1 Land degradation: an overview

INTRODUCTION

Much of the Earth is degraded, is being degraded or is at risk of degradation. Marine, freshwater, atmospheric, near-space (upper atmosphere: c. 15 km altitude to geostationary orbit: c. 40,000 km altitude) and terrestrial environments have suffered and continue to suffer degradation. This book focuses on terrestrial degradation, that is, damaged lands, land being the interface between the Earth’s solid surface and the atmosphere. Land is subject to a complex of influences, namely atmospheric, geological, solar radiation, and, in all but the coldest, driest, or otherwise inhospitable environments, organic activity. The approach adopted in this book is to progress from the global scale down through environments and ecosystems that are increasingly more controlled or disrupted and degraded by the activities of Man.

If it were possible to ask the bulk of Mankind their views about land, the chances are that individuals would more often than not recognize three categories: 1. land being utilized, 2. that with potential utility, and 3. that which appears useless, at least in the foreseeable future. Utility, may be said to be the capability of something to meet people’s perceived needs/wants. It has been defined in a more formal economic sense as ‘...a measure of self-perceived well-being and depends on the value of goods and services enjoyed’ (Lowe & Lewis, 1980: 7). In practice, both economic goods (things measurable in monetary units) and non-economic goods (things not easily measurable in economic units – such as aesthetic quality or a moral responsibility to conserve species) determine utility, but the former tend to dominate.

What is land degradation?

Land degradation may be defined as the loss of utility or potential utility or the reduction, loss or change of features or organisms which cannot be replaced. A precise definition is impossible, given the many factors which may be responsible. In general, land degradation implies a reduction in rank or status, for example, a degradation and/or loss of soil, or a change to a simpler floral/faunal composition or a substitution of one organic form for a lower organic form. Blaikie & Brookfield (1987: 6–7) suggested land is degraded when ‘...it suffers a loss of intrinsic qualities or a decline in its capabilities...’ (it) ... is therefore best viewed not as a one-way street, but as
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A result of forces, or the product of an equation, in which both human and natural forces find a place; that equation being:

\[
\text{Net degradation} = (\text{natural degrading processes} + \text{human interference}) - (\text{natural reproduction} + \text{restorative management})
\]  

(Blaikie & Brookfield, 1987: 7)

Chartres (in Chisholm & Dumsday, 1987: 7) suggested land degradation was something that can result from any causative factor or combination of factors, which reduces the physical, chemical or biological status of the land and which may restrict the land’s productive capacity.

Not infrequently, land degradation results at the end of a ‘chain of causation’ and is an un-anticipated consequence of what may be far-removed human and/or natural cause(s). The onset of the problem may therefore be difficult to forecast. Some land degradation is due to natural (bio-geophysical) causes, some is due to human causes and some to a combination of causes.

Once land has been degraded, it is often possible to rehabilitate it and thus restore it to a level of utility, possibly not as good as its original state but better than it was in its damaged state. Given satisfactory perception of the threat, funding, technology, and organization, degradation, whatever the cause, would be reduced. Land restoration implies the rehabilitation of degraded land to a standard matching that which it originally had. The one form of degradation which is permanent is the extinction of living species.

In practice, when cost–benefits and other limitations are weighed up, only a portion of degraded land can be satisfactorily rehabilitated. Some degraded land may remain abandoned and neglected for a long time. This derelict land may then be rehabilitated to some sort of utility, quite possibly not its original state, when techniques, funds and motivation permit (Fig. 1.1).

