

Research Paper 5

**The Environmental Debate:
A Critical Overview**

Matthew Gandy

December 1992

Cover illustration by the author shows
two protected species of butterfly:
Top, the Spanish Festoon *Zerynthia rumina*.
Bottom, the Apollo *Parnassius apollo*.

Geography Laboratory
Arts Building C
University of Sussex
Falmer
Brighton BN1 9QN

ISBN 1 874465 04 5

£3.50

The environmental debate: a critical overview

Matthew Gandy
School of European Studies
University of Sussex

1. Introduction

In this paper I examine the post-war debate over the causes and appropriate policy responses to environmental problems. Concern over environmental pollution and the wastage of materials and energy is shown to be a consistent element in environmental concern in developed economies since the late 1960s and early 1970s, but the emphasis of the debate has shifted from 'limits to growth' type fears towards finding new ways of integrating economic and environmental policy making.

I begin by outlining the background to the growth of environmental concern over the post-war period and the complexity and diversity of the different strands of thought lying behind the contemporary 'greening' of public policy. The paper then considers the influence of socio-economic change and the connection between political shifts in public policy on the growth of market-based environmental policy. Finally, the relationship between different interpretations of the cause of environmental problems and the current debate over appropriate policy responses is examined, conceived in terms of a distinction between market-based and non market-based conceptions of the environmental crisis.

2. The recognition of an environmental crisis

In the period up to the end of the eighteenth century three general notions concerning the relationship between humankind and nature were identified by Clarence Glacken: the idea of a designed earth by divine forces; the idea of environmental influence on human culture; and the impact of human activity on the natural environment. For Glacken, the appreciation of the human impact on the environment was less well developed until the latter part of the nineteenth century, a period marked by the widespread recognition of the environmental consequences of human activity, as illustrated by the publication of 'Man and Nature' by George Perkins Marsh in 1864 and the influential writings of John Ruskin, William Morris and others, at a time of rapid urban growth and increasing industrial activity (Glacken, 1967; Williams, 1986).

After the second world war, the deleterious human impact on the environment accelerated rapidly, with increasing scientific evidence of an environmental crisis. In the late 1950s and 1960s, for example, a number of post-war developments associated with the increasing mechanisation of agriculture became the focus of public concern, including the contamination of ecosystem food chains with pesticides (Carson, 1962); and the destruction of wildlife habitats and declining biotic diversity (Hawksworth et al,

1974; Perring, 1974; Rose and Wallace, 1974). The post-war period also saw recognition of the threat to human health from air pollution caused by the burning of fossil fuels, leading to the 1956 Clean Air Act in the UK and US Clean Air Act of 1970.

In the late 1960s there was widespread media coverage of disasters such as the Torrey Canyon oil spillage and the Minamata Bay mercury poisoning in Japan. These and other incidents gave impetus to a burgeoning environmental movement in many developed economies. In the period from the late 1960s to the early 1970s a wide range of environmental organisations were founded, including the Conservation Society, Friends of the Earth, Greenpeace and Population Concern. In 1972 the first environmentalist political party was formed in Tasmania, and by the mid-1980s there were twenty three green political parties contesting national elections, mainly in the OECD nations (Parkin, 1989; Seager, 1990).

The 1972 UN Stockholm Conference on the Environment was the first international recognition of the need for global action to protect the environment. In the same year, the publication of the 'Blueprint for Survival' called for radical measures by governments and was endorsed by an impressive panel of leading academics from within the natural sciences (Goldsmith et al, 1972). The environmental debate of the early 1970s was focused on the perceived incompatibility between continued economic growth and environmental protection, typified by the 'limits to growth' thesis of the Club of Rome (Forrester, 1970; Meadows et al, 1972; Mesarovic and Pestel, 1974).

Uncontrolled population growth was frequently identified as the underlying cause of the crisis (Ehrlich, 1970; Ehrlich and Ehrlich, 1970; Hardin, 1968, 1974) and many of these studies claimed that there would be an imminent exhaustion of the earth's 'carrying capacity' for the human population. The pessimistic projections of the limits to growth school were taken very seriously by policy makers and formed a central element in public debate. The analysis was rooted in the natural science discipline of biology and its emerging sub-discipline of ecology:

"Geometric increases in number can always overtake the size of the cake that technical ingenuity can devise. Perhaps ecology's first social law should be written - All poverty is caused by the continued growth of population." (Colinvaux 1980 p.196)

Attention was also focused on the wastage of energy and resources in industrialised societies. Research suggested that the US, for example, was facing the first serious peace-time shortages of essential raw materials (Ballard, 1974) and it was predicted that future demand for minerals could only be met by huge inputs of energy during extraction and processing (Dunham, 1974). Figures on primary energy usage indicated that oil consumption in the period 1960-1970 in the OECD nations was equivalent to total oil produced before 1960 and that coal consumption since 1940 exceeded all the

coal produced in the preceding nine centuries (Hubbert, 1976). The key policy document to emerge from the 'limits to growth' period of environmental concern was the Global 2,000 Report commissioned by president Carter in 1977, which in its opening paragraph warned that:

"If present trends continue, the world in 2000 will be more crowded, more polluted, less stable ecologically, and more vulnerable to disruption than the world we live in now. Serious stresses involving population, resources, and the environment are clearly visible ahead. Despite greater material output, the world's people will be poorer in many ways than they are today." (US Council on Environmental Quality, 1982 p.1)

Yet by the time of its publication, the political and economic circumstances for environmental policy had begun to shift, and many of the basic premises behind the neo-Malthusian pessimism of the 'limits to growth' period were being widely questioned.

3. The decline of neo-Malthusianism

From the mid-1970s onwards the 'limits to growth' thesis was subjected to sustained criticism from across the political spectrum. From the political Left, the criticism focused on the social and economic consequences of limiting economic growth (Beckerman, 1974) and the ethical implications of socio-biological and neo-Malthusian arguments against Third World aid and development (Bradford, 1989; Harvey, 1974). Marxist analysts took issue with the application of positivist and empiricist methodology to the study of human society, leading inevitably to neo-Malthusian type conclusions (see Harvey, 1974; Sandbach, 1980). David Harvey, for example, highlighted the relationship between ideology and science, in discounting the objectivity and impartiality claims associated with many so-called 'scientific' analyses of environmental problems:

"The use of a particular scientific method is of necessity founded in ideology,..and any claim to be ideology-free is of necessity an ideological claim". (Harvey, 1974 p.256)

From the political Right, the ecological pessimists were criticised for exaggerating the rate of resource depletion and systematically underestimating human ingenuity and technological change (see Simon, 1981). Indeed, the weaknesses in this early work were instrumental in the Reagan administration's rejection of the findings of the Global 2000 Report. The technological critique has also been pursued within the political-economy based literature, where the link between environmental sustainability and the potential for economic development is depicted as a dynamic relationship rather than a static relationship as implied in much of the early 1970s 'limits to growth' and neo-Malthusian literature:

