century, the status of women is still

- The dominant economic system leads to inequities in the access to resources.

The evidence supporting these points is set out in Tabatabai, (1993); UNICEF (1994); UNDP (1996); UNHCR (1997); Ellwood (1998); and World Bank (1999).

Clearly, sustainable development, involving improvements to the natural environment and in the social and economic domains, is needed in the 'rich' countries as well as in the poor.

3.   What are sustainability and sustainable development?

The present author takes the view that sustainability and sustainable development are contestable concepts, like democracy, truth and justice (Jacobs, 1991). They cannot be defined in the same way that physical scientists might define the standard metre. Indeed, discussion and debate about the concepts of sustainability and sustainable development provide a focus for contact between contending positions (Myerson & Rydin, 1996) and so become essential parts of the practical process of working towards sustainability.

Nevertheless, some kind of description of the concepts is necessary to establish the broad domain of discussion. For instance, many proponents of sustainability and sustainable development might not wish these concepts to be applied to the economic success of a company which manufactures weapons of mass destruction, or 'sustainable futures' to the maintenance of the futures market for stocks and shares.

Sustainability and sustainable futures are treated here as the goals or endpoints of a process called 'sustainable development'. A sustainable society is considered to be a society that has reached sustainability through this process. So, it remains to define 'sustainable development'.

The well-known broad definition in the Brundtland Report (WCED, 1987) is:

> Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

This definition emphasises the longterm aspect of the concept of sustainability and introduces the ethical principle of achieving equity between the present and future generations. The context in which the definition is embedded indicates that 'needs' include a sound environment, a just society and a healthy economy. Sustainable development is not intended to mean sustaining practices, industries and organisations that are harmful to these three requirements.

While providing a valuable perspective on sustainable development, the Brundtland Report's definition is limited in several ways. As part of a political document (in the sense of involving power structures in international relations), the definition appears to equate 'needs' with 'wants' and to assume that economic growth is necessarily part of development. Because it does not clearly distinguish between different types of economic structure, it appears to support growth in the use of materials and energy, a form of economic growth that damages the natural environment. The definition does not mention the natural environment explicitly, focusing only upon *human* needs or wants. However, the report as a whole makes it clear that these 'needs' include the conservation of the natural environment.

My own broad definition of sustainable development is:

> Sustainable development comprises types of economic and social development which protect and enhance the natural environment and social equity.

This broad definition conveys explicitly that there are three principal aspects -- ecological, economic and social -- and that the ecological aspect and social equity are primary. Furthermore, this description of avoids trade-offs between environment, economy and society. It

says that any type of social or economic development is sustainable, *provided* that it protects and enhances the environment and social equity.

'Development' as used here covers social and economic improvement in a broad sense, as summarised below. It may or may not involve economic growth. The emphasis is not on economic growth per se but rather on 'qualitative improvement in human well-being' or 'unfolding of human potential', as discussed by the ecological economist, Herman Daly.

Protecting the natural environment is not intended to mean 'freezing' ecosystems to the extent that natural evolutionary and ecological processes cannot occur, but rather means 'keeping changes at non-catastrophic, pre-human rates'.

The importance of ecological sustainability follows from the fact the economy and society depend ultimately on the integrity of the biosphere and the ecological processes occurring within it. As mentioned in the previous section, nature provides human societies and economies with a complex life support system, comprising among other things air, water, food and a suitable climate for our survival, and the physical resources which are currently the foundation of economies. We interfere with these natural systems at our own risk. For this reason, my broad definition of sustainable development makes the ecological aspect a constraint on types of economic and social development.

In Australia, the adjective 'ecologically' is normally placed before 'sustainable development' to indicate the primacy of the ecological aspect of sustainability and to remind us that the concept of sustainable development is not limited to sustaining the development of environmentally damaging industries. A more accurate term would be 'ecologically sustainable and socially equitable development'. However, in this chapter, this is shortened to the well-known international term, 'sustainable development'.

Social equity is used here in the sense of 'equal opportunity' rather than 'equality'. With this interpretation, sustainability could in principle exist under some forms of capitalism and some forms of socialism.