Perception of land degradation

The willingness that people, organizations, governments, etc have to utilize, and perhaps to protect, an environment or a resource depends mainly upon their perception of utility which is influenced by both their attitude and plight. The value attached to an ecosystem or resource can be measured by the amount of money or other utilities foregone in order to obtain some of that resource or to make use of it (Cottrell, 1978: 1). An area of land may have a range of perceived values. For example: a forest may provide timber, serve as a conservation area, support recreation, protect a watershed from erosion and possibly have aesthetic or religious significance. These perceptions are not static, they may vary over time, and, at any one point in time, different

![Fig. 1.1. Land degradation terminology.](image-url)
groups of people may make different demands on the same land. Demands on land can also vary from locality to locality (Immler, 1986: 45). Not all members of a population are likely to enjoy the utility of the land to the same degree and it is common for some people to bear all, or most of, the costs of land development, yet get little benefit from it.

The utility of land can be due to complex factors: climate, communications, law and order, moral and cultural and many other considerations, e.g. a locality or a resource may even be valued purely as a consequence of belief and historical accident (Doxiadis, 1977: 11). Utility of land or a resource often reflects the amount of labour involved in its exploitation, for example, coal has utility in itself as a fuel or raw material for chemicals, etc, it also generates mining, transport, and other employment.

Resource economists since Adam Smith and David Ricardo have argued that the value of a resource or ecosystem is largely governed by the cost of production/realization, particularly labour input costs. Land degradation can adversely affect the yield of labour in terms of production ‘... Other things being equal, the product of work on degraded land is less than the same land without degradation’ (Blakie & Brookfield, 1987: 1). Given that the productive capacity (utility) of land or a resource is, at least in part, Man-made, it is possible for such inputs to come, not from the locality being exploited or valued, but from a distant area, e.g. the value of land in the Caribbean for banana production depends upon the demand for and the ability to transport and market the fruit in Europe. To summarize, land, labour and capital are not always separable in practice, and a resource generally has utility because of inputs of labour and capital.

Investment in enhancement of land utility has been termed landesque capital (Simon, 1981: 86). Landesque capital is capital that can be depleted or added to. Alteration in input of labour or materials, technological innovation, altered natural conditions, changed attitudes towards the land or its produce can lead to land improvement or land degradation. There are land uses that can cause little deterioration in the value of the land, for example, carefully managed tourism or well-managed extraction of water or geothermal energy. There are land uses which cause severe land degradation (e.g. nuclear weapons testing).

To establish whether land degradation has, has not occurred, is occurring, will or will not occur, demands that the present, past and future utility of the land be established. The present is seldom well documented, and, where it is, it may not be an accurate ‘baseline’. Information on the past and forecasts of the future are likely to be missing or at best inaccurate. ‘Natural landscape’ is often the result of long-forgotten human activity, like the degraded maquis-type biomes of the Mediterranean – the land at present does not give a true indication of the potential that it once had. The opposite can hold; much of what is now rich Dutch farmland was once relatively unproductive saltmarsh or shallow sea which has been enhanced in utility by Man.

Land degradation studies are frequently hindered by reliance on received information and insufficient, objective and accurate data. For example, it is not unusual for the people of the Himalayas or the Andes to be charged with causing severe land degradation, which, in turn, is seen to be the cause of siltation and flooding in lowlands. The evidence that the situation in the Himalayas and Andes has significantly deteriorated due to Man, and the proof linking siltation and flooding with activity in the uplands is mainly circumstantial and often speculative (Ives & Pitt, 1988: 139, 191; Blakie, 1989: 25).
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To get a useful ‘baseline’, planners and managers should not overlook the contribution of the palaeoecologist, archaeologist, historian and local people, not only to show past capabilities of the land, but also to indicate if there have been problems or catastrophes which might recur and if there were strategies developed by past peoples to exploit the land that modern land users may be unaware of, and which might prove valuable.

Short-term studies which attempt to explain changes in an ecosystem may be ineffective, especially if dealing with organisms like trees which may live and regenerate only over a period of hundreds of years. In the last ten years, improved knowledge of the structure and function of ecosystems, remote sensing and advances in information storage and retrieval has made it easier to establish baseline data from which to monitor land degradation. However, degradation monitoring is not a precise science and difficulties may not be forecast or recognized even with the best studies.