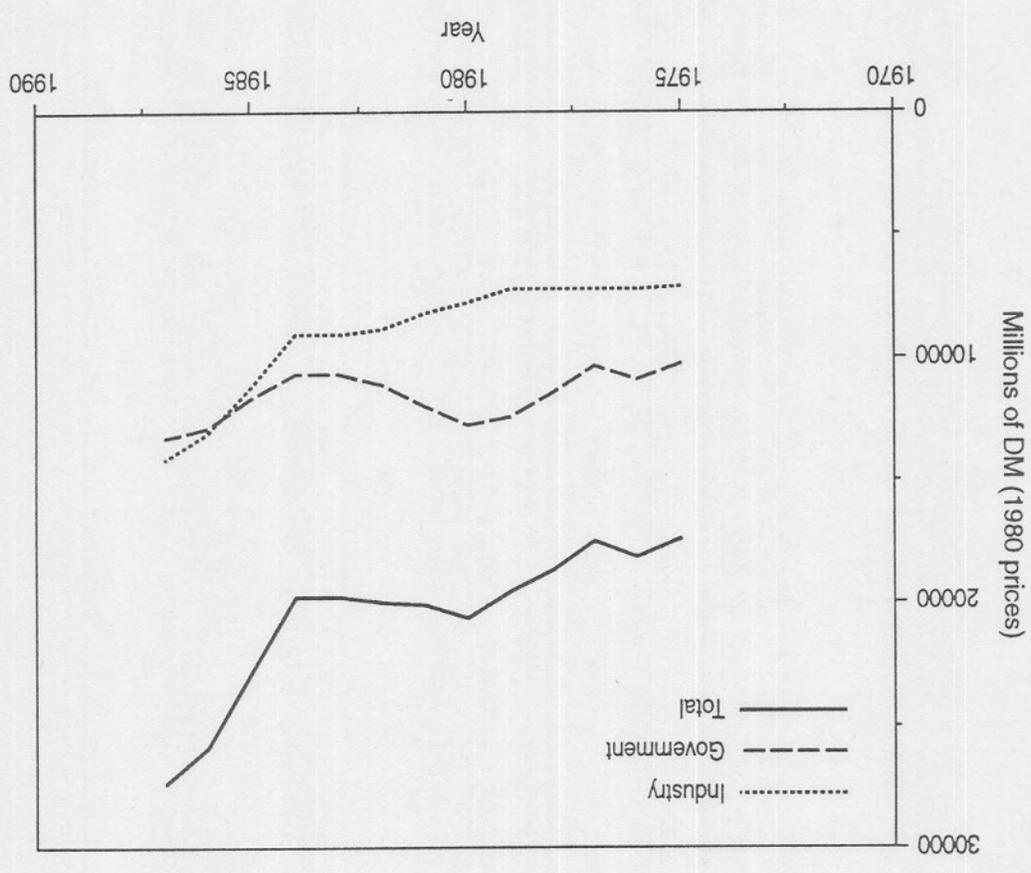
"..the frontiers of sustainability are constantly shifting. Developments in biotechnology, for example, leave open the possibility that resources can be produced from nature without permanently harming the biosphere. There is nothing inevitable about the destructive progress of science." (Redclift, 1987 p.203)

The mid to late 1970s were marked by mounting economic, social and political difficulties facing the OECD nations which heralded a waning of environmental concern (Rüdig and Lowe, 1983; Sandbach, 1980). The poor economic situation of stagflation and declining profitability in many developed economies was also exacerbated by substantial oil price rises, which contributed to cost-push inflation and lower rates of growth in the core economies. An important consequence of the price rises for primary energy sources was that the relationship between energy consumption and rates of economic growth altered through the widespread adoption of energy conservation measures. Research suggested that the US economy in the early 1970s had an energy efficiency of only 1-2%, with a concentration of waste within the transport, commerce and domestic sectors. For Ayres and Narkus-Kramer (1976) this revealed that the neo-Malthusians had neglected to examine the scope for energy conservation, since there was "no fixed relationship between the extent to which final demand is satisfied and the quantities of physical materials and energy required" (Ayres and Narkus-Kramer, 1976 p.1).

Following the oil price rises of the 1970s, there was an 18.9% improvement in energy efficiency in Western Europe between 1973 and 1983, and contrary to earlier expectations oil prices fell by almost 25% in real terms from 1981 to 1985 (Odell, 1985). Further evidence suggests that within the OECD as a whole, total energy consumption has fallen by 40% between 1970 and 1990 (Financial Times Survey, 1991). The implications of the changing relationship between rates of resource depletion and economic growth served as an important rebuttal of the arguments which held that economic growth and environmental protection were intrinsically incompatible policy goals. Shortages of resources were also seen increasingly in terms of geo-politics rather than a result of natural scarcity, which was underlined by a general weakening in producer cartels for a range of primary raw materials since the early 1970s (Crow and Thomas, 1983).

The 1980s emphasis on sustainable growth and development has emerged, therefore, from the ashes of the 1970s debate over finite resources, as many of the previously held assumptions about the relationship between economic activity and environmental degradation have been refuted. The new wave of environmental concern during the 1980s can therefore be characterised as being distinct from the earlier wave of interest in the late 1960s and early 1970s. In addition to the repudiation of simplistic neo-Malthusian assumptions, there has been a growing critique since the 1970s of the

Source: Leipert and Simonis (1990)



Expenditure on environmental protection in West Germany 1975-1987

Figure 1

limitations of conventional economic policy making. For example, attention has focused on the failure of conventional economic indicators such as GDP to distinguish between economic activity which is harmful or beneficial to the environment. Research has indicated a growing burden of expenditure in developed economies to tackle the consequences of environmental degradation, as shown in Figure 1 for West Germany from 1975 to 1987. To avoid this economic and environmental burden, it is maintained that the full ecological and social costs of economic activity must be integrated into decision making, since a pre-condition of sustainable development or the "ecological modernization of industrial society" would be a transformed information base for policy making (Leipert and Simonis, 1990 p.4).

There are a number of variants of the contemporary term 'sustainability' in widespread use, all of which denote a difference in emphasis in terms of the degree of reorientation in current policy which is required. A broad distinction can be made between the 'sustainable growth mode' and 'sustainable development mode' (Turner, 1988), the latter requiring fundamental economic restructuring and the integration of environmental ethics into economic policy making. These environmental ethics include the recognition of poverty, social needs and North-South development issues. Similarly, O' Riordan (1989), distinguishes between 'sustainable utilization' within the current market economy framework, and 'sustainability', which would involve a radical transformation of society. Above all, the concept of sustainability has enabled the combination of previously polarized positions on the environment and economic growth, even if there has been little practical impact on environmental policy making (Owens and Owens, 1989). Despite the intense interest in the 'catch all' concept of sustainability and new measures of economic activity since the late 1980s, conventional economic indicators such as GDP are still used across the political spectrum, in order to evaluate the efficacy of public policy (see Coates and Hillard, 1986; 1987).

By the late 1980s the emphasis of the environmental debate had shifted towards the need for international agreements, the implementation of tougher environmental legislation, and the increased use of economic policy instruments in order to integrate environmental policy into mainstream market-based economic policy. The 1980s focus on sustainability and alternative forms of economic policy has emerged from the perceived limitations of both neo-Malthusianism and conventional economic policy making. However, the sustainability consensus masks important differences in both the interpretation of the causes of environmental problems and the promotion of different policy strategies.

4. The re-emergence of environmentalism in the 1980s

During the 1980s public attention was drawn to new scientific evidence of the seriousness of an environmental crisis encompassing: climatic change and ozone

depletion; the effects of 'acid rain'; the destruction of tropical rainforests and mass extinctions of fauna and flora; the impact of unprecedented levels of air, sea and land pollution; the continuing threats to agricultural production from growing desertification and soil erosion; and more recently, fears over the safety of food and water for human consumption (see IPCC, 1990; Koopowitz and Kaye, 1983; Myers, 1980; Seager, 1990). In addition to these identifiable processes of environmental degradation, there was a series of major environmental catastrophes, including Union Carbide chemical plant explosion at Bhopal, the nuclear fiasco of Chernobyl, and the Exxon Valdez oil spillage in northern Canada, acting as a further catalyst to public concern (see Mackay and Thompson, 1988).

There has also been a growing environmental role for international organisations as a continuation of the 1972 UN Stockholm Conference, in recognition of the need for cooperation between nation states in order to achieve sustainable growth and development. The United Nations has become increasingly involved in environmental policy, as reflected by the UN Environment and Development Programme's Brundtland Commission of 1987, and the UN Rio Conference held in June 1992. Other international developments include the Brandt Commission of 1983 and the World Conservation Strategy of 1980, drawn up by the

Table 1: The electoral success of Green Parties in the European Parliament elections

	1979	1984	1989	Green Parties in 1989
Belgium	3.4%	8.2%	14.3%	AGALEV, ECOLO-V, REGEBO
Denmark				
France	4.4%	6.7%	10.6%	The Greens
Greece	(not in EC)		1.5%	Alternative Ecologists, Ecological Movement
Ireland		0.5%	3.7%	Green Party
Italy			6.2%	Green List, Rainbow Greens
Netherlands		6.9%	7.0%	Rainbow Party
Portugal	(not in EC)	(not in EC)	14.9%	United Democratic Coalition
Spain	(not in EC)	(not in EC)	2.8%	Green List (LV), Ecological Greens (VE), Green Party (PV), Green Alternative (AV-MEC)
United Kingdom	0.1%	0.5%	14.9%	Green Party
West Germany	3.2%	8.5%	9.3%	The Greens, Ecological Democratic Party, Ecological Union

Source: Mackie (1990); Mackie and Craig (1985).

