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POLITICS OF GLOBAL ENVIRONMENTAL MANAGEMENT:
THE HEAT OF GLOBAL WARMING

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CHAPTER I
INTRODUCING THE THEME AND CONCEPTS

Introduction¹

Global climatic change is perceived as a major challenge to humanity. Present-day institutions, socio-economic relations and international relations may have to be redefined or renegotiated to cope with this challenge. These relate to the manner that countries govern themselves through the unit of a nation state where the issue of sovereignty is paramount; the question of justice being extended to future generations in a world full of inequalities; and the pressures of trying to integrate long term economic forecasting with bio-physical constraints. The operation of the global economic system and the role of the nation-states might also have to be reconsidered in light of global climate change. This points out that nation states are not monoliths but are affected and influenced by a series of factors, from processes both internal as well as external to them.

The purpose of this paper is to highlight the factors behind the current rise of global environmental management, especially in the context of global climate change. While the political dimension of this issue is important, the very nature of the issues discussed under global environmental management are questionable (and hence political in themselves). I attempt to understand the creation of the global environmental agenda about global climate change. Global environmental management has to be seen in the context of the present economic and political trends. Environmental negotiations are used to reinforce arguments raised in other fora such as trade, aid and technology transfers. Various actors are involved in the negotiations of developing an approach to solving the crisis of global climate change. I highlight the role of the nation states while mentioning other interest groups like the environmental movements/organizations and the private sector.

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I wish to acknowledge the contributions of Dr. M.A.M. Salih and Dr. E.B. Ross for helping me clarify issues and shape this paper. All errors and omissions, however, are solely mine.

In this paper I intend to establish that treating the global commons as a mere management issue would not be able to address the basic issues of the pressures that humankind has created on our life-support systems [Ch II]. For this purpose I look at the recent history of global environmental management since the 1970s debate on limits to growth to the establishment of a technomanagerial approach towards environmental issues [Ch III] and look at the perceived impacts and the international responded to the issue of global climate change. In Chapter IV, I summarize the science of global climate change and also look at the creation of concern about global climate change by science bureaucracies. I focus on the role of the Intergovernmental Panel on Climate Change [IPCC]. Chapter V covers the various interest groups in the negotiations of the United Nations Framework Convention On Climate Change [FCCC] and the major issues linked to the debate. My concluding chapter shows the broader linkages of the Global Climate Change debate.

'The climate system involves the interaction of the biota, air, sea, ice, and land components, with solar radiation providing nearly all the energy that drives the system' [Schneider & Rosenberg 1989:9]. There are local, regional and global changes according to the manner in which these parts interact with each other. While local and regional climatic patterns are affected by a host of factors, like forest cover, altitude, proximity to the sea etc., global climate change affects the entire climatic system because it operates due to the changing radiative balance due to the increase of the concentrations of trace 'greenhouse' gases (Carbon dioxide [CO_2], Nitrous oxide [NO_2], Chloroflorocarbons [CFCs], and Methane [CH_4]) in the atmosphere leading to a rise in average global surface temperature.

The major human sources of the greenhouse gases are production of energy from fossil fuels, industrial activity as well as certain agricultural practices (eg. paddy cultivation) and deforestation². However, it is the regional patterns of changes in the climate via temperature, precipitation and moisture that would determine the effect of global climate change through the greenhouse effect on natural and human activities³.

2 Watson et al [1992] give a detailed account of the sources as well as the sinks of greenhouse gases.

3 A simple mechanism of operation of climate can be found in Foley [1991]. For more detailed explanations, see generally Houghton et al [1992].

WHAT IS GLOBAL WARMING?

Global warming is caused by the greenhouse effect in the atmosphere of the planet. This is a natural phenomenon which occurs due to the presence of certain gases resulting in pushing up the temperature on the surface of the earth. This is because solar radiation travels in short waves but is converted into longer waves once it is reflected by the surface of the earth. These longer wavelengths are then absorbed by the gases in the atmosphere causing an increase in temperatures. It is estimated that the temperature of the surface of the planet would have been 33°C lower if these gases were not there [Hanley & Spash 1993]. The greenhouse effect is essential as it creates the right temperatures of life to exist on the planet.

In the last 150 years or so, however, human contribution towards the greenhouse effect has been taking place at a substantial level. This is mainly due to the industrialization and the spread of agriculture at both the extensive and the intensive margins. There has been an sustained anthropogenic contribution (with ongoing emissions and increased concentration of CO_2 , CH_4 , CFCs and N_2O alongwith the natural contribution (mainly due to water vapour) towards the greenhouse effect resulting in a steady increase in the temperature of the surface. This is termed as global warming and would lead to climate change.

Global climate change has thrown up fundamental questions about the way present day societies have evolved and the directions that they are going⁴. It is closely linked to the dominant pattern of development practised since the beginning of the industrial revolution. At one level, these questions deal with the impact of human activity on the environment but also raise fundamental questions about the way human beings impact on others, both spatially and temporally. A major role in this is the manner in which social and economic institutions are presently designed.

Global climatic stability can be seen as a global good as human production systems are highly dependent on climate. Conversely, emissions causing climatic change can be seen as a global bad and mechanisms to deal with this issue have to be evolved. These might challenge the existing structures of human governance and thus create problems in the implementation of a solution to the problem of global climatic change. We also have to realize that present day structures are geared towards maintaining balance in present day societies and may be inadequate to deal with 'future' problems. Modifications in institutional, socio-economic interactions are mediated by a complex interactions of interests, perceptions and ideologies and looking at a

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See McKibben [1990] for a readable elucidation of the complex phenomenon of global climate change.

singular cause will not allow clear alternatives to emerge.

Global climate change creates a challenge in the field of social science research as a multidisciplinary and interdisciplinary approach has to be adopted to tackle this issue. While other species also modify their environment, human interventions into their environment are disproportionately high. These interventions have allowed the progress (as broadly understood) of human societies. However the consequences of these interventions is being realized only recently. This realization, for example, can be found in the debates on conservation, appropriate technology and sustainable development⁵.

At the same time, the impact of environmental feedbacks on human activities as well as particular structures of human society affecting the ecological system also takes place [Clark 1989]. A molecule of CO₂ released in the atmosphere in Antarctica affects the radiative balance of the Earth as one released in the Sahara desert. Moreover, this molecule of CO₂ remains in the atmosphere for a number of years and has a cumulative effect over time. This also introduces an intertemporal dimension into the analysis. Thus distribution of causes and consequences, spatially as well as temporally, has to be understood.

We also need to analyze the different access to energy and biomass sources and look at the impact of climate change on the basis of regional distribution, class distribution, and distribution across generations. However, for the purposes of this paper, I will only look at the international dimension of the issue - the negotiations between the nation states and the other pressure groups acting on these countries. While this is a partial analysis, it is nonetheless a crucial one as nation states and their governments have a large say in determining and addressing global environmental problems in the present world system through regulations and restrictions.

One way that human behaviour has been interfering with the ecological system is through the emissions of greenhouse gases into the atmosphere. There are

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While I will not be problematizing the concept of sustainable development but it is implicit in the entire argument here. Global climate change is clearly one of the major issues in the debate on sustainable development.

then reactions and adjustments in the geosphere-biosphere realm. This, in turn, has implications on the human societies through the (threat of) sea level rise, increased intensity of hurricanes and changed agro-climatic zones. We also have to recognize that there are unequal impacts within human societies based on the economic ability to withstand these anthropogenically induced 'natural' changes as well in the spatial distribution of these impacts. Thus the human agency acting on the ecological sphere, consciously or unconsciously, is affected directly and through feedback loops by the process of climate change. We have to look at the interest groups, the potential gainers and losers from global climate change in the light of changing ecological regimes⁶.

The framework of this paper is based within a sustainability paradigm in which economy, ecology and technology play complementary roles and are related to each other in a complex web. I propose to look at the technological, institutional/organizational, and economic factors/options and their interactions with each other as well as the influence on the environment. The human economic, social and cultural systems operate within an ecological system while having a proactive relationship with it.