In subsequent chapters of this book, the economic and social aspects of sustainability are combined into a single aspect called 'human sustainability'. However, before doing this, we emphasise the importance of the non-economic, social aspects of sustainability. In our broad definition of sustainability, these enter through social equity and many components of human well-being that cannot be described by economic indicators alone (see Box 1).

Box 1: Some components of human well-being
(after Boyden & Dovers, 1997).

- access to clean air and water;
- adequate diet;
- adequate dwellings;
- personal security, both physical and emotional;
- opportunities for learning;
- opportunities for cooperative small-group interaction;
- an emotional support network;
- opportunities for creative behaviour;
- an appropriate pattern of physical exercise; and
- an environment and lifestyle which do not promote a sense of alienation, of anomie, of being deprived, of boredom, of loneliness or of chronic frustration.

Together, these and other conditions may be considered to describe a state of human health. While they all can be influenced to some degree by economic conditions, they are clearly determined to a large degree by social structure and institutions.

4.   Role of corporations in sustainable development

In this chapter a corporation is considered to be "an association of individuals, created by law or under authority of law, having a continuous existence irrespective of that of its members, and powers and liabilities distinct from those of its members" (Macquarie Dictionary 1981). A corporation is one element of an economy, and the economy is one element of a society. So, corporations contribute to the sustainability or unsustainability of a society and the planet as a whole, but do not totally determine it.

Corporations impact on the natural environment, their own workforces and society at large and so affect the sustainability of the planet and society. They make these impacts through their choices of raw materials and suppliers, land use, geographic locations, manufacturing processes including creation of wastes and pollution, organisational structures, financial arrangements, management systems, employment and work practices, customer services, community activities, uses of information and lobbying. Their social impacts are both direct (e.g. those following from the locations of their offices and factories) and indirect (e.g. by creating models of consumption which are copied in the community at large).

It is sometimes argued that corporations operate on behalf of consumers and so it is consumers alone who are responsible for the impacts. This view treats corporations as the passive instruments of consumer demand. In reality, corporations shape consumer demand and the market in various ways.

They create consumption by advertising and marketing. They acquire and store knowledge that is not always publicly available and then release it selectively. In this way, they also define 'goods' and 'services' and create new products. This can influence sustainability, for better or worse, as shown by the example in Box 2.

Box 2: Should utilities supply energy or energy services?

This example shows how defining goods and services affects sustainability. Until the 1980s, the emphasis in the energy sector was on energy supply. It was part of the old paradigm that the more energy we use, the better off we are. Utilities supplied energy, in the form of electricity or oil or natural gas. Consumers were taught to seek the least cost energy in terms of the cost of a kilowatt-hour of electricity, or a megajoule of natural gas, or a litre of gasoline. However, recently, the concept of 'energy service company' (ESCO) has emerged. ESCOs supply energy services such as warm houses in winter, cold food and drink, clean clothes and hot showers. In a least cost approach, an energy service is generally provided by means of a combination of energy supply and efficient energy use. For instance, the least cost warm home may include passive solar design, insulation and draught exclusion, and the least cost hot shower usually involves a water-efficient shower head. In this approach, it is not the cost per unit of energy that is important, but rather the total energy bill. By reducing the number of energy units used wastefully, the consumer can often pay more for a unit of energy and still have a lower energy bill. By changing the concept of the product from 'energy' to 'energy services', corporations and the rest of society can simultaneously improve economic efficiency and improve the natural environment. (von Weizsäcker et al., 1997)

Corporations also lobby governments to create laws and other conditions that are favourable for their operations and products. For instance, they may have limited liability, tax deductions for investments, infrastructure provided by government, subsidised energy and patent protection.

Clearly, corporations are important players in the sustainability scene. Therefore, creating a sustainable society must involve changes to corporations as well to other social institutions.