One reason for delay in recognizing land degradation may be that many people have been conditioned to looking at economic indicators of development, and only when environmental/resource depletion translate into economic difficulties do they really ‘notice’. People are more likely to react to more visible forms of land degradation: dust storms, deep gullies, land slides, etc, yet, much land degradation is insidious. Gradual loss of topsoil is one of the major threats to human well-being, but it is not readily apparent, at least not in its early stages. Even when degradation becomes obvious, people may not wish to acknowledge it: to admit he has a soil erosion problem a farmer may feel is admission to bad husbandry; to admit an irrigation project is silting up or suffering salinization may embarrass a government or agency.

Some people, particularly the poor and powerless, may react to problems, including land degradation, in a fatalistic way. They may be perfectly aware of the problem and the long-term implications, but are unable or unwilling to do more than practise what they know to simply scratch a living. It is also common for those in authority to be sufficiently removed from the land that they do not see degradation as a problem nor the efforts to counter it as worthwhile.

Even the most enlightened government or agency is going to weigh the readily apparent short-term labour/economic costs and/or foregone benefits against possible future long-term benefits from degradation control efforts (Chisholm & Dumsday, 1987: 196). There may also be the dilemma for the would-be investor in degradation control: that the money and effort might give better returns if used in some other way; it may make economic sense to degrade and abandon some lands.

Agreement that land degradation is taking place and requires attention is sometimes difficult to achieve, at least in part, because the perception of utility varies: an increase in utility for one affected group may mean a decrease in utility for another group or groups. For example, the replacement of forest by savanna may be welcomed by herders or farmers; their livelihoods can be followed in the area. As a result, a conservationist or forest-dwelling aboriginal people may not be so pleased.

Special interest groups and sometimes governments may discourage recognition/reaction to degradation: it is not uncommon for a government to have decreed an inappropriate land use or activity and then to adhere to it in spite of the damage it causes in order not to have to counter the ‘official line’ (Blakie & Brookfield, 1987: 4). In the USA, in the 1930s, writers like Steinbeck, folk-singers like Woody Guthrie, and a number of contemporary environmental activists, strove to publicize the causes and need for control
of the ‘Dustbowl’ conditions in the mid-west (see Chapter 8). Their activities were at the time widely regarded as ‘un-American’ and subversive.

Perceived solutions to land degradation may not be appropriate; for example, a widespread response in the West has been to apply artificial fertilizers to land that is suffering topsoil erosion and/or decline in fertility – this is a treatment of ‘symptoms’ not an attempt to cure the causes, it may even delay the breakdown of production – at which point the problems are recognized – and real solutions are difficult.

**Development and concern for land degradation**

Land degradation is often seen as a consequence or ‘side-effect’ of development. Concise, generally acceptable definitions of development are not easy to come by, and those that are express wishful thinking rather than realities involved. The IUCN *et al.* (1980) suggested that development was . . . the modification of the biosphere and non-living resources to satisfy human needs and improve the quality of life . . .’ The UN General Assembly Resolution 2626 (XXV) of 24th October, 1970, suggested that ‘The ultimate objective of development must be to bring about a sustained improvement in the well-being of the individual and bestow benefits on all’ (Ghosh, 1984: *nii*). To sustain development its demands must be within the support capabilities of the land, and the environment in general, otherwise degradation will take place.

Land degradation is not a new phenomenon, nor is concern for it a recent development (Roberts, 1989: 182; Bunney, 1990). Greek and Roman writers commented on soil erosion, deforestation, and other problems, and environmental concern was incorporated into Confucianism in China. In medieval Europe, St Francis of Assisi urged more concern for nature, and in the first half of the seventeenth century Francis Bacon penned the maxim: ‘We cannot command nature except by obeying her’ (translation from Latin – *Essays*, Everyman edn, 1939. London: Dent and Sons). In the late eighteenth century Benjamin Franklin noted ‘. . . whenever we attempt to amend the Scheme of Providence, and interfere with the governance of the world, we had need to be very circumspect less we do more harm than good’ (Silverman, 1986).