Technological factors present various alternative means by which the threat of global climate change can be reduced. Industrialization is one of the major contributors towards global climate change. A technological approach evaluates various alternative technologies aiming at climatic stabilization. These technologies might not be related to each other. The level of emissions is largely determined by technology and the raw material sources used in the production of energy, cement or agriculture. There are various alternative technologies which can be used having different implications for the environment. For example, with the goal of restricting net carbon emissions, carbon scrubbers could be used to trap the CO₂ produced during the generation of electricity. Similarly, afforestation to fix a certain amount of CO₂ could also be done to achieve the same result. While there is little in common

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While ecology allows us to look at the impact of human activity on nature, we have to know how the emissions that cause this problem come about in the first place. i.e. the causes of these emissions, the reason they are emitted, gains from the process from which these emissions come as well as the distribution of these gains. On the other side of the spectrum, resulting from the ecological systems reaction to the excessive emissions, there is a differential impact of the consequences of anthropogenically induced emissions.

between the processes of carbon scrubbing and afforestation, both might restrict the net emissions of CO₂ in the atmosphere and thus reduce the possibility of global climate change.

Organizational/institutional factors play a major role because they determine the structure in which the human societies operates. While dealing with global climate change, we have to consider the structure of present day societies with excessive use of energy and overconsumption; regulatory array of instruments based on the adoption of a market and/or a command approach; as well as structures of law and the international structures. Issues like governance of global commons in a world divided into nation states and the congruent issues of sovereignty can be seen here. This also points to the institutions and organizations created by these states to tackle such challenges.

Economic factors are important in determining the viability and feasibility of undertaking any structural or technological change. The appropriateness of change has to be evaluated both in terms of efficiency as well as that of distribution justice and equity. This allows us to make a choice between various options in the context of channelling limited resources in a desired direction.

All these factors operate within human societies and influence the ecological system and are in turn affected by it. A certain level of coordination between these factors is required for effective operation of human societies. The cumulative impact that these factors have on the ecological system has also to be recognized. New technological innovations which are economical may not be implemented due to institutional structures⁷. Similarly we may have a technology which does not have high environmental costs but is not economically viable at the present time⁸.

7 Nuclear energy may be taken as a case in point. It might be economical for producing x megawatts of energy from nuclear fission but the Nuclear Non-Proliferation Treaty [NPT] might not allow the production of energy from nuclear sources without the country adhering to certain terms and conditions which it might not want to accept due to strategic or other reasons.

8 Solar energy, at the present level of development, serves as a good example of this. There are institutional constraints on the use of solar energy even if it can be demonstrated to be economically viable in the long run. There is a subsidy granted by the state for energy in most of the developing world. This is also the area where the largest potential for producing/utilizing solar energy exists because of geographical location. However,

Power

In a world where the distribution of power is unequal i.e. in a situation where the principal levers of power in the world are economic [aid, trade and technology]⁹, there are bound to be differential gains in the negotiations on global environmental governance. This is because the international agenda is determined by the economic powers and environmental negotiations are carried out in the context of present day international politics.

The industrialized countries, while being dependent on other countries for maintaining the ecological balance of the Earth, are 'demonstrating' their concern by telling others how to manage their environment but with a minimal check on themselves¹⁰. Even though the economic centre of trade, finance and technology is in the industrial countries [Carley & Christie 1992:100-27], the ecological centre is located in the tropical countries. We can see this as a reverse dependency for ecological sustenance while the economic dependency continues to operate in the traditional way from the industrial countries to the others. This has important implications for the negotiations on global environmental management as both groups have something to negotiate with [Grubb 1990]¹¹. However, the economic and the associated scientific and intellectual dominance of the world by the industrialized countries allow them to set the international environmental agenda. It is very difficult to

energy is subsidized as it is a crucial input for industry as also a basic requirement. Unless solar energy can be produced in sufficient amounts and the required infrastructure for its use can be provided, it becomes very difficult for the state to attempt to switch to this source of energy while eliminating subsidy on the others in order to make this competitive.

⁹ The threat of war is still as credible threat but does not have the kind of long term control that is possible through 'neocolonialism'.

¹⁰ According to Agarwal & Narain [1992], 'if global inequalities were to continue... then the emerging global environmental management system which can also be called a new international ecological order, can itself become a source of continuing inequality and poverty, and erosion of poor country's sovereignty'.

¹¹ Sebenius [1991:126-36] uses the term 'blocking coalition' for denoting the role of the countries that have a major role in the climate issue but refuse to agree to the present shape of the agreement. For instance, the entire exercise of an agreement on climate change will come to naught if present and/or future big emitters refuse to comply. For example, the setting targets for reducing emissions was left out of the FCCC as the USA refused to agree to any target. Similarly, if India and China, large countries having vast coal reserves continue to use it as the chief source of energy without any precautionary measures, agreement between all other countries in the world without their participation will still result in global climatic change.

establish pertinent environmental issues affecting industrializing countries in the international agenda¹².

Global Environmental Change

With increasing use of resources and the consequent waste generation by humankind, goods once considered 'free' are being adversely affected and over-exploited. This is due to the increased economic and technological advancement. The drive of economic exploitation and the concurrent advancement in technology has continually opened new frontiers for the exploitation by humankind. This exploitation is generally carried out like a frontier economy {a la Cowboy economy [Boulding 1966:127]} and the scarcity of these 'free' goods is realized much later. Even when it is realized, the confidence in the capacity of scientific and technological knowhow to solve any impending problems serves to brunt the concern [Beckerman 1992, Cairncross 1992]. This drive towards capital accumulation and technological advancement is allowing larger and newer areas to come under the impact, control and influence of humankind [Caldwell 1990:68-9].

In the earlier periods, the drive towards expansion was restricted by the

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The Sustainable Development Bulletin [1992] 'unmasks' the Northern environmental agenda as:

1. ...[T]he North defines the environment in extremely narrow ecological terms, and to the exclusion of economic, social and cultural dimensions of the environment...
2. [T]he North takes a 'time perspective' of the environment, not a 'space perspective'....whilst the North is worried about preserving the life styles of its future generations, it is carelessly trampling on the daily lives of the present generations of people in the South by its gross abuse of Nature's resources for its own profligate consumption...
3. [I]n the context of the international debate on the environment, the North has defined issues of international rule-making almost exclusively on matters of concern to them: the Ozone Convention, the Toxic Convention, the ... Climate Convention, the ... Biodiversity Convention...
4. [T]he North has set up a whole range of institutional structures to put their strategy on the ground even before these are discussed in international fora where the South has a chance to present their case...{eg Global Environmental Facility}...
5. [A]ll these measures are aimed at controlling and managing the resources of the South in order that the North can continue to enjoy an environmentally wanton style of consumption...

location and nature of expansion was extensive ie. greater territories were brought under the dominant method of production. However, the same logic extended to other resources after most of the land had been brought under human control. There was a continued expansion at the extensive margin with the seas becoming a major area of contention [Sebenius 1993]. Technological advancement also permitted an expansion on the intensive margin¹³.

Cumulative and Systemic Global Changes

We have been witnessing increasing environmental problems threatening the life-support systems of the Earth by diminishing and/or polluting the availability of resources sustaining human life. An example would be the increasing use of chemical fertilizers for increasing the production of agricultural crops. Over time, these have a positive feedback impact on the productivity of the crop itself by diminishing the regenerative ability of the soil on which these crops are nurtured as also having an indirect impact of causing pollution through the production of the fertilizer at one end and introducing toxins into the food chain at the other.

These negative effects on the life support systems are referred to as environmental problems in this paper. To clarify, the term environment is usually used to denote processes and incidents that take place external to the system in discussion ie. proper drainage and sanitation is a must in an urban environment. Environmental processes as used here refer specifically to processes intertwining with the geosphere-biosphere interface. For example, I would classify erosion of soils due to deforestation as an environmental process. It follows that environmental problems are those processes occurring in the geosphere-biosphere realm which are perceived to be adverse to human activity. These could be natural processes like drought or human caused processes like industrial pollution. These processes are usually seen in relation to human activities and thus have spatial dimensions on a continuum from the local-microcosmic to the global-macrocosmic range.

13 Biotechnology serves as a good example here. Genetic engineering has created a capacity to be minimally dependent of the natural environment for the cultivation of certain crops.