In the context of sustainable development, the most straight-forward task of corporations is to improve the quality and efficiency of their own internal operations, without changing the kinds

For example, a car manufacturer might practise this aspect of sustainable development by:
• implementing cleaner production processes, including design for disassembly;
• replacing a 'fordist' production line with work teams;
• making its buildings energy efficient;
• reducing noise and local air pollution within the factory and beyond its boundaries;
• building new plant in an industrial ecology park close to a railway station and offering public transport travel passes as part of employment packages;
• placing strict environmental and social equity requirements on suppliers;
• consulting with local community about noise, pollution, transport, parking, working hours and the provision of public facilities by the corporation.

A more difficult aspect of sustainable development is a corporation's decision to stop producing certain types of products and services. Should it refrain making cars, even cleaner ones, at all? If it does, would another corporation fill the alleged niche, or could the market and the structure of the national economic by changed slightly as a result so that 'bads' become less popular than 'goods'?

Following a suggestion by Philip Sutton, a corporation which is successfully integrating sustainable development into its strategy, both in terms of its operations and the kinds of 'goods' or 'bads' it sells, is called here a 'sustainability-promoting corporation' (Sutton, this book). Of course, the degree to which the corporation is promoting sustainability will have to be taken into account. Some corporations may be simultaneously promoting and damaging sustainability: e.g. an oil company which has invested substantially in renewable energy; a tourist company that provides both ordinary tourism and genuine ecotourism.

The term 'sustainable corporation' is avoided here, because its most obvious meaning is simply a long-lived corporation. Long–lived corporations do not necessarily produce an ecologically sustainable planet and a socially equitable society. Do we really want to sustain corporations based child labour, or making weapons of aggression, junk food and cigarettes? However, there is some evidence that corporations that build sound, responsive relationships with all their stakeholders -- including employees, suppliers, customers, investors and local community -- tend to be longer-lived and more successful as businesses in the longterm than other corporations (Wheeler and Sillanpää, 1997).

This is one of several business reasons why a corporation may choose to become sustainability promoting. Some others are:

• Reducing the risk of litigation and consumer boycotts resulting from perceived bad practice. Examples are the ongoing litigation experienced by tobacco corporations; the severe boycotts experienced in Europe by Shell as fallout from its plan to dispose of the Brent Spar oil rig and its perceived role in the environmental and social damage in Nigeria; and the ongoing boycotts experienced by Nestlé, for its promotion of artificial milk formula in less developed countries.

• In some cases reducing production costs through more efficient use of energy and materials, and turning wastes into resources or marketable products.

• Gaining market advantage and product differentiation for products and services produced in environmentally sound and socially just ways.

• Enhancing customer loyalty by adapting to changing community expectations for better practice with respect to sustainability.

Before considering some of the ways in which corporations can become sustainability promoting, I set out a general framework for understanding sustainability and for implementing sustainable development.

5.   Framework for sustainability

As shown in Figure 1, the framework or model (Diesendorf, 1998) has four logical levels:
• Level 0, comprising the broad ethical principles;
• Level 1, comprising broad goals arising from these principles;
• Level 2, comprising measurable objectives or indicators; and
• Level 3, comprising the action plan for implementation of ESD. (This level is discussed in Section 5.)

Level 0

At Level 0 there are three principles:
(i) Have respect for nature;
(ii) Have respect for humans; and
(iii) Be generous in our respect and kindness.
     The latter is the Precautionary Principle. One version of this principle is given in the Australian Intergovernmental Agreement on the Environment (Australian Government, 1992):

     "Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation."

These broad principles are actually ethical requirements. By ethics, I mean pertaining to questions of right or wrong, or good or bad. Consideration of values and ethics does not seem to be popular in the business world. An exception is the World Business Academy and its journal *Perspectives on Business and Global Change*, published by Berrett-Koehler in San Francisco. Those who are uncomfortable with starting from an ethical position might consider that the above ethical principles are essential for the longterm viability of the economy and society. Therefore, they could be seen as enlightened self-interest on the part of individuals and corporations planning for a longterm future.

Level 1

At Level 1, the broad goals to conserve or enhance inter- and intra-generational equity, human well-being, biodiversity and ecological integrity are standard ones in the sustainability literature. To these goals the Conservation of Cultural Diversity has been added here as a social analogue to the Conservation of Biodiversity. It is implicit in several approaches to sustainability and can be justified in a similar way to the latter (Diesendorf, 1997). To find pathways to ecological sustainability, the dominant cultures of the late 20th century could learn much from pre-industrial cultures which are rapidly disappearing. We do not have to become hunter-gatherers or shifting agriculturalists to understand and in some cases to implement the general sustainability features of those societies.