International Union for the Conservation of Nature and Natural Resources (IUCN) (Brandt Commission, 1983; World Wildlife Fund, 1983). The European Community has steadily increased the scope of its environmental policy making, as indicated by the EC sponsored 'European Year of the Environment' in 1987, the launch in 1992 of the Fifth Action Programme on the Environment, and the increasingly comprehensive range of directives aimed at improving environmental standards in its member states (Burgues, 1992; Haigh, 1987).

The renewed growth of environmentalism in the 1980s can be shown by a number of indicators: the increasing priority afforded to the environment in surveys of public opinion (Blowers, 1992; Porritt and Winner, 1988); the widespread greening of politics and formation of environmentalist political parties, as suggested by the elections to the European Parliament shown in Table 1; and a series of major international conferences and efforts to reach international agreements, including the 1987 Montreal Protocol on CFC emissions and the 1988 Conference on the North Sea (Elsworth, 1990). In the UK alone, membership of environmental organisations ranging from Friends of the Earth to the Royal Society for the Protection of Birds, has risen substantially during the 1980s, as illustrated in Table 2. These clear indications of a rise in environmental concern in the 1980s should, however, be set against important electoral setbacks at a national level for Green Parties in Germany, Sweden and the UK in the early 1990s, indicative of partial waning of environmental concern in the face of pressing political and economic difficulties largely absent in the late 1980s (see Rüdig and Bennie, 1992).

Table 2: Change in membership of selected environmental groups in the UK 1980-1989

	1980	1989	% change 1980-1989
Greenpeace	10,000	320,000	+3,100
Friends of the Earth	12,000	120,000	+900
World Wildlife Fund	51,000	202,000	+296
Ramblers	36,000	73,000	+103
National Trust	950,000	1,750,000	+84
CPRE	27,000	44,500	+65
RSNC	140,000	205,000	+46
RSPB	321,000	433,000	+35
Total	1,547,000	3,147,500	+103

Source: McCormick (1991)

The political goals of the different environmental groups illustrated in Table 2 are very diverse, ranging from the more conservatively inclined Council for the Protection of Rural England to left-orientated groups such as the Labour Countryside Campaign and the Ramblers (see Lowe et al, 1986). The split in environmentalist opinion is seen very clearly in the bitter divisions between the fundamental 'fundis' wing and the pragmatic 'realos' wing of the German Greens (Müller-Rommel and Poguntke, 1990). On the right of the environmental movement, there are claims that Green politics has been hijacked by the left (Bramwell, 1988; Capra and Spretnak, 1984). This is illustrated by reference to the defection of leading conservative environmentalists, such as Herbert Grühl, from the European Green Movement. It is also claimed that the worst environmental degradation has been a result of central planning:

"In reality, it is socialist planning and economic policies, both under socialist and corporative capitalist parties, that have proved to be the most wasteful consumers of resources...The claims of the new Red ecologists that more of the same -'changing social relations of property', 'taking resources from private ownership' will somehow produce an ecological millennium, show that ecologism has already lost its way." (Bramwell, 1988 p.235)

Some environmentalists welcomed the process of de-industrialisation since the early 1970s as the natural precursor of a post-industrial and ecologically sustainable society, based around the adoption of decentralised human-scale technologies. However, the identification of the 'industrial super-ideology' (Porritt, 1986 p.350) as the root cause of environmental problems has been criticised as a variant of 1950s and 1960s style liberal pluralism in political science by structuralist and political-economy interpretations of the environmental crisis. The concept of post-industrial environmental utopias is rejected as based on an inadequate conception of the social and economic organisation of capitalist societies (Frankel, 1987; Gershuny, 1978; Weston, 1986):

"They (the post-industrialists) argue that the class-based society of the classical capitalist era has been replaced by a highly complex 'industrial society' in which economic interests are simply one of many countervailing factors in the distribution of resources...The society they wish to replace - the 'industrial society' - does not exist." (Weston, 1986 p.28)

The attack on materialist culture and the 'industrial society' has been a central element in environmentalism since nineteenth century romanticism, and is allied with conceptions of the implicit superiority of rural as opposed to secular urban ways of life (Williams, 1986). The development of urbanism and cities has also been characterised as an underlying cause of alienation from nature and also as a contributory factor in the development of socially stratified societies and militarism (Mumford, 1961).

The left of the environmental movement has seen the diversity of environmental politics

as an indicator of its failure to mount a coherent challenge to the underlying causes of environmental problems:

"The very fact that environmentalism now draws support from such a wide spectrum of political opinion is evidence of its failure to threaten the status quo...A campaigning environmentalism, based upon an understanding of the social construction of our physical surroundings, would have been in direct confrontation with the capitalist system." (Weston, 1986 p.15)

The eco-socialists like Joe Weston have argued for a combination of environmental protection and social justice, stressing for example, the job creation potential of environmental protection technology and labour intensive 'soft' technologies (Griesshammer, 1985; Howells, 1986; Ryle, 1988; Williams, 1986). Eco-socialism has also been identified with the more pragmatic policies of 'environmental Keynesianism', for the regeneration of industrially depressed areas with public spending on environmental policy and was promoted in the mid-1980s as an alternative to monetarism and neo-liberal policies for economic restructuring (see Labour Party, 1986; Ossenbrügge, 1988; SPD, 1986).

The eco-socialists have been particularly powerful within the fundamentalist wing of the German Greens, and their radical agenda can be illustrated by the writings of Rudolf Bahro, who ultimately resigned from the German Green Party in 1985, in opposition to their repeated compromises and alliances with the existing political establishment:

"The existing world order impoverishes half of humanity, forces whole nations below the basic subsistence level, and everywhere smothers local cultures, makes hundreds of millions of people landless and unemployed, destroys the fertility of the land, extends the deserts, fells the rain forests, and drives one country after another into state bankruptcy and towards military dictatorship....An ecological and social type of economy demands a completely different system of production: small units, locally integrated and self administered, with soft technologies which save resources and spare the environment. The present big industrial infrastructure for the flow of energy and materials, must be dismantled." (Bahro, 1986 pp.36-40)

In the early eighties, it was widely argued that opinion within industrialised societies could be categorised into two main groups, ecocentrist and technocentrist, on the basis of their response to the environmental crisis (see Sandbach, 1980; O'Riordan, 1981; Pepper, 1984). The ecocentrists stressed the need for decentralised and low technology based social organisation, while the technocentrists continued to promote existing patterns of production and consumption, hard technological solutions to environmental problems, and no radical changes to society. However, a number of developments since the mid-1980s have served to weaken the clarity of this distinction, including the advent of 'green consumerism'; the emerging political consensus over the goal of environmental