Global environmental problems have been identified, established and made visible over the last decade or so¹⁴. An interesting dimension of global environmental problems is the flux in the continuum mentioned above. Turner et al [1990] classify global environmental changes as 'systemic effects' or as 'cumulative effects'. They maintain that 'globally systemic changes need not be caused by global-scale activity; only the physical impacts of the activity need be global in scale, manifested through the system adjustments that follow' and that 'changes of the cumulative type include those that are local in domain, but which are widely replicated and which in sum constitute change in the whole human environment.' They also draw a distinction between 'proximate sources' and 'driving forces' where the former are those human activities which lead directly to an impact on the environment (open-cast mining) and the latter are a complex set of 'actions and rationales that give rise to proximate sources' (technological change, migration of populations)¹⁵.

Global Commons

For a working definition of global commons we can start with the notion of a resource that is freely available for the use of all humankind, irrespective of geographical and national boundaries. In this context, we have to emphasize

¹⁴ We can consider the Stockholm Conference on the Human Environment as the first attempt to grapple with environmental issues of global concern. Thomas [1992] notes that the 'Conference is important because of the legitimacy it lent to environmental concerns in international affairs and the clear link it established between environmental and developmental matters,...'. However, it is only in the Eighties that issues of global concern like loss of biodiversity, ozone depletion and global warming gained widespread public concern with the release of the Brundt Commission report and the World Conservation Strategy which placed the issue of 'sustainable development' firmly on the international agenda culminating with the World Commission on Environment and Development and the United Nations Conference on Environment and Development in 1992.

¹⁵ We can see this in terms of deforestation for the purposes of agrarian expansion. Here agrarian expansion is the driving force impacting on the environment due to the deforestation. In this case, if such deforestation is occurring at a large scale in different geographic areas, it will have a cumulative effect on the global environment. On the other hand, there would be a systemic environmental effect through the loss of sinks for excessive carbon-dioxide in the atmosphere. We can thus see the connection between the driving force of agriculture operating through a proximate source leading to a systemic global environmental change. As Miller [1989] as cited in Carley & Christie [1992,164] points out: 'to explain global environmental change it is necessary to examine the direct human actions which influence it, as well as the indirect human actions that set in motion complex chain of events which also affect the environment.'

the potential availability of the resources rather than actual availability. Due to the potential availability of these resources, there is a benefit for the entire humankind¹⁶. These can, in many ways, be enclosed and used privately or controlled by a nation state.

Since there is a potential for exploitation of these resources, there is danger of overexploitation as it might not be in the 'interest' of any individual entity to exercise restraint, leading to the 'tragedy of the commons'[Hardin 1968:137]. There is tendency for every entity utilizing a resource to maximize the extraction regardless of the rate of exploitation which may result in the ultimate depletion of the resource itself. As long as there is no institutional arrangement to determine the users and the amount of the resource that they can utilize, there is a possibility of depletion of common resources.

The size of the resource domain become a challenge in the case of global commons. Whereas in a fishing community, there is a possibility of reaching a consensus about the amount of fishing to be done per period which can be ensured through mutual restraint or punishment, it becomes extremely difficult to do so in the case of global commons as there are a large number of actors situated at multiple sites with their own priorities. Broadly, these include nation states with their developmental agendas, private enterprises, and the public which is struggling on livelihood issues or on issues of a 'quality of life'. In the present international socio-political structures it is difficult to create conditions to avoid this 'tragedy of the global commons' due to the multiple agendas of the various actors which are usually not compatible with each other¹⁷.

16 Soroos [1992;31] defines '[a]n international commons [as] a resource domain that is shared by more than one state; ones that are shared by all states may be referred to as a global commons'. A note at the end of the essay clarifies a 'resource domain as an area or a region, defined broadly, that encompasses something that is of use to human actors and over which some form of jurisdiction can potentially be exercised....[t]he atmosphere is a domain which serves as a sink for pollutants.'

He identifies the atmosphere[1992;32] as 'a good illustration of a resource domain that has the physical attributes of a common property resource[CPR] (CPRs can be subjected to joint use where several users can derive benefits from using the resource, but also that overuse or misuse can diminish the resource's value to all users) and the legal status of an international commons.'

17 The concept of the 'tragedy of the commons' has been criticized both at the theoretical level as well as the application of the principle in traditional resource management systems. Theoretically, the critique is based on the use of an additively separable function to see the rational choice of each actor. This means that there is no learning

CHAPTER II

'MANAGEMENT' OF GLOBAL COMMONS: GLOBAL CLIMATE CHANGE

One of the characteristics of human societies is the development of rules and regulations to govern day to day activities as well as determining how to approach problems, both of a short term and the long term nature. This governance has consolidated in the boundaries of states for the past few centuries, and consolidated in the nation-states of the twentieth century almost all over the world. Nation-states have evolved into the highest decision making authority and global interactions has been mediated through the nation states. The evolution of nation states has allowed a cohesive development within geographical boundaries of that country. While it is true that this development has not been all-encompassing either in the economic, social or cultural sense but it has allowed a particular pattern of development or underdevelopment to emerge which is unique to most nation states. For example, the capitalist development of Japan and France are different from each other as is the underdevelopment of Pakistan and India.

While recognizing the importance of nation states, we have to see that there have been challenges to the governance and decision making abilities of the nation states. At one level, this has come from within by challenging the authority of those in power to make decisions on behalf of the others - based either on the authoritarian or democratic values of representing the interests of the ruling elite or the interests of 'the greatest good'. There are increasing challenges by marginalized groups or minorities about decisions affecting their interests taken by the governments. These challenges usually take the form of a demand for more autonomy or that of cessation [leading to the formation of another nation state]. On the other hand, there are challenges of another type emanating from international forces.

from wrong decisions and that the same decisions are taken in each period. This is the critique from the observed resource management systems also. There people can see the resource depleting and so come up with, formal or informal, arrangements to protect the resource. However, in the context of global warming which is not directly visible and felt by most actors: the fact that it would take many number of years to manifest itself and so modifications to behavior cannot be based on learning from the issue - seems to indicate the 'tragedy of the commons' approach towards global warming.

International economic forces acting through Transnational Corporations (TNCs) and international banking are increasing getting greater control on physical and financial resources within sovereign states. Technological uniformization has brought the world closer and increased dependence of nation-states on each other, as has the use of satellite communications and international media which has started a process of cultural homogenization.

Global Environmental Problems

All these are challenges to nation states. Another challenge is the rise of 'global environmental problems'. While the international dimensions of environmental problems has been long apparent - trans-border pollution, acid rain, and conflicts over water sharing of rivers passing through different countries, there has been an increased amount of these problems in recent years. Three reasons [Hurrell & Kingsbury 1992:1-3] for the emergence of these global environmental issues are:

- * Environmental problems are global as they affect everyone. A solution can be found only with the cooperation between all or a large number of states [emission of greenhouse gases, ozone depletion, safeguarding bio-diversity, management of seabeds]
- * Local and regional environmental problems are becoming more extensive and spreading in different parts of the world [urban degradation, deforestation, salination, denudation, water or fuel wood crisis, desertification] causing international impacts and threatening the socio-economic conditions in most countries.
- * The close interrelationship between the mechanics of the globalizing world economy and the host of environmental problems related to this [degradation related to the affluence of the industrial countries, poverty in the industrializing or de-industrializing countries].

The rising environmental challenge to nation-states has to be addressed

urgently. However, we have to see whether nation states are resilient enough to rise to this challenge or that a new type of governance structure is required to be able to address these issues.

Supra-National Management

There is pressure demanding the adjustment of nation states to the rising environmental change¹⁸. One of the central points in this regard is the issue of sovereignty of a country over its own resources and affairs. This has been recognized in international agreements and laws [eg. Principle 2 of the Rio Declaration on the Environment and Development]. However, this is seen as one of the basic problems since the beginning of the environmental movement in the industrial countries in the 1970s. Environmental issues occurring in the bio-physical realm may not overlap with political boundaries. The structure and sovereignty of a nation state can therefore act as a deterrent towards addressing and solving certain environmental problems¹⁹. Some kind of limit to the sovereign powers of nation states may be required and environmental management be done through some kind of supra-national authority. However, this seems unlikely in any foreseeable future for a variety of reasons.