The goal of intergenerational equity is the basic thrust of the Brundtland definition of sustainable development. If we accept it, then, it can be argued, we must also accept the need for intragenerational (i.e. social) equity. It should be recalled that, in this chapter, 'equity' does not mean 'equality', but rather 'equal opportunity'.

The Conservation of Natural Capital, widely used in some models of sustainability, has been replaced here by the Conservation of Critical Capital, because the former overlaps strongly with Conservation of Biodiversity & Ecological Integrity and, even where it does not, there are vast quantities of some forms of natural capital (e.g. sand) which are not in urgent need of conservation. 'Critical' capital facilitates a focus on those forms of natural and human-made capital which are threatened (e.g. phosphorus, archaeological sites).

Conservation of Atmosphere and Climate is not normally included as a sustainability goal. However, in view of the seriousness of the present threat and the fact that the potential impacts of climate change impact on biodiversity, ecological integrity and human health, it has been

Level 2

There is a rapidly growing literature on sustainability indicators (e.g. Daly & Cobb, 1990; Sustainable Seattle, 1995; Hamilton, 1997; Hart, 1998). Some examples of measurable objectives or sustainability indicators for a society are given in Table 1. Several of the indicators are really categories rather than indicators themselves. Further refinement is still needed. For example, in 'rate of materials flow' it is necessary to specify which materials and what kinds of flows.

Standard criteria for indicators in general are that they should be measurable, relevant, simple to use and understand, reliable, reproducible, and timely for decision-making. Several authors suggest that *sustainability* indicators should, in addition, reflect something fundamental to the environmental, economic and social/cultural health of a community over generations (Hart, 1998).

The categories of indicator -- 'ecological', 'economic' and 'social' -- are presented in quotes because there is considerable overlap between categories. For instance, vehicle kilometres travelled per capita (or VKT) has ecological implications from greenhouse gas emissions and local air pollution; economic implications for a city (e.g. high VKT suggests urban sprawl and hence high infrastructure costs) and social implications in terms of isolation of people who do not work outside the home (especially women and young children) in outer suburbs and physical divisions through communities by major roads. This overlap may be a useful criterion for a sustainability indicator, as opposed to an ordinary ecological or social or economic indicator. In devising sustainability indicators, we also try to put the observed quantity into a sustainability context: for instance, mortgage repayments and rents are related to the median income in the region.

It must recognised that the measurable objectives are strongly dependent upon cultural viewpoint. Some of these measurable objectives are only useful when applied to the whole planet, while others are appropriate only for specific regions, e.g. 'developed' countries or bioregions or municipalities. The development of indicators is still a non-trivial exercise. For the internal operations of a corporation, it is quite a specialised activity, especially for social indicators.

Sustainability indicators have an important place in the concept of sustainability and the process of sustainable development. Indicators are required for monitoring progress and are valuable for motivating action. However, they do not in themselves produce good policy and actions to implement it. To avoid creating inappropriate indicators, one first develops policy by asking the question "What behaviour am I seeking?" and then creates indicators to serve that policy (see Section 6).

Table 1: Examples of some measurable objectives or sustainability indicators

'Ecological'	'Economic'	'Social'
Rate of materials' flow; Rate of energy use; Total & per capita rate of greenhouse gas emissions; Vehicle kilometres travelled per capita; Human population & growth; rate; Area of land degraded & polluted; Water pollution; Air pollution.	'Genuine Progress Indicator'; Distribution of household & personal income; Percent of income needed to pay for basic 'needs' of a person; Percent of children living in households with no adult earner; Mortgage repayments & rents relative to median income in region; Employment by top 5 companies in the region.	Basic services within walking & cycling distances of dwellings; Availability of day care for under 5s. Levels of education, including literacy & numeracy; Life expectancies at birth and at age 20; Morbidity rates; Crime rates; Homelessness; Teaching of indigenous languages in schools.