Few decision-makers or the public at large gave much heed to environmental concern before the 1960s. It has been argued that, after the English Reformation (i.e. by the early eighteenth century), a ‘Protestant ethic’ had emerged in Europe. Those who support the idea of a Protestant ethic hold that the West’s religious and moral outlook was compatible with the development of science, technology and capitalism, and that it has moulded Western attitudes towards land and nature. It is claimed by some that it led to Westerners stressing the goodness of hard work, the need to tame and exploit nature and an abhorrence of disorder – attitudes that have not always helped to protect the land (Tawney, 1914; Weber, 1958; Caldwell, 1977; Dawson & Doornkamp, 1973: 249–75).

After the mid eighteenth century Europe had growing industrialization and rising birth rates. It was, however, possible for people to migrate to the Americas, and to various other colonies, and, increasingly, produce was coming from these lands back to Western Europe, particularly to the UK. By the late eighteenth century/early nineteenth century, it was apparent that the ‘frontier would some day close’ – in 1798 and 1803 Thomas Malthus published his *Essays on Principles of Population*, examining the interrelationships between population and resources. Drawing on ideas initially spread
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by French Philosophes like Condorcet, Malthus’s essays were opposed to utopianism and anarchy and effectively said that as Man could not change nature and the supply of most resources, little could be done to counter poverty (and ultimately land degradation).

In the second half of the nineteenth century ‘romantic’ poets like Wordsworth, William Blake and Emerson expressed interest in the environment, in that they saw ‘industrial man’ as a corruptor of nature. In Victorian Britain reformers like Chadwick, anti-establishment intellectuals like William Morris and Robert Owen, and, in Europe, Kropotkin and Marcuse, concerned at what they saw as a decline in public health and morals as a consequence of industrialization and urbanization, were, by the 1860s, preaching ‘utilitarian environmentalism’. At this time there was considerable activity in the natural sciences (in the UK, Darwin and in France, Teilhard de Chardin). In the USA, George Perkins Marsh (1864) and others began to promote conservation, and at that time there was an active conservation lobby in S. Africa (Cape Province) (Anderson & Grove, 1987: 21; Grove, 1990). Some have argued that Marsh’s book Man and Nature (1864) began modern discussion of environmental issues.

Between the 1860s and the 1930s development and environment thinking became clouded by over-cruel environmental determinism promoted by writers like Huntington (1915), Brookes (1926), Markham (1944) and Friedrich Ratzel (Simon & Kahn, 1984: 2; Redcliffe, 1984). Environmental determinism was discredited by the 1940s, but a reaction to it might explain why it was not until the 1960s that there was anything but patchy interest in environmental dimensions of development. A paternalistic attitude toward development flowered in this 1860s to 1940s period; the view tended to be that Westerners best knew how to solve environmental, social and economic problems and should command rather than learn from other peoples.

A review of the environment/development literature from the 1960s to the present suggests that attempts to explain why environmental damage occurs can be split into seven broad categories (Table 1.1).

From the 1950s (Thomas et al., 1961) and particularly from the early 1970s worries were voiced about an impending ‘environmental crisis’.

Endowed with a ‘Messianic fervour’ (Rees, 1981: 2), many of the activists of the 1960s to 1970s ‘ecology/environmental movement’ (e.g. Hardin, 1968; Ehrlich et al., 1970; Brubaker, 1972; Meadows et al., 1972; Ward & Dubos, 1972) were given derogatory titles by politicians and the press: ‘prophets of doom’, ‘Neo-Malthusians’, etc. On the whole, the ‘movement’, which included many environmental and conservation non-governmental organizations, e.g. Friends of the Earth, Environmental Defence Fund, Sierra Club, Council for the Preservation of Rural England, and many others, was interested in conservation and control of human population increase and there was little entry into politics (O’Riordan, 1976; Sandbach, 1980; Clark & Munn, 1986: 8–12).