* A claim to abolish or limit sovereignty has to be seen in a broad context where issues of economic rights and social and cultural patterns has to be taken into consideration. The implications of limiting sovereignty in the interests of environmental management and/or ecological well-being has to be thought through for its

¹⁸ See, for instance, Gore [1992:295-360], the present USA Vice President, views on a global Marshall Plan.

¹⁹ Conflicts can arise between nation states due to various reasons. Soroos [1992:38-41] lists some of the conflicts which arise in managing 'international' commons which are equally applicable for global commons. These are:
 * Economic circumstances.
 * Access to technologies.
 * Vulnerability to collateral damage.
 * Historical use of the resource domain.
 * Previous national interests.
 * Previous exclusive claims.
 All except the last have been raised as issues by one country or the other in the negotiations on global climate change.

implications on the above²⁰.

* Even though there are examples of nation-states limiting their sovereignty in the case of economic interests [eg. the North Atlantic Free Trade Agreement (NAFTA) between USA, Canada and Mexico and that of the European Union comprising of countries in Western Europe], it is difficult to counter the appeal of a nation state or to create popularity for the idea of a supranationalist decision making structure among the present power elite.

* Apart from the local power elite, there is an interest of the local populations in operating within a nation state which has some sort of social and cultural cohesiveness. There is a fear of losing their identity through the assimilation into a larger body. On the other hand, there is also the threat of having to share their privileges with others.

* Another practical problem is that a creation of a supra-national body or the limitation of the sovereignty of any country would not guarantee a state of ecological well-being or better environmental management. In fact, it could divert attention from pending problems to the negotiations into the structure and the role of such an authority. It would still require the presence of regional and local authorities to be able to overcome problems at those levels apart from being unable to address distributional issues, some of which are at the core of the present and anticipated ecological problems.

* This might be a futile exercise simply because if nation -states are willing to negotiate reduced sovereignty then they can as well negotiate international co-operation and co-ordination. However, one can conceive of a global dictator/hegemon under whom this kind of

20 Gray & Rivkin [1991] have put forward this argument where they say that 'creating a supranational organization to monitor the process will have dubious benefits. In advocating such an organization many environmentalists tend to denigrate the value of the nation-state. At best they see national sovereignty as an inconvenience, and at worst, as an all but insurmountable obstacle to effective global environmental policy. However, environmentalism is not the only value worthy of protection. Being environmentally responsible does not require abandoning other important values, such as national self determination...'.

ecological authority is possible.

Globalized Commons:

Even though the nation states are the chief administrative and decision making unit in the world nowadays, there are still vast areas free from any administrative or territorial claims of these nation-states and have no recognized exclusive jurisdiction²¹. 'Examples are...resources of the continental margin and the deep seas, celestial bodies and orbits in outer space, the electromagnetic frequency spectrum, and the Antarctic... planet's ozone layer and carbon dioxide balance' (Wijkman 1982:151)²².

While these areas or physical properties have always existed, it is only when they become important for use by human(ity) that they are referred to as 'commons'. This then is a function of the level of knowledge and technology, resource limits as well as the demographic profile of the regions using that resource. It is also based on the demonstration effect (we should use the resource because others are using it) and the fear of losing a potentially useful resource in the future ie. if one country has the technology to tap a resource over which no other country has an exclusive jurisdictional right, then other countries would seek to limit the use of that resource even if they do not have the technology to utilize this resource themselves in anticipation of developing/acquiring this technology later. Say, the emissions in the atmosphere by a developing country at the present time do not match that of the industrialized countries. However, this does not mean that the country in question has given up the right to development whereby one of the byproducts

21 Porter & Brown [1991:92] : 'the global commons includes natural systems and resources, such as the atmosphere and oceans, that belong to all living beings rather than to individual states'. WCED [1987:261-89] discusses oceans, space and Antarctica as global commons. Pearce [1991:11-30] refers to Global warming and conserving the world's biological diversity in his chapter on Global Commons.

22 See Commission on Developing Countries and Global Change [1992:25-8] for a critique of the Northern use of the term 'global commons'.

may be increased emissions of greenhouse gases²³.

Although many resources can be considered as 'common' there are certain distinctions that have to be kept in mind, especially with respect to global commons due to the spatiality [spread] of the resource as well as the number of users. Traditionally, commons have been taken to be resources available for a limited number of users defined in terms of a restricted area. However global commons, while sharing the same characteristics, have some distinctive features that put them in a separate sub-set of this group [Lipschutz 1991:48-51]. These features determine the nature of global commons.

These are:

physical mobility : whether the resource is fugitive or non fugitive²⁴

spatial distribution (of the resource).

spatial distributions of causes and impacts.

technological and cultural impacts

anticipatory management.

We will discuss this in the context of climate change. Firstly we need to clarify that the global commons that is being referred to is the climate. This common is fugitive in the sense that there are no geographical constraints on it. It is also spatially vast as it covers the entire globe. This has special problems associated with it and it is difficult to control. Hardin's dictum of 'mutual coercion, mutually agreed upon [Hardin 1968:144] is difficult to operationalize because of the vast numbers of actors at the international level and the various interest groups operating in the nation states as well

23 We can consider another example. The retrieval of deep sea manganese nodules might be prohibitively expensive based on present technology or compared to the reserves that the country commands over land. However, when the land based manganese ore is depleted or the technology of mining the sea beds is sufficiently advanced to be able to equate the returns from sea and land based extraction, it might be too late to mine the seabeds as other countries would have already done so.

24 Implying whether the resource in question is mobile or immobile within a particular area.

as beyond them. Even though Hardin's position can be critiqued effectively by looking at the micro-level common property management arrangements, it seems that we are committed to the 'tragedy of the global commons'.²⁵ There are technological impacts on climate due to the use of fossil fuel and other processes producing trace gases and it is difficult to solve the problem without considering the changes in lifestyles which are determined by cultural patterns. Since this is an example of a problem which will accumulate and have an impact over time, there is a need for anticipatory policies to be able to mitigate or abate this problem.

In the case of climate stability, we can use the atmosphere as a common at the first instance. To clarify, there is a threat of global climate change through an anticipated change in global temperatures resulting in a changed climatic pattern for different parts of the world. Changes in the precipitation levels, levels of the oceans, aridity and change in the permafrost lines in the polar regions are some of the anticipated changes. The anticipated global climate change would be a result of the human induced greenhouse effect through the emission of certain gases in the atmosphere. However, the atmosphere and the oceans interact in a complex manner (which has still not been completely understood by scientists) to create a particular climatic regime. Since the cause of climate change operates through the atmosphere, I will use the atmosphere as the representative commons here²⁶.

Tragedy of the 'tragedy of the Global Commons'

It is not only the co-operation and coercion at the international level which would permit proper utilization or protection of the global commons but the need to operate at the regional and national levels to insure the terms of the international restrictions on the use of the resource. In the case of climate

25 Fife [1976] cited in O'Riordan & Turner [1983:268] points out that 'the tragedy of the commons is not always the result of careless or ignorant people making micro-decisions that produce adverse macro-outcomes: in some cases it may be deliberately created by the mode of economic production and the attitudes of the owners of capital.'

26 We should also note that the atmosphere acts as a common in its own right also [Sebenius 1993:196]. Without some institutional arrangements, it is indivisible, non-excludable and subject to crowding.

change, nations might agree to put a ceiling on the emissions from their respective boundaries but a choice of who is allowed to make emissions within the geographical boundaries has to be made - whether production of goods emitting carbon dioxide [electricity generation] is more important than goods emitting methane [paddy] has to be prioritized subject to various power dynamics. These internal dynamics will then make the compliance of any target negotiated at the international level difficult to enforce.

Moreover, looking at the global commons, especially climate change, merely as a management problem may not solve the problem but merely postpone it or may result in certain other unforeseen problems leading to the 'tragedy of the tragedy of the global commons'²⁷. Integration of environmental management into economic activity can result in a certain reduction of emissions into the atmosphere. However, 'most economic activity, no matter how well planned does absorb some of the capacity of the environmental commons...The "design palliative" cannot be treated as the ultimate solution so long as economic development tries to accelerate and socially created wants continue to escalate' [O'Riordan & Turner 1983:272]. A technomanagerial approach towards managing the environment may have some short run relevance, say 'green revolution' agriculture but that too have various social, cultural and even economic consequences. However global environmental problems, which manifest themselves in the long run economic perspective, cannot be managed in the technomanagerial sense of adjusting the system to adapt to changes in climatic patterns but require a more fundamental transformation in the manner in which present day economic activities and production relations are fashioned from the microcosmic to the macrocosmic level.