Table 3: Western environmentalist thought 1960 to 1990: A typology

School of thought	Central tenets	Key proponents
Cornucopians	No major problems perceived. Easily solved by human ingenuity and the market economy.	Simon (1981) Simon and Kahn (1984)
Managerialists and technical fixers	The use of organisational or technical solutions, such as the expansion of nuclear power to combat energy shortages and global warming.	Feiss (1963) Hä fele (1974)
Market-based approaches	The use of MBIs (market-based instruments) to internalise environmental cost externalities and tackle sources of 'market failure'.	Pearce et al (1989; 1991)
Institutional reform school	Promotion of sustainable development by better integration of environmental policy with economic development. Focus on N.-S. dimension and need for change in global monetary and trade policy.	Brandt Report (1981) UN Brundtland Commission (1987)
Environmental Keynesianism	Emphasis on the employment creation potential of public expenditure on environmental protection.	Griesshammer (1984) SPD (1986)
Post-industrialists and liberal pluralists	Ideology of industrialism seen as underlying problem. Focus on need to change individual attitudes.	Capra and Spretnak (1984) Porritt (1984)
The Limits to Growth school	The promotion of scientifically based public policy and the control of both population and economic growth.	Meadows et al (1972) Goldsmith et al (1972)
Socio-biology and authoritarian ecology	The promotion of neo-Malthusian ideas and social Darwinism in public policy.	Bramwell (1988) Colinvaux (1980)
Deep Ecology	Preservation of wilderness areas and the centrality of nature to all social policies.	Devall and Sessions (1985)
Gaia hypothesis	The promotion of homeostatic and sustainable policies.	Lovelock (1979)
Utopian socialists and anarchists	The transformation of society into numerous decentralised and largely self-sufficient communities. The promotion of 'soft' technologies.	Bahro (1982, 1986) Croall and Rankin (1981)
Orthodox Marxists	Environmental degradation seen as an inevitable consequence of capitalism.	Harvey (1974) Sandbach (1980)
Feminist perspectives	Domination and destruction of nature seen as a corollary of women's oppression under patriarchy.	Shiva (1988)
Post-Marxist structuralism	Environmental problems seen as stemming from structural features in the economy and society identifiable through historically based analysis.	Hecht and Cockburn (1989) Ossenbrügge (1988) Redclift (1987)

sustainability, which has clouded the distinctiveness of the 'green' alternative; and the rift between the fundamentalist and pragmatic wings of the environmental movement.

Thus far, this paper has described the rise of environmentalism and environmental concern as if it were simply a response to environmental change but socio-economic changes within the developed economies have also facilitated and shaped its development. Rising affluence, for example, has allowed the growth of 'post-materialist' values (Cotgrove and Duff, 1980; Inglehardt, 1981) and a greater demand for 'positional goods' such as environmental amenity (Hirsch, 1977). The growth of a new middle class associated with the rise of service sectors in the economy has been linked with the emergence of new political demands since the 1960s encompassing feminism, environmental protection and quality of life issues (Esser and Hirsch, 1987)

Despite the diversity of environmentalist thought, as illustrated in Table 3, the membership of the environmental movement is overwhelmingly drawn from professional and managerial occupations (Cotgrove and Duff, 1980; Lowe and Goyder, 1983; Lowe et al, 1986). This apparent anomaly can be explained by important political differences within the middle class, as in the distinction between more conservatively inclined nature conservationists and heritage preservers and the radical left orientated anti-nuclear protestors (Cotgrove, 1982). Indeed, the divergence of political views within the middle class since the 1960s can be conceived as an example of class de-alignment in political identification (Særlvik and Crewe, 1983). Studies have suggested that many of the members of the ostensibly non class-based green movement can be characterised as 'political outsiders' in relation to established class structures and social relations, and are often employed in the public service sector of the economy (Cotgrove and Duff, 1980, 1981; Lash and Urry, 1987).

The re-emergence of environmentalism and the rise of 'green consumerism' in the 1980s should be placed in the context of the socio-economic restructuring in the developed economies which has been necessitated by growing economic difficulties in the OECD nations since the early 1970s. In the 1980s, for example, there has been a trend towards what may be termed 'positional' or luxury goods. This diversification of 'positional' goods corresponds with the product differentiation and market niche creation which is integral to the economic shift from Fordism to post-Fordist flexible accumulation and economies of scope rather than of scale (Cooke, 1988; Scott and Storper, 1986). The shift from the mass consumption of consumer durables to individualised consumption, can be illustrated by the development of environmentally friendly products which are more expensive than their environmentally damaging alternatives, not because they are necessarily more expensive to manufacture, but because they serve an elite consumer market where price is less of an object:

"The frenetic pursuit of the consumption dollars of the affluent has led to a much

stronger emphasis upon product differentiation under the regime of flexible accumulation." (Harvey, 1989a, p.269)

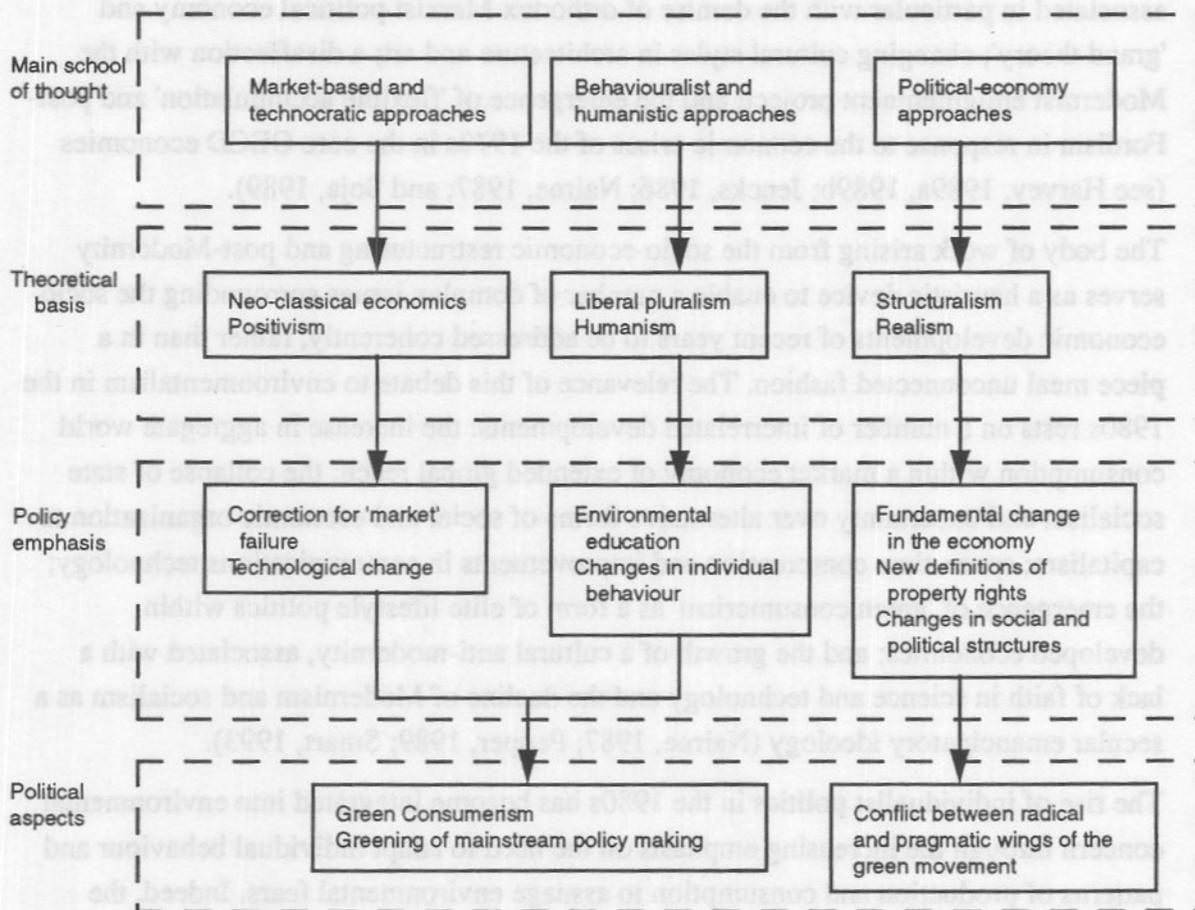
An important question is how far the nature of western environmentalism and environmental policy has been shaped by the wider socio-economic changes which have aided its development. Since the early 1970s, the developed economies have undergone a set of socio-economic, political and cultural changes, which many social scientists believe are interrelated and not readily explicable in terms of existing conceptual frameworks (Pratt, 1990; Smart, 1993). This has led to a key theoretical debate at present within the humanities and the social sciences, concerning a postulated shift from Modernism to post-Modernism. The phenomenon of post-Modernism has been associated in particular with the demise of orthodox Marxist political economy and 'grand theory'; changing cultural styles in architecture and art; a disaffection with the Modernist enlightenment project; and the emergence of 'flexible accumulation' and post-Fordism in response to the economic crises of the 1970s in the core OECD economies (see Harvey, 1989a, 1989b; Jencks, 1986; Nairne, 1987; and Soja, 1989).