In 1971, UNESCO launched the Man and Biosphere Programme (MAB), which helped expand awareness of the structure and function of the world’s environments and the manner in which Man interacted with nature. By the early 1980s environmental ‘stocktaking’ provided a foundation for environmental policy advocacy. The International Union for the Conservation of Nature and Natural Resources (IUCN) published the World Conservation Strategy (IUCN et al., 1980). Concerned to build ‘the social factor’ into their environmental recommendations, most environmentalists of the 1970s and 1980s failed to identify either the agency, without which nothing can be achieved, or the mechanism, with which environmental policies could be


**Table 1.1. Explanations of why environmental degradation occurs (from the environment/development literature 1960–1989).**

<table>
<thead>
<tr>
<th>Category</th>
<th>Explanation</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neo-Malthusian</td>
<td>Argues demographic pressure leads to overuse or misuse of land, especially marginal land(^4). Criticized for being too simplistic by failing to look at population increase in its social and historical context. Also overlooked the fact that c. one-third of the world’s people use most resources and consume about six times the energy of the other two-thirds in developing countries.</td>
<td>A, B</td>
</tr>
<tr>
<td>Limits to growth or</td>
<td>Similar to A above</td>
<td>C, D</td>
</tr>
<tr>
<td>Gandhian approach</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic perspective</td>
<td>Irrational land/resource use causes degradation and can be understood through analysis of issues associated with the economics of production – in particular, faulty property relationships and difficulty in managing common resources(^5).</td>
<td>E, F G</td>
</tr>
<tr>
<td>(i) tragedy-of the-</td>
<td></td>
<td></td>
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<tr>
<td>commons school</td>
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<tr>
<td>(ii) externalities school</td>
<td>Argues that population increase leads to destruction of common resources as individuals acting to maximize their benefit harm society as a whole. In Africa it has been suggested that increased state ownership has reduced community control yet failed to replace it with effective state control. Individuals react by taking what they can from common land before anyone else does(^6). Neo-Malthusian analysis widened to consider externalities as well as population increase. In particular, weaknesses of capital accumulation which lead to accelerated exploitation of land/resources to the point of degradation, profits are then invested elsewhere.</td>
<td>H</td>
</tr>
<tr>
<td>Dependency perspective</td>
<td>External factors affect population and land use in developing countries, leading to environmental degradation. The external factors include: inappropriate technology transfer, promotion of inappropriate agricultural strategy, trade and aid relationships.</td>
<td>I, J K</td>
</tr>
<tr>
<td>Economics thinking</td>
<td>Faulty economics thinking has influenced decision-making – economists tend to see Earth’s resources as limitless and have been willing to pursue a “Faustian bargain”, whereby short-term benefits are traded for long-term, unknown, unforeseen costs.</td>
<td>L, M</td>
</tr>
<tr>
<td>Neo-Marxist</td>
<td>Wealth of the more advanced countries has been achieved by transfer of resources from the world’s poor countries. In so doing poor countries are impoverished and this leads to land degradation.</td>
<td>M</td>
</tr>
</tbody>
</table>
Table 1.1. (cont.)

<table>
<thead>
<tr>
<th>Category</th>
<th>Explanation</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethical stance</td>
<td>Man has seen himself as above nature and separate from it (especially in the West), in control, but not obliged to manage it (i.e. act as a steward). In practice, all individuals, regardless of ethics, will tend to be biased toward short-term gain (see Table 1.2).</td>
<td>N</td>
</tr>
</tbody>
</table>