27

See *The Ecologist* [1992:180-2] for a critique of global environmental management where the criticism is built around 'global knowledge', 'global policing' & 'universal culture'.

CHAPTER III
GLOBAL ENVIRONMENTAL MANAGEMENT AND CLIMATE CHANGE

There is a strong connection between environmental concerns and the structures of present day societies. These structures pertain to industrialization, control of agriculture through mechanization and heavy input technologies and 'technological marvelation'. In this context, certain environmental concerns have stemmed from these processes as also these processes have defined certain environmental concerns as a priority over others. We can trace the growth of environmental concerns and its relationship to politics.

There is a vast difference between being environmental conscious and taking action based on that consciousness. Consciousness does not mean that action will be directed at the solutions of the problems but all it seems to suggest is that there might be superficial change in the way people view or use resources. The relationship of people with resources is fashioned by the socio-cultural aspects as well as current political challenges.

Environmental-ecological movements stem from a particular socio-cultural period and are linked to a context. The first wave of environmentalism in Europe on the 1970s was linked to the new age movement and the general denunciation of the modern capitalist way of life. Initially, the movement was linked to the entire issue of a change in the system²⁸. It was also influenced by the predictions of the 'limits to growth' scare and the visibility of the resource crunch during the first oil shock.

On the other hand, environmental issues were also being linked to the issue of sustenance and development in the developing countries. Livelihood struggles were debating and using environmental arguments in their struggles to create a better and just system of governance by the national elites. This was also the time that the negative aspects of development and its failure to

28 Fingers [1992:7] points out that '[e]cological movements [of the 1970s] sought not only an answer to ecological problems, but also the transformation of the (political) 'system'. This is totally different from today's trend towards global environmental management : the new trend considers politics as a simple means to solve environmental problems; policies become management tools.'

deliver its promise was being realized by many in these countries. There were demands from the South to correct regional imbalances through the Non-Aligned Movement and proposals of a New International Economic Order (NIEO) were discussed and debated in various UN forums.

The Brundtland Report [WCED 1987] emphasized that sustainable development was possible with economic growth and environmental conservation working complementarily. This is one of the reasons of the decline of the political orientation on the issue of the environment in the industrial countries and the development of the 'environmental management'. Technocratic solutions were forwarded to the problems of environmental degradation and pollution. These technofixes emphasized and concentrated on the effects of a particular societal industrial and consumption pattern and did not address the causes of the problem which lie in the high industry and consumption patterns.

However, the chief position in the North was 'Not In My BackYard' (NIMBY) which meant that as long as environmental damage was not done in my proximity, it was okay but it should not impact on my interests. However, this view was not clear enough to see that the Western modernization drive was creating a bigger and bigger backyard resulting in damages and harm on the interests of the North itself. There was a growing realization that the NIMBY approach would not really be able to address the environmental pollution issue as its very nature allowed in to cross backyards and borders. Increasingly, it was realized that there are other serious consequences of pollution apart from the threat to human health and the destruction of scenic beauty. Pollution due to human activity was causing invisible but dangerous damage to the life support systems of the planet. The dangers of ozone depletion and global warming were realized as connected to the large scale industrial activity in these countries which would have direct and indirect impact on the Northern countries ²⁹.

As demonstrated by George [1992:1-4], the impact of debt has bearings on the

²⁹ Sachs [1993:19] indicates that the North is concerned about the planet as 'the North [itself] now faces a problem...[F]or the first time the Northern countries themselves are exposed to the bitter results of Westernizing the world. Immigration, population [sic] pressure, tribalism with mega-arms, and above all, the environmental consequences of worldwide industrialization threaten to destabilize the Northern way of life....As a result, the North devises ways and means for protection and risk management worldwide. The rational planning of the planet becomes a matter of Northern security.'

sustainability of the industrial world itself and so urgent steps have to be taken to address these issues³⁰. Similarly, environmental problems have been spreading in the North as well as the South and the usual way of addressing them is to call them the problems of prosperity and the problems of poverty respectively. However, these problems are linked - ie. the North on an average is prosperous because the South is kept poor through structural features in the economic and political spheres³¹, some of which were highlighted by the debate on the New International Economic Order [South Commission 1990:18].

From the 'limits' to 'change'

Global climate change and the associated debate on global warming is linked to the concept of global change. The chief motivation of this field of study is that there are interconnections between various parts of the Earth and that there is a threat to all parts due to the activities carried out in another part. This impacts on the well being and the livelihood patterns of people totally unrelated to the cause of the disturbance in the system.

There are certain similarities between the themes of global environmental change and limits to growth [Buttel, Hawkins & Power 1990,59-60].

- * The limits to growth was based on a computer model developed at Massachusetts Institute of Technology (MIT) [Meadows 1992, Moll 1991] and the advanced research on global change is based on megascience and supercomputer General Circulation Models.
- * There is global reasoning in both terms where the biosphere is taken as a global system being degraded due to global processes.

30 George [1992:5-7] also points out the connection between global warming, deforestation and debt problems of developing countries.

31 Shiva [1993:151-3] in a section named 'Global environment or green imperialism' points out that '[i]nstead of extending environmental concern and action, the recent emergence of a focus on 'global' environmental problems has in fact narrowed the agenda..The construction of the global environment narrows the South's options, while increasing the North's. Through its global reach, the North exists in the South, but the South exists only within itself, since it has no global reach.

* A 'pathological' scenario of environmental collapse threatening human survival are created.

These, in turn, are related to industrial development and the attendant problems of industrial chemical production, industrialization/mechanization of agriculture and associated pollution. Both these thesis also have a predictive feature based on current happenings in the world. While the case of limits to growth was driven home due to the OPEC oil shock of 1973 that of global environmental change got a substantial boost from the heat wave in across many parts of the Western hemisphere in the 1980s when record high temperatures were observed.

While saying this, there are significant contextual differences which show a difference in these terms. The predictions of 'limits to growth' threatened the very existence of the system; global environmental change has a more ecological modernization approach³². Global environmental change bases itself on the role that markets and technology can play in solving the problem of global climate change³³. The reason for this technocratic approach towards global environmental management is at one level a matter of scale but it has also to do with the prioritization of the agenda itself [Shiva 1994]³⁴. For example, the Global Environmental Facility [GEF] is to finance projects addressing ozone depletion, climate change, biological diversity and international waters [GEF 1994:1]. The first phase of the environmental movement in the North was linked to the change in the overall system and there was a strong political undercurrent in the movement and led to the emergence of 'green parties' in some of these countries. However, the eighties saw the coming into power of more conservative regimes and also, interestingly, the

32 Mol and Spaargeren [1993;437]: 'Ecological modernization is used as a theoretical concept for analyzing the transformation of central institutions of modern society within the boundaries of modernity, in order to solve the ecological crisis.[emphasis added]'

33 Sachs [1993;14-5] points out that '[l]imits to growth calls on homo industrialis to reconsider his project and aide by nature's laws. 'Global Change', however, puts mankind in the driver's seat and urges it to master nature's complexities with greater self-control. While the first formula sounds threatening, the second has an optimistic ring: it believes in a rebirth of homo faber and, on a more prosaic level, lends itself to the belief that the proven means of modern economy - product innovation, technological progress, market regulation, science based planning - will show the way out of the ecological predicament.

34 Shiva [1994;197] continues: 'the way global environmental problems are constructed hides the role and responsibility of the globalizing and parochial local in the destruction of the environment...'

co-option of the environmental agenda into mainstream politics.

While the interests of big business and even the entire capitalist system seemed threatened by 'limits to growth', global environmental change offers opportunities to businesses to expand their markets, especially in the field of energy. In fact, one of the major reasons global climate change has got so prominent is the role of the energy industries in the issue. This has also allowed the resurrection of the nuclear power industry which had lay low due to widespread protests about a nuclear threat a decade ago. It has also provided another hope for 'alternative' energy sources like solar energy which had suffered reductions in governmental subsidies with falling fossil fuel prices.