If we take the analogy of sustainability as a tree, the main trunks are now the broad ethical principles (Level 0), the main branches are the broad goals (Level 1), and the secondary branches are the measurable objectives (Level 2). The model will evolve with time, so we need not be disturbed that some major branches and many branches, twigs and leaves are only sketched in lightly or are even not yet visible. There is already plenty to do.

6.   Implementation of a sustainable development framework

The foregoing section has examined a framework for answering the question "What is the scope of sustainability and how can we present it in a systematic manner, distinguishing between ethical principles, broad goals and objectives which are actionable and measurable". This is illustrated in Levels 0-2 of Figure 1. To this sustainability framework must be added a systematic process for implementing it and for assessing progress towards it (Level 3).

The approach proposed in this chapter is to combine the most relevant and appropriate elements from the Ottawa Charter on health promotion and the set of action principles known as the Bellagio Principles (IISD, 1998). The Ottawa Charter arose from the first International Conference on Health Promotion, held in Ottawa in 1986 (WHO, 1997). Most of the charter can be readily applied to the health of the environment as well as to the health of people. Drawing upon the Ottawa Charter and the Bellagio Principles, the following steps towards the implementation of ESD are proposed. Examples are drawn from business.

6.1   Present a guiding vision, goals & scenarios

This essential step is identified in the Bellagio Principles. Without it, the other steps cannot be taken, at least, not in the direction of ESD. In practice this step involves both research and the facilitation of participatory processes. These can be combined into participatory action research (Carr & Kemmis, 1983; Cunningham, 1993; Toulmin & Gustavsen, 1996).

On some issues there are already quite clear visions, goals and scenarios for approaching sustainable systems: e.g. sustainable energy scenarios based on the efficient use of renewable energy sources. For some businesses, the vision may simple involve an improvement in existing operations and products: e.g. a refrigerator manufacturer may develop a fridge which is energy efficient, has reusable parts and is reliable. For other businesses, the vision may involve a change in products, e.g. from building coal-fired power stations to wind farms.

6.2   Develop sustainability policy in all sectors, at all levels, with all types of instrument

Policy is a means of coordinating collective action for change. It is made by governments, businesses, trade unions, professional organisations and community organisations. Sustainability policy has some special features, due to the pervasiveness of uncertainty, irreversibility, non linearity of systems, and broad spatial and temporal scales (Walker, 1994; Dovers, 1995). Sustainability policy must foster environmental protection and social equity; identify barriers to sustainability and ways of overcoming them (and so have a research component); and involve both the power structure and ordinary people.

The instruments for implementing sustainability policy may include:
- economic (e.g. taxes, charges, bounties, rebates, and targeted expenditure),
- regulatory (laws, codes, product certification and standards);
- education, communication, information and training; and
- institutional change (which is a combination of regulatory and economic instruments).

For example, using such instruments, a corporation could implement environmental policies for energy and water conservation, communication by email and by internal mail in reusable envelopes, ordering consumables, ordering components of goods to be manufactured, and solid waste minimisation based on the hierarchical principles of

6.3   Create supportive environments

Such environments may be physical, institutional or psychological. They include living and working conditions, technologies and facilities, plans and programs, and cultural support (e.g. from films, theatre and songs).

For example, a corporation could reduce the environmental and social impacts of motor car use by its employees and customers by locating its offices at a public transport node, by providing secure bicycle parking and showers, by offering executive packages that include yearly public transport tickets, and by organising car pooling.

Sustainability targets and indicators are required for this step. They are best developed through consultative process involving a wide range of members of the community and the implementing organisation.

6.4   Strengthen community action

Community action has an important role to play in social change processes, because it may facilitate bypassing the barriers erected by vested interests, empower the majority of stakeholders, provide a mutual learning experience, cross sectoral boundaries and, by involving all stakeholders, facilitate the implementation of decisions.

Community action may occur in a wide range of tasks: e.g. in setting priorities, making decisions, planning strategies and participating in implementation. To do this effectively, members of the community require access to information and funding (or, within business, time off normal work).