The body of work arising from the socio-economic restructuring and post-Modernity serves as a heuristic device to enable a number of complex issues surrounding the socio-economic developments of recent years to be addressed coherently, rather than in a piece meal unconnected fashion. The relevance of this debate to environmentalism in the 1980s rests on a number of interrelated developments: the increase in aggregate world consumption within a market economy of extended global reach; the collapse of state socialism and uncertainty over alternative forms of social and economic organization to capitalism; space-time compression and improvements in communications technology; the emergence of 'green consumerism' as a form of elite lifestyle politics within developed economies; and the growth of a cultural anti-modernity, associated with a lack of faith in science and technology and the decline of Modernism and socialism as a secular emancipatory ideology (Nairne, 1987; Pepper, 1989; Smart, 1993).

The rise of individualist politics in the 1980s has become integrated into environmental concern through the increasing emphasis on the need to adapt individual behaviour and patterns of production and consumption to assuage environmental fears. Indeed, the growth of 'green capitalism' and 'green consumerism' has been widely welcomed in the technocratic and liberal pluralist sections of the green movement, as a key aspect of environmental policy, which can harness the 'enlightened self-interest' of consumers (see Elkington, 1987; Elkington and Hailes, 1988; Porritt and Winner, 1988; Seymour and Giradet, 1988). In this respect, therefore, the promotion of 'green consumerism' and market-based environment policy has closely followed the socio-economic shifts towards more individualised forms of political expression and a more fractious and

Figure 2

The relationship between different conceptions of environmental problems and policy



Source: Typology adapted from Emel and Peet (1989)

splintered politics associated with the decline of class-based mass political parties (Esser and Hirsch, 1987; Lash and Urry, 1987).

However, the 'post-Modern' condition of new flexible patterns of economic activity is of paradoxical significance for environmental policy, since it is a political and cultural adaptation to the perceived economic and political failure of the Modernist project, which had previously given some degree of legitimacy to the role of planning and state intervention in public policy. As a result, therefore, the recent development of environmental policy has been shaped by the economic and political inability of the state to take a major role in the implementation of policy under the shift from Keynesianism to neo-liberalism since the late 1970s and an emphasis on the use of market-based instruments in environmental policy (see section 5.1 below). It remains to be seen whether the burying of the 1980s Reagan/Bush legacy in the US presidential elections of November 1992 will provide a new policy making context in the OECD nations for environmental protection policies less driven by an ideological faith in the market.

5. Competing conceptions of environmental policy

In order to examine the environmental debate in greater detail, it is necessary to disentangle the main strands of thought which underpin the diversity of environmentalist views, as set out in Table 3. There are broadly three different groups of interpretations of the cause of the environmental crisis and appropriate policy responses, identifiable in the literature: firstly, there are the dominant market-based and technocratic approaches; secondly, there are behaviouralist, humanistic and human-ecology approaches; and thirdly, there are the structuralist political-economy approaches. Figure 2 suggests that these three approaches can be distinguished epistemologically in terms of their theoretical conception of society, and practically, in terms of the degree and nature of societal change which would be necessitated in order to protect the environment. The typology adopted here is based loosely on Emel and Peet (1989) and can be considered in conjunction with the philosophical distinction between positivism, humanism and structuralism used widely within human geography (see Johnston, 1983).

In the following sections, the review of different interpretations of environmental problems is used to clarify the debate over environmental policy, and in particular, the relative role of market-based and regulatory policy instruments. This paper argues that the most important cleavage within the spectrum of environmental thought and policy making concerns the conceptualisation of the role of the market and the degree and nature of state intervention in the economy.

5.1 Technocratic and market-based approaches

The market-based approach can be conceived as a variant of 'technocentrism' within the technocentrist/ecocentrist distinction (O'Riordan, 1989). In the past, technocentrism has

been frequently associated with the search for managerialist and 'hard' technological solutions, often promoted and financed by the state. An example is the advancement of 'nuclear parks' in response to the 1970s energy crisis (Hä fele, 1974). Technocentrist approaches saw solutions in terms of engineering based technical 'fixes' but since the late 1970s and 1980s the technocratic emphasis has shifted towards market-led technological developments based on the relative profitability of different policy options. The decline of nuclear power as a result of the extension of market forces into strategic technological decision making can be viewed as an example of this process.

Until the 1980s, the environmental policy debate had tended to discuss regulatory policy instruments to the relative exclusion of economic instruments: there has been a tendency to see fiscal measures and regulation by the state as direct alternatives (Owens et al, 1990). Economic policy instruments have emerged as a fundamental component in the new environmental consensus for sustainability, based around market-based conceptions of policy (see Pearce et al. 1989; 1991). It should be noted that a large section of the environmentalist movement have also embraced the development of 'green consumerism' and market-based policies, particularly the liberal pluralists and pragmatic wing of the green movement, as illustrated in Figure 2, where the emphasis on individual responsibility and action has become easily incorporated into 'green consumerism' and the use of market-based policy instruments to modify consumer behaviour.

A central concern emerging from the 1970s literature was whether the market could provide for the future. For Roberts (1974), the market could not consider long-term resource scarcity because it was only concerned with short-term profitability, as illustrated by the built-in obsolescence of consumer durables. However, other commentators began to develop an alternative perspective based around the notion that the market could provide for the future if it operated efficiently in the absence of various sources of 'market failure' which lay behind environmentally damaging economic activity (see Page, 1977). The market-based approach to environmental policy is based on the belief that a properly functioning market economy is the best allocator of goods and resources, yet the market does not currently extend adequately to the use of natural resources and environmental externalities:

"Environmental goods like clean air and clean water are not exchanged in unregulated markets: they have no price, so there is no incentive for economy in their use. While 'free' to the individual, they are scarce to the community, and therefore become degraded. Pollution can be seen in this context as an externality - a cost of economic activity which can be imposed by some parties on others without compensation. Intervention to create a 'market' in clean air or clean water - by creating property rights in the environment or imposing effluent charges - will in

theory internalise these costs and correct the market failure which leads to pollution." (Owens et al, 1990 p.4)

The effective operation of market mechanisms must therefore be brought about by the internalisation of the environmental costs associated with production and consumption. Button and Pearce (1989) argue that the costs of urban environmental policy are not adequately incorporated into decision making as a result of a combination of 'market failure' and the role of government interfering with the 'private optimum'. However, the market-based position does not conceive of the state's role as entirely negative, since state intervention is frequently necessary in order to allow the market to function effectively.

A key component in many market-based instruments (MBIs) is the use of the 'polluter pays principle' whereby costs are imposed on individual polluters as a disincentive to continue with the polluting activity (though some polluters may choose to ignore such incentives, see BANC, 1990). The different means by which the costs of polluting activity can be internalised can be further differentiated. The OECD has recently classified the range of economic instruments available for environmental policy into five categories: charges, subsidies, deposit-refund systems, market creation and financial enforcement incentives (Opschoor and Vos, 1989). In the case of the application of the 'polluter pays principle', by using pollution taxes or charges, there are two main theoretical arguments put forward: firstly, that of 'allocative efficiency' whereby a tax or charge achieves desired environmental quality at minimum economic cost (those who can most cheaply reduce pollution do most of the pollution control); and secondly, the 'innovative incentive principle', whereby a charge must be paid on all units of pollution, providing a continual incentive to develop better means of pollution control (Owens et al, 1990).

Criticism of market-based approaches to environmental policy has questioned a number of fundamental tenets held within the neo-classical economic paradigm, as well as the effectiveness of these policies in practice. For example, in order for a market to achieve optimal resource allocation, a range of conditions would have to be met, including the economic rationality of producers and consumers and perfect mobility of the factors of production, yet these conditions do not hold in reality (Emel and Peet, 1989). Despite these types of criticisms of the difference between the theoretical basis of neo-classical economic analysis and the nature of the market economy as it exists, many resource economists claim that technological and allocative efficiency can be attained with appropriate government intervention to correct for market failure (Button and Pearce, 1989; Pearce et al 1989; Turner, 1991).