Another factor associated with the above was that limits to growth projected an exhaustion of resources, especially fossil fuels but global environmental change came into the global environmental agenda at a time when fossil fuel prices were low and the fear of scarcity had been reduced considerably. There are enough proven reserves of fossil fuels available for the next century to maintain present rates of consumption³⁵. Apart from these sources, alternative sources are available from the nuclear and hydro power sectors and the potential of solar energy. This is the central concern in the debate on global climate change. The availability of fossil fuel based sources of energy make adoption of alternative sources difficult in a purely economic sense.

While we can recognize that there are some commonalities as also difference

35

Fossil fuel reserves in 1988 (thousand Mtoe)

	Proved.	Ultimately recoverable.
Coal.	722	2700
Shale Oil & Tar Sands.	na	1400
oil.	138	270
Gas.	103	200
Total(R).	663*	4750 ~
Production/Year(P)	7	7 ~
R/P ratio (years)	140	680

* error in original.

[Source: Anderson [1992;18 Table 4.]

in the concepts of the limits to growth and global climate change, the differences become visible when we consider the contextual surroundings. Another important element of the difference is that limits to growth did not touch the North- South divide strongly but was focused on the resource consumption patterns in the North [Sandbrook 1986:289]. However, global change talks about the importance of the North-South relationship, in fact putting undue importance on the South a source of sinks while not questioning the profligate energy use in the North (Buttel et al [1990], Commission on Developing Countries and Global Change [1992]).

Rise of Global Ecology and Global Environmental Management

The dominant work in natural sciences this century has been in analyzing and understanding the minute but since the 1970s science has been studying the mega/large trends. According to Finger [1992:8] 'If traditional scientific ecology refers to the dominant scientific epistemology of the 'infinitely small' (nuclear physics, analytical chemistry, and micro-biology), the new global ecology focuses on the Earth and the atmospheric sciences, whose points of reference are extensive and long-term cycles'.

Since 'limits to growth' and the Stockholm Conference on the Human Environment (1972), global environmental management has been on the international agenda but received a fillip only in the 1980s when the term sustainable development started coming in to use [Adams 1990]. Before this period, global environmental management referred more to international environmental management which did not usually have a global reach - acid rain negotiation in Europe involving countries of communist East Europe as well as capitalist West Europe or the Mediterranean Pollution Control regime. With global ecology identifying problems like Ozone depletion and global warming, the scope of international environmental management got a chance of truly becoming global. However, the underlying politics has to be taken into account. As mentioned earlier, mainstream politics was integrating the environmental agenda. This was also the time in which there was an increase in public awareness about the environment and a media hype over certain issues like ozone depletion and the

risk of skin cancer as well as whaling activities of certain nations.

As a consequence, global ecology got linked to the global environmental agenda and to a certain extent has played a major role in shaping the present discourse³⁶. The global ecological agenda does not challenge the present system but reinforces present political structures³⁷.

The greening of the mainstream, while on the one hand meant that environmental concerns started getting a space in mainstream policies but also meant that the environmental movement was being influenced by the mainstream. This has meant that the radicalism of the environmental movement has got diffused and got involved in various policy influencing exercises [examples like the World Resources Institute, World Watch Institute and many others].

This leads us to another dimension of the problem - the creation of concern by research institutes and the international research institutions like the IPCC [see Chapter IV]. In the seventies, research on climate change was focused on two issues - global warming and nuclear winter. These were perceived as global threats and both these issues got similar attention [Chatterjee & Finger 1994:8]. However, with the passing of the Cold War, the fears of nuclear winter diminished and that of global warming came centre stage. Global climate change was seen by some as the 'next global limit humanity will have to deal with [Meadows et al 1992:92].

36 Sachs [1993:18] points out 'there is a political, a scientific and a technological reason [for perceiving the Earth as an object of environmental management] as well. Politically, it was only in the 1980s that acid rain, the ozone hole and the greenhouse effect drove home the message that industrial pollution affects the entire globe across all borders. The planet revealed itself as the ultimate dumping ground. Scientifically, ecological research, after having for years mainly focused on single and isolated ecosystems ... shifted its attention to the study of the biosphere...Technologically,..., it was a new generations of instruments and equipment which created the possibility of collecting and possessing data on a global scale. As these factors have emerged simultaneously, human arrogance has discovered the ultimate dominion: planet Earth.'

37 According to Finger [1992:10]: 'A look at the cultural context of the 1980s helps to understand this new conception of socio-political transformation. the new ecological issues arise in a new cultural context (that of the 1980s), where collective projects and movements are declining. In other words, these issues cannot be inserted into the context of socio-political movements fighting for socio-political transformation. In this new cultural environment of atomized individuals, different forms of socio-political transformation become important, namely individual learning on the one hand, and technocratic management on the other. Both are linked, and can perfectly be applied in today's cultural context in response to new global issues: those are issues to which the individual person no longer has any immediate personal relation, and about which he or she can no longer be concerned in the traditional political way.'

Perceived impacts of global climate change

As warming towards the poles is going to be higher at the increment than the warming in the tropics, we can expect that the permafrost would shift into higher latitudes allowing more arable land to emerge in these regions while in the equatorial regions we can expect that there would be increasing aridity resulting in desertification in certain parts of the world [Meyer-Abich, 1993 citing IPCC 1990]. Since the exact climatic regimes are a function of complex and nonlinear atmospheric, oceanic and solar behaviour, we cannot clearly identify the exact impact on any particular region but there are, generally, relative advantages in some broad regions while there are disadvantages in others³⁸. There is least consensus on the impact of oceans on climate change though there are indications that there would be a change in the thermal budget of the oceans affecting circulation and its capacity to act as sink of CO₂ and heat as well as affecting fisheries as fish shoals move with the change in ocean currents and temperature.

Socio-economic aspects:

Any change that takes place in the human condition is usually differential in impact ie. different people are affected differently due to the same phenomenon/condition/change. This may be a difference either in direction or magnitude. All the people would not be affected in the same way due to global climate change but they will either be gainers and losers or only gainers and losers on a relative scale. This would be determined by the regions in which people are located, the professions that these people follow, the class status etc. For instance, there is the danger of a rise in mean sea-level. There are now revised estimates showing that the rise in sea levels would be less than five metres (as projected in earlier estimates). However, this would still mean that people will get displaced. Even if these projections turn out to be incorrect, the very fact that there is a risk of a sea-level rise will affect the well-being of people inhabiting the coastal areas. As a simple example,

the risk may lead to a reduced value of real estate leading to a 'loss' for landlords and a gain for the tenant.

We can see the sectoral implications of climate change on economic activities. Nordhaus [1991] has divided up the economy of the United States of America into potentially severely affected (farms, forestry, fishery), moderate potential impact (construction, water transport, energy and utilities, real estate), and negligible effect (mining, manufacturing, other transport and communication, finance, insurance, trade, governmental services, rest of world). Overall, according to his calculations, there would not be a major impact of climate change on the economy of the United States of America as a whole. The cost of climate change will be only 0.26 % of national income based on 1981 prices which would be around \$ 6.2 billions [Nordhaus 1991]. While such elaborate studies have not been carried out in most of the developing countries but we can get a rough idea from the fact that a large part of the deltaic plains of Bangladesh are expected to be lost to a sea level rise and that the whole of the Maldives would be submerged. While the entire population of Maldives is threatened; the economy of Bangladesh would be severely affected. Preliminary analysis show that the future of 11 million Bangladeshis would be affected by sea-level rise [Rahman & Roncerel 1994].

Agriculture is one of the activities which is most likely to be affected by global climate change. There would be a change in the agro-climatic conditions in various regions³⁹. These changes will take place both in the industrialized world as well as in the developing countries. The impact on the national economy would be more adverse for the developing countries than the industrialized ones because the resource base, production environment and infrastructural systems like irrigation are directly and closely linked with climate. There are various reasons for a more adverse impact in developing countries.

* Agriculture forms a larger share of national income in developing countries.

39

See Parry [1990] for a clear presentation of the likely impact of global warming on agriculture and food security of the planet. Also see Pimentel [1991] for the impact of climatic change on North America.