In the case of a corporation, the 'community' may consist of all employees or even all stakeholders.

6.5   Develop personal & organisational skills

These skills are developed by communication, education, information and training. They provide both personal and collective empowerment for social change. They may be acquired in school, home, work and community settings. They may be assisted by educational institutions, governments, employers and community organisations. For example, businesses could utilise training programs run by their human resources units, with inputs from external consultants. Such skill development is generally referred to as 'capacity building'.

6.6   Reorient the system

This involves changing organisational structure and operations, whether the organisation concerned is a business, industry, government or United Nations program. The changes require sustainability policies and all the instruments listed in Step 6.2. These are institutionalised into a new system, which is a more supportive environment for ESD (Step 6.3).

For example, the transformation of some energy supply utilities into energy service companies (ESCOs) in the 1980s and 90s, discussed in Box 2, required policies, legal constraints, 'cultural' changes to organisations, new programs and projects, and new financial mechanisms.

In some corporations on the pathway towards sustainability promotion, large changes in structure and work practices may be appropriate, e.g. from production lines based on large teams of unskilled single-task workers to small teams of multi-task workers.

The above six steps add up to an action plan for the implementation of sustainable development.

services they produce. Discussion and debate are an important aspect of all steps. The steps do not necessarily comprise a linear system, because each step may be revisited in a 'cycle of learning' in which an evaluation process provides the link between each cycle (see the action research literature cited previously). Indeed, Step 6.6 is really a combination of Steps 6.2 and 6.3, taken at a more general and powerful level.

The Bellagio Principles contribute some useful guidelines on how these steps should be implemented: namely with a holistic approach with adequate scope, a practical focus, broad participation, openness, ongoing assessment and adequate support.

7. Conclusion

Sustainability is treated here as the goal or endpoint of a process called 'sustainable development' or 'ecologically sustainable and socially just development' (ESD). Sustainable development comprises types of economic and social development which protect and enhance the natural environment, social equity and human well-being.

The concept of sustainability can be readily applied to the planet and to human society. However, in the case of corporations, it is more meaningful to consider the degree to which they are sustainability-promoting or sustainability-impeding. There are several good business reasons why corporations should follow the former path.

The model of sustainability presented in this chapter integrates ecological, social and economic aspects without requiring tradeoffs. It has four logical levels: ethical principles, broad goals, measurable objectives or indicators, and a broad strategy for implementation. It offers both a comprehensive theoretical framework and a six-step implementation strategy, involving action by government at all levels, business and community organisations. In essence this strategy involves facilitating community participation and empowerment in order to create a vision and scenarios, to develop sustainability policy and to implement ESD by changing the system.

References

Australian Government, 1992. *Intergovernmental Agreement on the Environment*, Department of the Environment, Canberra

Birch, C. 1975, *Confronting the Future: Australia and the World: the next Hundred Years*, Penguin, Harmondsworth

Boyden, S., Dovers, S. & Shirlow, M. 1990.*Our Biosphere under Threat: Ecological Realities and Australia's Opportunities*, Oxford University Press, Melbourne

Boyden, S. & Dovers, S., 1997. Humans in the biosphere. In: M. Diesendorf and C. Hamilton (eds), *Human Ecology, Human Economy: Ideas for an Ecologically Sustainable Future*, Allen & Unwin, Sydney, pp. 3-34

Brown, L.R. et al. (various years), *State of the World reports*, W.W. Norton, New York, annually from 1984

Carr, W. & Kemmis, S., 1983. *Becoming Critical: Knowing through Action Research*, Waurn Deakin University, Ponds, Victoria

Carson, R. 1962. *Silent Spring*, Houghton Mifflin, Boston

Commoner, B. 1972, *The Closing Circle*, Bantam, Toronto

Cunningham, J.B., 1993. *Action Research and Organisational Development*, Praeger, Westport, Conn.