For MBIs to be effective there is a need for the development of sophisticated cost-benefit analysis (CBA) methodologies, extending monetary value to the 'total economic

value' of the environment, and moving beyond narrow conventional economic indicators such as GDP. This would according to David Pearce, include three different kinds of use value: direct use values (e.g. timber and eco-tourism); indirect use values (e.g. air quality); option and quasi-option values (e.g. the retention of resources for future generations); and also non-use existence values (e.g. the protection of the blue whale). As a parallel project, methodologies would be developed to determine the intensity of preference by measuring the willingness of consumers to pay for environmental protection.

There are perhaps four main arguments as to why the use of a monetary valuation of the environment may be an effective aspect of environmental protection: the economic argument can be seen as additional argument to scientific analysis of environmental problems; the economic argument is a more powerful tool for political lobbying than moral arguments, as the dominant language of social power, and is now widely employed by environmentalist pressure groups; money can also be portrayed as a universal notion of value; and finally, research has suggested that the conservation and sustainable utilisation of resources may be worthwhile in purely economic terms irrespective of other social and ecological concerns (Pearce, 1991).

However, there are a number of concerns both practical and methodological, with the use of monetary valuations as the basis for policy making. The assignment of monetary values to components of the environment assumes an atomistic view of the environment as a collage of different pieces to which property rights may be attached, but this fails to determine who has rights to what and the basis on which property rights are to be allocated. Note, for example, how multinational corporations are currently hardening their views on property rights to control the results of plant and animal breeding in order to secure long-term profitability within the global agricultural sector in the face of economic uncertainty (Harvey, 1992). A further consideration is the positivist conception of knowledge shared by both the natural sciences and also the emerging sub-discipline of environmental economics with its theoretical basis in neo-classical economics, since many of the factors which need to be incorporated within comprehensive cost-benefit analysis procedures are intrinsically subjective and 'indeterminate' (BANC, 1990; Rosenhead and Thunhurst, 1979; Self, 1975). The CBA procedure becomes even more uncertain when applied to the 'option values' of resources for future generations since money is not a constant value over time and economic crises periodically herald a devaluation of assets from previous periods of economic activity (Harvey, 1992).

Under market-based models of decision making, the distributional issues of income disparities both within and between nations are given inadequate attention. Neglected areas include the nature of democratic procedures for public decision making and the

impact of Third World debt and the terms of trade for basic commodities (BANC, 1990). If the neo-classical analogy of 'money votes' is used to show how decision making takes place in the market place, it is clear that many people are relatively, if not completely disenfranchised from environmental decision making. The application of the 'polluter pays principle' to reduce environmentally damaging activity may also be socially regressive, especially when used to discourage the profligate consumption of fuel and other basic essentials. A further distributional issue is the impact of 'green taxes' on raw materials usage and energy resources in developing countries and the concern that 'green taxes' are ultimately paid for by the public as additional forms of indirect taxation (Williamson, 1974). Pollution taxes may also cause negative wider macro-economic effects including increased inflation and reduced international competitiveness, an argument used against the introduction of a Carbon Tax in the UK to counter global warming, where there were fears over the employment impact in the high energy consuming industries (McGavin, 1991).

5.2 Non market-based approaches

A number of alternative conceptions to that of the neo-classical economic and technocentric approaches, move the focus towards more overtly subjective and ethically orientated positions. The necessity of considering non-economic factors in the application of economic or technical engineering based solutions to resource management problems has long been recognised in the field of natural hazards (Emel and Peet, 1989). This is linked to a recognition of the diversity of interpretations which exist of both the causes and possible solutions to environmental problems:

"What we have is not the real (environmental) risks versus a whole lot of misconceptions of those risks but the clash of plural rationalities each using impeccable logic to derive different conclusions (solution definitions) from different premises (problem definitions)." (Thompson, 1986 quoted in Redclift, 1987 p.202)

An important alternative to the market-based analysis is the range of structuralist political-economy perspectives. These are marked by their focus on the structural economic and political features of society, and in particular on the historical emergence and contemporary operation of the global market economy. Michael Redclift, for example, notes that environmental rationalities are not only socially constructed, but are "supported by social groups with different degrees of power and with conflicting economic interests" (Redclift, 1987 p.202).

Structuralist political-economy approaches are characterised by the rejection of the findings of positivist 'value-free' ahistorical analysis and individualist humanistic interpretations of social change. The historical dimension is seen a critical aspect of any explanation of environmental degradation, with emphasis on processes such as the internationalisation of the global environment through the extension of capitalist

exchange values into cultures based around traditional use values for natural resources (Redclift, 1987). There are a range of political-economy based arguments arising from the analysis of the historical development and contemporary operation of the global market economy. These studies suggest that capitalist economic development and environmental sustainability are intrinsically incompatible, and that an extension of market mechanisms and value-free 'scientific' rationalisations of environmental problems will ultimately only exacerbate the environmental crisis (Bahro, 1982; 1984; 1986; Redclift, 1987; Sandbach, 1980; Weston, 1986).

There were a number of Marxist studies in the 1970s, which showed how environmental concern had been dissipated by legislative measures. Examples include the 1974 Control of Pollution Act in the UK, interpreted by Sandbach (1980) as a 'legitimation' strategy by the Government to assuage the environmental fears of the electorate. Environmental 'reformism' was viewed as a legislative 'end of pipe' response to the growing political salience of environmental concern, with little practical impact on the cause of environmental problems. More recently, the UN Brundtland Commission of 1987 has been criticised for its failure to address the necessary shifts in power and institutional alignments which could allow sustainability to become a practical reality and therefore overcome the underlying barriers to environmental protection (O'Riordan, 1989).

Structuralist political-economy perspectives on the environment have developed substantially during the 1980s. Orthodox Marxist interpretations of economic development and environmental degradation have themselves been widely criticised by new political-economy perspectives. Principal concerns with the earlier studies include: the reliance on a labour theory of value (Martinez-Alier, 1987); failure to give sufficient weight to the impact of patriarchy on the environment, particularly in a Third World context (Shiva, 1986; 1988); the primacy of economic determinism in explanation (Corbridge, 1986); sterile 'epistemological confrontation' with other interpretations (Corbridge, 1986); the neglect of environmental degradation under state socialism; and insufficient attention given to the role of technology in extending the 'frontiers of sustainability' (Redclift, 1987).

In the last decade, there have been a number of studies of how structural causal mechanisms operate in producing local or regional manifestations of the environmental crisis. Examples include soil degradation in different societies (Blaikie 1985; Blaikie and Brookfield, 1987); famine in Nigeria (Watts, 1983); deforestation in the Amazon basin (Hecht and Cockburn, 1989); and the environmental pollution facing the inhabitants of Mexico City (Redclift, 1987). These studies stress the importance of the historical development of contemporary phenomena, and also the interplay of economic and political forces at both a regional and global level of resolution.

6. Conclusion

This paper has attempted to unravel some of the complexities and contradictions within the contemporary environmental debate. I argue that beneath the diversity of different perspectives, there is a key conceptual distinction to be made between market-based and non market-based conceptions of the causes of environmental problems. This in turn informs the discussion over the appropriate use of different policy instruments, and in particular the degree and nature of state intervention in the market. I suggest that this focus on the market/non-market dimension is a more useful conceptual framework than the influential ecocentrism/technocentrism distinction widely employed in the literature of the 1980s. The Western phenomenon of 'green consumerism' and the focus on market-based policy instruments can best be interpreted as a coalescence between the emphasis on 'individual responsibility' within the behaviouralist and pluralist environmental perspectives and the ideological shift towards market-based interpretations of the cause of environmental problems as a corollary of wider developments in the 1980s within public policy more generally. It is difficult to anticipate the future course of the environmental debate but it is conceivable that the contemporary emphasis on 'market failure' as the underlying cause of environmental problems may be displaced during the 1990s as a creature of its time, just as the 1970s neo-Malthusian conceptions of the 'limits to growth' have now been largely discredited.