Notes:  
* Marginal land – for a definition see Chapter 2.  
* Common resource – communally owned, public property. On which, for example, privately owned livestock are grazed. The consequence is that individuals acting to maximize their benefit harm society as a whole.  
* It is worth noting that in Australia and the USA, where there is serious land degradation, livestock and land are privately owned.  
* Various authors point out how ‘in-tune’ primitive peoples are with their environment. However, this is not always the case (if it ever is). For example, the Maoris made short work of the maos, and inhabitants of Easter Island completely destroyed native palm forests long before contact with Europeans.

implemented (Redclift, 1984: 44). The 1972 UN Conference on the Human Environment (Fournex) and the 1973 UN Conference on the Human Environment (Stockholm) were instrumental in bringing countries together to consider the future of the Earth. The United Nations Environment Programme (UNEP) was established, but the environmental movement waned between about 1975 and 1987. There had nevertheless been a tremendous impact on development thinking and development-related institutions; for example, before 1972 fewer than ten of the world’s governments had environmental agencies, by 1987 140 had them (Myers, 1986a).

It is likely that the 1973/4 OPEC oil price rises, which caused widespread concern for energy supplies, diverted attention from environmental worries. OPEC also helped to reduce the funds available in developed, and particularly developing countries for environmental protection. Nevertheless, between 1973 and 1985, there were a number of works expressing environmental/development concern (IUCN, 1975a), notably: the World Conservation Strategy, the Global 2000 Report (Council on Environmental Quality & Department of State (1982); the ‘Brunei Report’ (Independent Commission on International Development Issues, 1980) and the writings of Riddell (1981) and Tolba (1992). From roughly 1985, interest in the social and political issues involved in environment/development problems increased; much of this interest was from people in developed countries (Brown et al., 1984; Myers, 1985a; Bartelmus, 1986).

In the late 1980s, the World Commission on Environment and Development, was asked to formulate a global agenda for change. Its publication of the ‘Brundtland Report’ (World Commission on Environment and Development, 1987a) marked a shift toward more pragmatic consideration of environment/development. Within a few years of this Report, there was a new interest and, by the late 1980s, a concern for ‘green issues’ had risen to a level unknown previously (Porritt, 1988).

During the mid to late 1980s the ‘Gaia hypothesis’, first proposed in the early 1970s, attracted attention as empirical and theoretical work on global bio-geophysical function gathered information on the role of oceanic, atmospheric and organic processes in controlling climate (Goldsmith, 1989).
Table 1.2. Attitudes towards environment and development.

1. Environmental determinism Essentially, the idea that environmental factors are all-powerful and determine what happens. Man thus has little choice, regardless of what he may think.
2. Meld environmentalism View that nature is all-powerful: Man can choose, but at his peril. If environmental rules/limits are disregarded, there will be trouble.
3. Environmental possibility The recognition of possibilities and limitations set by the environment.
4. Environmental probabilism Developer attempts to predict typical reaction to a given milieu.
5. Cognitive behaviouralism People react to a given milieu in light of previous experience(s).

Source: Based in part on Saarinen, 1966: 26.

Table 1.3. Approximate global land areas/land use (1977 situation).

<table>
<thead>
<tr>
<th>Land use</th>
<th>Area (million ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arable</td>
<td>1,462</td>
</tr>
<tr>
<td>Grassland</td>
<td>3,018</td>
</tr>
<tr>
<td>Forest</td>
<td>4,077</td>
</tr>
<tr>
<td>Other land</td>
<td>4,476</td>
</tr>
<tr>
<td>Permanent ice cover</td>
<td>1,400</td>
</tr>
<tr>
<td>Total</td>
<td>14,473</td>
</tr>
</tbody>
</table>

Of this, estimates suggest: 849 is moderately productive and 477 is highly productive agricultural land.


HOW SIGNIFICANT A PROBLEM IS LAND DEGRADATION?