Daly, H.E. & Cobb, J.B., 1990. *For the Common Good*, Beacon Press, Boston

Diesendorf, M., 1998. Models of sustainability and sustainable development. Proc. 'Beyond growth: policies & institutions for sustainability', 5th Biennial Conference of International Society for Ecological Economics, Santiago, November 1998

Diesendorf, M., 1997. Principles of ecological sustainability. In: M.Diesendorf and C. Hamilton (eds), *Human Ecology, Human Economy: Ideas for an Ecologically Sustainable Future*, Allen & Unwin, Sydney, pp. 64-97

Dovers, S. 1995. A framework for scaling and framing policy problems in sustainability

Ehrlich, P. & Ehrlich, A. 1990. *The Population Explosion*, Hutchinson, London

Ellwood, W. 1998 (ed.). *The A-Z of World Development*, New Internationalist Publications, Oxford

Hamilton, C., 1997. *The Genuine Progress Indicator: a new Index of Changes in Well-being in Australia*, Australia Institute, Canberra

Hart, M., 1998. Hart Environmental Data Website (accessed 20 May 1998), http://www.subjectmatters.com/indicators/

IISD (International Institute for Sustainable Development), 1998. IISD Website http://iisd1.iisd.ca/measure/bellagio1.htm/ (accessed 6 September 1998)

Jacobs, M., 1991. *The Green Economy*, Pluto Press, London

Macquarie Dictionary, 1981. Macquarie Library, Sydney

McMichael, A.J. 1993. *Planetary Overload: Global Environmental Change and the Health of the Species*, Cambridge University Press, Cambridge

Myerson, G. & Rydin, Y., 1996. Sustainable development: the implications of the global debate for land use planning. In: Buckingham-Hatfield, S. & Evans, B. (eds), *Environmental Planning and Sustainability*, John Wiley & Sons, Chichester, pp. 19-34

Science Summit on World Population 1993, Joint Statement by fifty-eight of the World's Scientific Academies, National Academy press, Washington DC

Sustainable Seattle, 1995. *Indicators of Sustainable Community*, Available from Metrocenter YMCA, 909 Fourth Avenue, Seattle WA 98104, USA; email: sustsea@halcyon.com

Tabatabai, H. 1993. *The Incidence of Poverty in Developing Countries: an ILO Compendium of Data*, International Labour Office, Geneva

Toulmin, S. & Gustavsen, B. (eds), 1996. *Beyond Theory: Changing Organisations through Participation*, John Benjamins, Amsterdam & Philadelphia

Union of Concerned Scientists 1992, *World's Scientists' Warning to Humanity, Union of Concerned Scientists*, Washington DC

UNDP c1996, *Human Development Report 1996*, Oxford University Press, Oxford

UNICEF 1994, *The State of the World's Children*, Oxford University Press, Oxford

UNHCR 1997, *The State of the World's Refugees*, Oxford University Press, Oxford

von Weizsäcker, E., Lovins, A.B. & Lovins, L.H., 1997. *Factor 4*, Allen & Unwin, Sydney.

Walker, K.J. 1994. *The Political Economy of Environmental Policy: an Australian Introduction*, New South Wales university Press, Sydney

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

Wheeler, D. & Sillanpää, M. 1997. *The Stakeholder Corporation: A Blueprint for Maximizing Stakeholder Value*, Pitman, London

WHO, 1997. Website of World Health Organisation, Division of Health Promotion, Education & Communication, accessed at http://www.who.int/hpr/hep/documents/ottawa.html on 2 September 1998

World Bank 1999, *World Development Indicators 1999*, World Bank, Washington DC

World Resources Institute 1994, *World Resources 1994-95: a Guide to the Global Environment*, report in collaboration with the United Nations Environment Program and the United Nations Development Program, Oxford University Press, New York & Oxford

Figure 1: Framework for Sustainability and Sustainable Development

Level 0: **Broad ethical** **principles**	Respect nature Respect other people Be generous in your respect (Precautionary Principle)
Level 1: **Broad Goals**	Conservation of biodiversity & ecological integrity Conservation of critical capital / Conservation of atmosphere & climate Conservation of cultural diversity / Improvement of well-being / Inter- & Intra-generational equity
Level 2: **Measurable objectives or indicators**	See Table 1
Level 3: **Action plan for implementation**	See Section on Implementation