- * Production is still dependent on variables such as run-offs and precipitation.
- * There are little or no cushions (technical or social) for shock,
- * There are insufficient institutional arrangements and responsive markets and insurance systems which could spread agricultural risk to other sectors [Jodha 1989:148-50].

The above point to the threat that climate change can pose to the survival struggles of the poor in the developing countries. In a situation of high economic and ecological stress that communities in these countries operate, the dislocation and distress, if not destruction that climatic change can create may severely affect the livelihood strategies of some people in the developing countries.

International Response to Potential Climate change

In the initial years, even though there were studies done under the umbrella of the United Nations through the World Meteorological Organization [WMO], these remained predominantly a domain of scientists from the North. The emphasis of this research was on the impact of CO₂ on climate and was largely done under the leadership of scientists from the USA. By 1985, the Villach Conference seemed to have established a consensus among the scientists that there is a potential global warming problem and about the degree of contribution of the various greenhouse gases to it. This process culminated in the Villach-Bellangio Conferences of 1987 [Bodansky 1994, 47-48].

The most recognized work on the science of global warming has been done by the Intergovernmental Panel on Climate Change [IPCC]. This panel has established that global climate change may exist but has not been able to establish the regional impacts as there are no sound techniques that allow forecasts into the future with some degree of confidence. Even the regional scenarios made

by the IPCC have a low level of confidence.

The IPCC was established in 1988 to look into the issue of climate change by the UNEP and WMO under the leadership of Prof. B. Bolin and the work was divided into three working groups to look into the aspects of science, impacts and response (referred to as WKI, WKII and WKIII respectively in this paper) [Ramakrishna 1992:157-59]. The IPCC comprised of scientists selected or nominated by various governments from various disciplines working towards creating a consensus about the level and impact of global climate change. It was divided into three working groups in the first session in Geneva with Terms of Reference stating that the reports of the working groups should be written to address the needs of the policymakers and nonspecialists ⁴⁰. These groups dealt with the science of climate change (WKI), impacts of global climate change (WKII), realistic response strategies (WKIII) [Boehmer-Christiansen 1994]⁴¹. Its first report was made in 1990 at the Second World Climate Conference. It advised governments to act immediately on the issue of climate change. This was followed by a supplementary report in 1992 which more or less reaffirmed the earlier findings with certain modifications based on further studies and refined modelling⁴².

40 Intergovernmental Panel on Climate Change, report of the first session of the WMO/UNEP Intergovernmental Panel on Climate Change (World Climate Programme Publication Series, TD-no.267,1988) as cited in Ramakrishna 1992.]

41 For the terms of references of each working group see document op cit footnote 40.

42 The summary conclusions drawn by the 1992 report of the IPCC by Houghton et al[1992:5-6] are:

'findings of scientific research since 1990 do not affect our fundamental understanding of the science of the greenhouse effect and either confirm or do not justify alterations of the major conclusions of the first IPCC Scientific Assessment, in particular the following:

- * emissions resulting from human activities are substantially increasing the atmospheric concentrations of the greenhouse gases...;
- * the evidence... indicate the sensitivity of global mean surface temperature to doubling CO_2 is unlikely to lie outside the range of 1.5 to 4.5°C ;
- * there are many uncertainties in our predictions particularly with regard to the timing, magnitude and regional patterns of climate change;
- * global mean surface air temperature has increased by 0.3 to 0.6°C over the last 100 years;
- * the size of this warming is largely consistent with predictions of the climate models, but it is also the same magnitude as natural climate variability; alternatively this variability and other human factors could have offset a still larger human-induced greenhouse warming;
- * the unequivocal detection of enhanced greenhouse effect from observations is not likely for a decade or more.

There are also a number of significant new findings and conclusions which we summarize as follows:

- * Depletion of ozone in the lower stratosphere in the middle and high latitudes results

In late 1989, the UN General Assembly passed a resolution [UN General Assembly Resolution 44/207. Protection of global climate for present and future generations of mankind, Dec 22 1989] to begin the process of negotiations to address the challenge of global climate change under the International Negotiating Committee [INC] for a Framework Convention on Climate Change. This also meant that control over the negotiation process came under the General Assembly of the United Nations⁴³ rather than the bodies that had set up the IPCC - UNEP and WMO. The Framework Convention of Climate Change was sought to be ready by the time of the United Nations Conference on The Environment and Development in June 1992. The final draft was ready in May 1992 and it came into force in March 1994⁴⁴. However, this is just a framework convention which lays down guidelines rather than having any protocols in it to specify what each country would do under the treaty [Sebenius 1993]. Therefore, the process is still ongoing and will proceed after the 'Conference of Parties' meet at Berlin during April 1995.

The threat of global climate change due to excessive anthropogenic emissions into the atmosphere has been recognised and most countries are participating in international negotiations to deal with the issue. However, the international response is far from adequate to deal with the potential threat. Negotiations are still chiefly being done between nation states which have different perspectives and priorities. A restructuring of the economic and also the political system, as would be required if the threat of global climate change turns out to be true, is not easily entertained by any of these nations. This is why each party talks of the changes that should be carried

in a decrease in radiative forcing which is believed to be comparable in magnitude to the radiative forcing contribution of chlorofluorocarbons (CFCs) (globally averaged) over the last decade or so.

* the cooling effects of aerosols resulting from sulfur emissions may have offset a significant part of the greenhouse warming in the Northern Hemisphere during the past several decades.

* the Global Warming Potential(GWP) remains a useful concept... (but)... we now recognize that there is increased uncertainty in the calculations of GWP, particularly in the indirect components...

* Whilst the rates of increase in the atmospheric concentrations of many greenhouse gases have continued to grow or remain steady, those of methane and some halogen compounds have slowed.

* Some data indicates that global emissions of methane from rice paddies may amount to less than previously estimated.

↔

43 UNGA Resolution 44/207 'reaffirms that the United Nations system, through the General Assembly, owing to its universal character, is the appropriate forum for concerted political action on global environmental problems'.

44 See Holmberg *et al* [1993:25-7] for a simplified explanatory note on the FCCC.

out in other countries/regions - the North talks about deforestation, the South about industrial emissions. This legitimizes the technocratic approach of global environmental management.

CHAPTER IV
THE SCIENCE OF GLOBAL CLIMATE CHANGE

While the interest in the issue of global climate change among a vast majority of scientists is of recent origin, there were efforts to look at this issue from the 1820s onwards [Arrhenius & Waltz 1992]. In 1827, Baron Jean Baptiste Fourier calculated that the temperature of the earth's surface is affected by the chemical composition of the atmosphere. 'The theory of the "greenhouse effect" was conceived a century ago by the French mathematician, J-B Fourier⁴⁵ and given support by Tyndall's⁴⁶ studies on the absorption of heat by gases. The first analysis of a possible climate change caused by industrial emissions of radiatively active gases was published in 1896⁴⁷, by a Swedish physical chemist. Svante Arrhenius, who calculated that there would be a global warming of 3.2-4.0 degrees Celsius [C] from a doubling of the earth's atmospheric carbon dioxide concentration, a level which could be attained sometime in the next century (Arrhenius, 1896). [All References in this paragraph from Arrhenius & Waltz 1992].

As mentioned above, anthropogenic contributions towards greenhouse gases has grown over the last hundred years. These emissions are taking place into the atmosphere which is a global common. Since there are no costs involved in the emissions into the atmosphere, there is an incentive for all countries to continue to emit at an unrestrained level. However, these emissions and the consequent concentration of greenhouse gases in the atmosphere lead to increased temperatures and affect climatic conditions which have global repercussions ie. even the countries that have nothing to do with the emissions may be adversely affected by it. This phenomenon is operating beyond the regional locale like that of acid rain in Europe. However, this does not imply that there are no local or regional impacts of the emission of these gases; issues such as pollution from a thermal power plant cause local

. 45 FOURIER JB 1827 'MEMOIRE SUR LE TEMPERATURE DU GLOBE TERRESTRE ET DES ESPACES PLANETAIRES '-MEMOIRES DE L' ACADEMIE DES SCIENCE, FR7,569-604.

46 TYNDALL J 1861 'ON THE ABSORBTION AND RADIATION OF HEAT BY GASES AND VAPOURS' AND 'ON THE PHYSICAL CONNEXION BETWEEN RADIATION, ABSORBTION, AND CONDUCTION'- PHILOSOPHICAL MAGAZINE AND JOURNAL OF SCIENCE, S4,22,NO.146,169-194 AND 22,NO.147,273-285.