To establish the significance of land degradation requires an assessment of how widespread it is, how severe the damage is, and whether or not it is practically controllable or reversible. Measurement is difficult. One complication is that it is possible for degradation to proceed in broadly the same way and at a similar pace in two areas which differ in some aspect of soil, flora, etc., in which case the effects may be quite different. For example, where soil is deep, erosion which would soon affect a shallow soil may have no effect on vegetation cover or fertility for hundreds of years. (Harlin & Berardi, 1987: 151–72). Land degradation has not been easy to measure; before the late 1970s there was little in the way of accurate data on the world’s ecosystems (Table 1.1 gives an approximate breakdown of global land use.) Economists of the 1970s tended to dismiss environmental matters as ‘intangibles’ and so there was little serious assessment unless a problem had developed (Fyre, 1978: 6; Immler, 1986: 41).

One cannot assume that present day social, economic, cultural and environmental conditions are the same as they were in the past, nor that they will remain constant in the future – this can make prediction of rates and seriousness of land degradation difficult. An area cleared of forest may suffer severe erosion until crops or regrowth are established and erosion may then decline to close to original levels until there is some future change in land use.
Land degradation is widespread in the USA, Europe, the USSR and the Third World: all countries, rich or poor, arid or humid, cool or tropical suffer it. It is not only a problem where there are high populations, for, in Australia or Amazonia, where population is sparse and sedentary settlement is a relatively recent phenomenon, there is land degradation. The effects of land degradation may be felt both in the locality where land is damaged and elsewhere. For example, deforestation may drive the price of fuelwood beyond the reach of distant townsmen; erosion which damages farms in an upland may also cause siltation that ruins irrigated land or possibly causes floods well away in lowlands.

While the causes of land degradation are diverse and often complex, there are some clear trends. One is that land is being lost from productive use at an alarming rate. Over the last 7000 or 8000 years, since most people have come to depend on sedentary agriculture, one estimate suggests 450 million ha of cropland and grazing land have been severely degraded. There can be little doubt that there has been, and continues to be, extinctions of flora and fauna at a disturbing rate (World Commission on Environment and Development, 1987b).

Even if the amount of land available/potentially available to feed mankind, is adequate for the near future, using present agricultural strategies, there is an uneven distribution of land in relation to population (Ghosh, 1984: 75). There is also a risk that some parts of the globe are more prone to environmental change than others. Ultimately there is a limit to availability of land, and demand upon it increases due to rising population, increasing expectations and loss by degradation. In AD 2110, world population is likely to reach 10.5 billion, 9.1 billion of whom will be in the poorer, probably more degraded, developing countries (Wolman & Fournier, 1987: 9). Impressive improvements in crop production since the Second World War will be difficult to sustain if degradation is not controlled, in some cases the production increase may be transient and modernized high-yield production is, at least partly, the reason for land degradation. There is a risk that short-term gains in agricultural production or growth of gross national product create an illusion of progress while land degradation develops largely unheeded until the problem is severe.

Is there an ‘environmental crisis’?

Some have talked of an ‘environmental crisis’ since the 1960s. However, it was really from about 1981 that the fear has been widely articulated. Now it has become a cliché, with little real proof (Thirgood, 1981: 161; Johnston & Taylor, 1986: 1–11; Wolman & Fournier, 1987: 39; Watts, 1989). In the 1970s environmental degradation tended to be regarded mainly as a problem restricted to richer nations, a view widely voiced at the 1972 Stockholm Conference on the Human Environment. In the early 1980s many disagreed that there was a serious environmental problem (Simon, 1981; Simon & Kahn, 1984). Today, some talk of a global environmental crisis, others of the South’s environmental crisis.

There are undoubtedly serious environmental problems. Whether there is a global crisis situation, in the sense that it is now a turning point, a last chance to act before world degradation has taken place to the degree that control will be impossible, is more difficult to answer. Some of the global bio-geochemical and bio-geophysical cycles, vital for maintaining climate, atmospheric gases, soil fertility, etc., might be close to breaking point. Certainly, threats to the environment have been growing faster than the willingness or ability to control them.