References

- Ayres, R. and Narkus-Kramer, M. 1976 *An Assessment of Methodologies for Estimating National Energy Efficiency*. Paper presented to the Annual Meeting of the Technology and Society Division of the American Society of Mechanical Engineers. New York, 5th December 1976.
- Bahro, R. 1982 *Socialism and Survival*. London: Heretic Books.
- Bahro, R. 1984 *From Red to Green*. London: Verso.
- Bahro, R. 1986 *Building the Green Movement*. London: Gay Mens Publishers.
- Ballard, D.W. 1974 *An American view of problems of Materials Reclamation*. Paper presented to *The Conservation of Materials Conference*. Harwell, 26-27th March, 1974.
- BANC (British Association of Nature Conservationists) 1990 *The Conservationists' response to the Pearce Report*. London: BANC.
- Beckerman, W. 1974 *In Defence of Economic Growth*. London: Jonathan Cape.
- Blaikie, P. and Brookfield, H. 1987 *Land Degradation and Society*. London: Methuen.
- Blowers, A.T. 1992 Narrowing the options: the political geography of waste disposal. In Clark, M.; Smith, D.; and Blowers, A.T. eds. *Waste Location: spatial aspects of waste management, hazards and disposal*. pp.227-247. London and New York: Routledge.
- Bradford, G. 1989 *How Deep is Deep Ecology?*. California: Times Change Press.
- Bramwell, A. 1989 *Ecology in the 20th Century: A History*. New Haven and London: Yale University Press.
- Brandt Commission 1983 *North-South: A Programme for Survival*. London and Sydney: Pan Books.
- Burgues, J.G. 1992 *The European Commission and environmental policy*. Plenary session at the conference Perspectives on the Environment: Research and Action in the 1990s. Held at the University of Leeds, 14-15th September 1992.
- Button, K.J. and Pearce, D.W. 1989 Improving the Urban Environment: How to Adjust National and Local Government Policy for Sustainable Urban Growth. In *Progress in Planning*. 32, pp.137-184.
- Capra, F. and Spretnak, C. 1984 *Green Politics: The Global Promise*. London: Hutchinson.
- Carson, R. 1962 *Silent Spring*. London: Hamilton.
- Coates, D. and Hillard, J. ed. 1986 *The Economic Decline of Modern Britain*. Brighton: Wheatsheaf Books.

- Coates, D. and Hillard, J. ed. 1987 *The Economic Revival of Modern Britain*. Aldershot: Edward Elgar Publishing.
- Colinvaux, P. 1980 *Why Big Fierce Animals Are Rare*. Harmondsworth: Penguin.
- Cooke, P. 1988 *Post-Fordism and Flexible Integration*. Paper presented to St Catharines College Geography Society, Cambridge University, January 18th 1988.
- Corbridge, S. 1986 *Capitalist World Development*. UK: MacMillan.
- Cotgrove, S. and Duff, A. 1980 Environmentalism, Middle-Class Radicalism. In *The Sociological Review*. 28, pp.333-349.
- Cotgrove, S. and Duff, A. 1981 Environmentalism, values and social change. In *The British Journal of Sociology*. 32, pp.92-110.
- Croall, S. and Rankin, W. 1981 *Ecology for Beginners*. London: Writers and Readers.
- Crow, B. and Thomas, A. 1983 *Third World Atlas*. Milton Keynes: Open University.
- Devall, B. and Sessions, G. 1985 *Deep Ecology: Living As If Nature Mattered*. Utah: Peregrine Smith.
- Dunham, K. 1974 *Non-renewable mineral resources*. Paper presented to conference The Conservation of Materials. Harwell, 26-27th March 1974.
- Ehrlich, P.R. 1970 *The Population Bomb*. New York: Ballantine Books.
- Ehrlich, P.R. and Ehrlich, A.H. 1970 *Population, Resources, Environment: issues in human ecology*. San Francisco: W.H. Freeman.
- Elkington, J. 1987 *The Green Capitalists*. London: Victor Gollancz.
- Elkington, J. and Hailes, J. 1988 *The Green Consumer Guide*. London: Victor Gollancz.
- Elsworth, S. 1987 *A Dictionary for the Environment*. London: Paladin.
- Emel, J. and Peet, R. 1989 Resource management and natural hazards. In Peet, R. and Thrift, N. 1989 *New Models in Geography* Volume One. pp. 49-76. London: Unwin Hyman.
- Esser, J. and Hirsch, J. 1987 The crisis of fordism and the dimensions of a 'postfordist' regional and urban structure. In *International Journal of Urban and Regional Research*. 7, pp. 417-437.
- Feiss, J.W. 1963 Minerals. In *Scientific American* 1963 Technology and Economic Development. pp.107-118. Harmondsworth: Penguin.
- Financial Times Survey 1991 *Industry and the Environment*. 13th March 1991.
- Forrester, J.W. 1970 *World Dynamics*. Cambridge, MA: Wright-Allen Press.

- Frankel, B. 1987 *The Post-Industrial Utopians*. Cambridge: The Polity Press.
- Gershuny, J. 1978 *After Industrial Society: The Emerging Self-service Economy*. London: Macmillan.
- Glacken, C.J. 1967 *Traces on the Rhodian Shore*. Berkeley: University of California Press.
- Goldsmith, E.; Allen, R.; Allaby, M.; Davoll, J.; and Lawrence, S. 1972 *Blueprint for Survival*. Harmondsworth: Penguin.
- Griesshammer, R. 1985 The Ecological Boomerang. In Ayrton, P.; Enlehardt, T.; and Ware, V. ed. 1985 *World View 1985: An economic and Political Yearbook*. London and Sydney: Pluto Press.
- Hä fele, W. 1974 A systems approach to energy, In *American Scientist*. 62, pp.438-47.
- Haigh, N. 1987 *EEC Environmental Policy* (Second edition). UK: Longman.
- Hardin, G. 1968 *The Tragedy of the Commons*. In *Science*. 162, pp.1243-8.
- Harvey, D. 1974 Population, resources and the ideology of science. In *Economic Geography*. 50, pp.256-277.
- Harvey, D. 1989a *The Urban Experience*. Oxford: Basil Blackwell.
- Harvey, D. 1989b *The Condition of Postmodernity*. Oxford: Basil Blackwell.
- Harvey, D. 1992 *Dialectics, Environmental and Social Change*. Lecture given to the Institution for Historical Research. Senate House, University of London, 11th February 1992.
- Hawksworth, D.L. ed. 1974 *The Changing Flora and Fauna of Britain*. London and New York: Academic Press.
- Hecht, S. and Cockburn, A. 1989 *The Fate of the Forest*. London and New York: Verso.
- Hirsch, F. 1977 *Social Limits to Growth*. London: Routledge and Kegan Paul.
- Howells, K. 1986 Mixing It: Energy, the Environment and the Unions. In Weston, J. ed. 1986 *Red and Green*. London: Pluto Press.
- Hubbert, M.K. 1976 Outlook for fuel reserves. In Lapedes, D.N. *Encyclopedia of Energy*. New York: McGraw-Hill.
- Inglehardt, R. 1981 Post-Materialism in an Environment of Insecurity. In *The American Political Science Review*. 75, pp.880-900.
- IPCC (Intergovernmental Panel on Climatic Change) 1990 *Policymakers summary of the scientific assessment of climatic change*. World Meteorological Office / United Nations Environment Programme.

- Jencks, C. 1986 *What is Post-Modernism?*. London and New York: Academy Editions and St Martin's Press.
- Johnston, R.J. 1983 *Philosophy and Human Geography*. London: Arnold.
- Koopowitz, H. and Kaye, H. 1990 *Plant Extinction: A Global Crisis*. London: Christopher Helm.
- Labour Party 1986 *Labour's Charter for the Environment*. London: The Labour Party.
- Lash, S. and Urry, J. 1987 *The End of Organized Capitalism*. Cambridge: Polity Press.
- Leipert, C. and Simonis, U.E. 1990 *Environmental Damage -Environmental Expenditures: Statistical Evidence on the Federal Republic of Germany*. Berlin: Wissenschaftszentrum für Sozialforschung.
- Lovelock, J.E. 1979 *Gaia: A New Look at Life on Earth*. Oxford: Oxford University Press.
- Lowe, P.D. and Goyder, J. 1983 *Environmental Groups in Politics. Resource Management Series Vol.6*. London: Allen & Unwin.
- Lowe, P.D.; Cox, G.; MacEwan, M.; O'Riordan, T.; and Winter, M. 1986 *Countryside Conflicts: The politics of farming, forestry and conservation*. Aldershot: Gower.
- Mackie, T. 1990 *Europe Votes 2*. London: Dartmouth Publishing Company Ltd.
- Mackie, T. and Craig, F. 1985 *Europe Votes*. London: Parliamentary Research Services.
- Martinez-Alier, J. 1987 *Ecological Economics: Energy, Environment and Society*. Oxford and Cambridge, MA: Basil Blackwell.
- McCormick, J. 1991 *British Politics and the Environment*. London: Earthscan Publications Ltd.
- McGavin, B. 1991 Going green - but what about the workers? In *Employment Gazette*. 1, pp.11-19.
- Meadows, D.H.; Meadows, D.I.; Randers, J.; and Behrens, W. ed. 1972 *The Limits to Growth*. New York: Universe Books.
- Mesarovic, M. and Pestel, E. 1974 *Mankind at the Turning Point: The Second Report to the Club of Rome*. London: Hutchinson.
- Müller-Rommel, F. and Poguntke, T. 1990 Die Grünen. In Mintzel, A. and Oberreuter, H. ed. 1990 *Parteien in der Bundesrepublik Deutschland*. pp.276-311. Bonn: Bundeszentrale für politische Bildung.
- Mumford, L. 1961 *The City in History*. London: Secker and Warburg.
- Myers, N. 1980 *The Sinking Arc*. London: Pergamon Press.

- Nairne, S. 1987 *The State of the Art: Ideas and Images in the 1980s*. London: Chatto and Windus.
- Odell, P. 1985 Energy and Regional Development: A European Perspective. In *Built Environment*. 11, pp.31-53.
- Opschoor, J.B. and Vos, H.B. 1989 *Economic Instruments for Environmental Protection*. Paris: Organisation for Economic Co-operation and Development.
- O'Riordan, T. 1981 *Environmentalism*. London: Pion.
- O'Riordan, T. 1989 The challenge for environmentalism. In Peet, R. and Thrift, N. ed. 1989 *New Models in Geography Part One*. London: Unwin Hyman.
- Ossenbrügge, J. 1988 Regional Restructuring and the Ecological Welfare State - Spatial Impacts of Environmental Protection in West Germany. In *Geographische Zeitschrift*. 76, pp.78-96.
- Owens, P. and Owens, S. 1989 Resource Management. In *Progress in Human Geography*. pp.107-117.
- Owens, S.; Anderson, V.; and Brunskill, I. 1990 Green Taxes. *Green Paper No.2*. London: The Institute for Public Policy Research.
- Page, T. 1977 *Conservation and Economic Efficiency*. Baltimore: Methuen.
- Parkin, S. 1989 *Green Parties: An International Guide*. London: Heretic Books.
- Pearce, D.W. 1991 *Saving the Tropical Rainforest: An Economic Approach*. Paper presented to the Geography and Planning Research Seminar. The London School of Economics, 5th December 1991.
- Pearce, D.W.; Markandya, A.; and Barbier, E.B. 1989 *Blueprint for a Green Economy*. London: Earthscan Publications.
- Pearce, D.W. ed. 1991 *Blueprint 2: Greening the World Economy*. London: Earthscan Publications.
- Pepper, D. 1984 *The Roots of Modern Environmentalism*. London: Croom Helm.
- Pepper, D. 1989 Green Consumerism - Thatcherite Environmentalism. In *New Ground*. Winter 1989/90, pp.18-20.
- Perring, F.H. 1974 Changes in our Native Vascular Plant Flora. In Hawksworth, D.L. ed. 1974 *The Changing Flora and Fauna of Britain*. pp.7-27. London and New York: Academic Press.
- Porritt, J. 1984 *Seeing Green*. Oxford: Basil Blackwell.
- Porritt, J. and Winner, D. 1988 *The Coming of the Greens*. UK: Fontana.

- Pratt, A. 1990 *Varieties of theory and truth: the challenge of post-structuralism*. Discussion paper presented to the London School of Economics, Department of Geography, Postgraduate Reading Weekend, East Bergholt, 16th November 1990.
- Redclift, M. 1987 *Sustainable Development: Exploring the Contradictions*. London and New York: Routledge.
- Roberts, F. 1974 *Management policies for non-renewable materials resources*. Paper presented to The Conservation of Materials Conference. Harwell, 26th-27th March 1974.
- Rose, F. and Wallace, E.C. 1974 Changes in the Bryophyte Flora of Britain. In Hawksworth, D.L. ed. *The Changing Flora and Fauna of Britain*. pp.27-47. London and New York: Academic Press.
- Rosenhead, J. and Thunhurst, C. 1979 Operational Research and Cost Benefit Analysis: Whose Science? In Irvine, J.; Miles, I.; and Evans, J. ed. 1979 *Demystifying Social Statistics*. London: Pluto Press.
- Rüdig, W. and Lowe, P.D. 1986 The Withered 'Greening' of British Politics: a Study of the Ecology Party. In *Political Studies*. 34, pp.262-84.
- Rüdig, W. and Bennie, L. 1992 *A Flash in the Pan? The Rise and Fall of the British Green Party*. Paper presented to the conference Perspectives on the Environment: Research and Action in the 1990s. Held at the University of Leeds, 14-15th September 1992.
- Ryle, M. 1988 *Socialism and Ecology*. London: Radius.
- Sandbach, F. 1980 *Environment, Ideology and Policy*. Oxford: Basil Blackwell.
- Särlvik, B. and Crewe, I. 1983 *Decade of De-alignment*. Cambridge: Cambridge University Press.
- Scott, A. and Storper, M. eds 1986 *Production, work, territory: the geographical anatomy of industrial capitalism*. Boston: Allen & Unwin.
- Seager, J. ed. 1990 *The State of the Earth: An atlas of environmental concern*. London, Sydney and Wellington: Unwin Hyman.
- Self, P. 1975 *Econocrats and the Policy Process*. London: Macmillan.
- Seymour, J. and Giradet, H. 1988 *Blueprint for a Green Planet*. London: Dorling Kindersley.
- Shiva, V. 1986 Chipko: trees, water and women. In *Sanity*. April issue pp.30-33.
- Shiva, V. 1988 *Staying Alive*. London: Zed Books.
- Simon, J.L. 1981 *The Ultimate Resource*. Princetown, NJ: Princetown University Press.

- Simon, J.L. and Kahn, H. ed. 1984 *The Resourceful Earth - A Response to Global 2,000*. Oxford: Basil Blackwell.
- Smart, B. *Postmodernism*. London: Routledge.
- Soja, E. 1989 *Postmodern Geographies*. London and New York: Verso.
- SPD (Sozialdemokratische Partei Deutschlands) 1986 *Arbeit und Umwelt für Hamburg: Beschäftigungsorientierte Alternativen zur Standortpolitik*. Hamburg: Arbeitskreis Wirtschaftspolitik der SPD Hamburg-Eimsbüttel.
- Turner, R.K. 1990 Towards an integrated Waste Management Strategy. *Key Environmental Issues*: Number Eleven in a Series. London: British Gas.
- Turner, R.K. 1991 Economic instruments and solid waste management. In *WARMER Bulletin*. 31, pp.8-9.
- UN World Commission on Environment and Development (Brundtland Commission) 1987 *Our Common Future*. London: Oxford University Press.
- US Council on Environmental Quality 1982 *The Global 2,000 report to the President*. Harmondsworth: Penguin.
- Watts, M. 1983 *Silent Violence: food, famine and peasantry in Northern Nigeria*. Berkeley, CA: University of California Press.
- Weston, J. 1986 *Red and Green*. London: Pluto Press.
- Williams, R. 1986 *Socialism and Ecology*. London: Socialist Environment and Resources Association.
- Williamson, J. 1974 *An industrialist's view of the recovery and recycling of materials*. Paper presented to The Conservation of Materials Conference. Harwell, 26th-27th March 1974.
- World Wildlife Fund 1983 *The Conservation and Development Programme for the UK: A response to the World Conservation Strategy*. London: Kogan Page.