47 ARRHENIUS S. 1896 'ON THE INFLUENCE OF CARBONIC ACID IN THE AIR UPON THE TEMPERATURE ON THE GROUND'- PHILOSOPHICAL MAGAZINE AND JOURNAL OF SCIENCE,S5, 41, NO.251 237-276

environmental problems from coal dust [which replicated at a large enough scale can be considered a cumulative global environmental problem]. The same power plants, however, in the process of producing energy also emit carbon-dioxide which acts as a greenhouse gas and is a systemic global environmental problem. There are increasing concentration of gases such as CH_4 , CO_2 and NO_2 which cannot be explained away to a natural phenomenon. The case of the CFCs is even clearer: these compounds did not occur naturally in the atmosphere but are human made compounds introduced commercially in the 1930s. They are used in industrial processes related to refrigeration and air-conditioning and other activities such as aerosols manufacture etc. These CFCs have two side-effects in the atmosphere. On the one hand, they deplete stratospheric ozone allowing ultra-violet rays of the sun to penetrate the atmosphere and also act as greenhouse gases trapping heat from the surface of the Earth. Thus this artificial compound has had an adverse effect on two phenomenon viz. ozone depletion and global warming⁴⁸.

A major problem associated with the debate on global climate change is the uncertainty associated with the phenomenon. This uncertainty is associated with the quantification of the change in global temperatures due to the accumulation of greenhouse gases in the atmosphere leading to further uncertainty about the effects of this on global climate and subsequently on regional climates⁴⁹. These uncertainties are exacerbated due to the time span and intergenerational issues. Even if these issues are resolved, uncertainties about social and economic consequences persist, especially with regard to costs, even in the narrow sense of monetary value [this also becomes a challenge to the modern techniques of assessing gains or damages of undertaking remedial measures through the use of cost-benefit analysis]. Adoption of various policies is also based on this issue and is complicated

48 There has been an international recognition of the phenomenon of ozone depletion and global warming with the signing of the Vienna Convention on Substances that deplete Ozone and the Montreal Protocol in the case of Ozone and the Framework Convention on Climate Change in the case of global warming. The Ozone hole has been observed as a seasonal phenomenon over the Antarctica. However, we cannot categorize the Ozone Hole as a regional phenomenon as it indicates the reduction in stratospheric ozone at its thinnest point. Increased amounts of CFCs in the atmosphere will also affect the Ozone layer where it is thicker also.

49 Meadows *et al* [1992:93-5] see three large uncertainties related to global climate change due to global warming:

- * what would the global temperature have been without human interference?
- * what would be a warming planet's influence on temperatures, winds, currents, precipitation, ecosystems, and the human economy be in each specific part on Earth?
- * what would be the net feedback effect?

by the time span of the exercise.

Global Ecology and the Use of Science

While scientific evidence takes time to analyze and translate into policies, the debate on global climate change indicates the use of science or the manipulation by scientists to create a research agenda which allows continued research funds and scientific research into global ecology⁵⁰. This can be viewed from the perspective of science as ideology or the use of science for industrial/political purposes [O'Neill 1993, 152-4]. While looking at science as ideology {especially the Frankfurt School and Marcuse's work reflect this position strongly - Marcuse [as quoted in O'Neill 1993] points out that 'science, by virtue of its own method and concepts, has projected and promoted a universe in which the domination of nature has remained linked to the domination of man - a link that tends to be fatal to this universe as a whole'} is an interesting debate, I will take the weaker position of the manipulation of science by industrial and political interests and also by the scientific institutions for the purpose of this paper.

Even if science and the technology that it fosters are regarded as a necessary condition for determining environmental policy, the mega-science associated with global climate change is certainly not sufficient to enable action or policies. These actions and policies are determined by the ethical and political commitments and considerations. This is especially true in cases where there is a certain level of uncertainty about possible outcomes of the environmental policies. O'Neill points out that principles and judgements derived from ethical and political commitments are required to address these uncertainties.

50 According to Klaus-Meyer [1990, 55] " Many scientists are normally not especially concerned about political matters, which, after all, always remain somewhat doubtful with respect to methodology as well as to the results. In the case of climate change this is different, and society ought to appreciate that warnings are given by those who have the expertise of foresee emergent misfortunes or disasters. This is not to dispute that some of the climatologists who have aroused public awareness have also piggybacked some budget demands of their institutions on the public awareness issue, and others have a heart for the nuclear community which is so shaken by people's unwillingness to enjoy the benefits of atomic energy in spite of its risks and which might finally get their chance in saving us from CO₂".

He discusses the 'presumption principle of liberty' asserting that the 'proof is always on those who want to curtail liberty - to interfere'; a line of reasoning that defended the USA position on climate change during the Bush administration. This principle meant that the status quo was reinforced and the industrial interests in the USA could continue the damaging emissions until clear and acceptable scientific evidence about a conclusive link between global climate change and greenhouse gas emissions is established. Two other strategies are also put forward by O'Neill to deal with uncertainty - the 'mini-max' and 'avoid irreversible changes' where the former refers to considering the worse outcome of each policy and choosing the one with the least harmful effects while the latter refers to a risk averse position of avoiding policies resulting in irreversible change. Certain judgements have to be made in determining the uncertainties and judging the plausible claims. However, this plausibility itself is determined by certain criteria. We will look at the IPCC as an agency seeking to create this plausibility for its ideas and thus influencing decision making. The IPCC acted as a body creating a doomsday scenario- showing ecoalarmist tendencies and then turning to ecological modernization as a way of controlling this danger [Mol & Spaargaren 1993, Boehmer-Christiansen 1994].

Intergovernmental Panel on Climate Change [IPCC]

As demonstrated by [Boehmer-Christensen 1994:142-147] 'the scientific community has become coordinated by a "Northern" science bureaucracy which is extracting data and knowledge from a globally dispersed research base increasingly dependent on multinational research funds.... The global change research agenda is coordinated by an interlocking system of national - international scientific bureaucracies advised through the ICSU [International Council of Scientific Unions] and WMO [World Meteorological Organization]....'.

The IPCC was not the first body to study climate change, it was not even the first multilateral agency to do so. The WMO Executive Council, ISCU committees and UNEP have been involved in the global climate change research since the early 1970s. In 1979, the First World Climate Conference was organized and the WMO set up a World Climate Programme with two research components;

- * World Climate Impact Assessment and Response Strategies Programme (Coordination by UNEP), and
- * World Climate Research Programme (coordinated jointly by WMO and ICSU).

These programmes were new and did not receive sufficient funding and there was a need to create public concern to be able to attract funding for these programmes. While these activities that were going on in the science bureaucracies, governments were coming under increasing pressure from environmental movements to do something about the environment. The rise of 'mega science' projects dictated by the WMO, ICSU and UNEP allowed the governments to be able to channel funds and demonstrate an interest in the environment. This assured the governments that this research would take time and would not create pressures on the governments from environmental lobbies for the time being. It was also supported by the interests in the science (especially the fields of space research and computer modelling) and energy lobbies, both in the government and outside them.

Sufficient funds for research had to be raised for these programmes. This was done through the selective release of information through popular science writers and media which allowed a certain level of public concern to develop [Fingers 1992, Shackley 1994]. This concern in the public allowed a certain amount of research funds to be available for these programmes. There was also a plausible atmosphere created for global environmental management as the problems of global change through climatic change and the ozone hole were presented in a way that would force a fundamental change in the system unless a strong international regime to manage these changes were not established [eco-alarmism used for ecological modernization].

As per Butt et al [1990] the global change agenda caught the attention of the public through the CFC and stratospheric ozone depletion issue where 'dread factors' and 'spectacular events' played a major role. In the case of the CFC issue, the dread factor was skin cancer and the spectacular event was the discovery of the 'ozone hole' over Antarctica. It propelled a swift international negotiation for the ban of CFC products by the year 2000 [Article 2A(5), Montreal Protocol on Substances that Deplete the Ozone Layer 1987]. However, there were underlying factors that facilitated this process

which cannot be elaborated here⁵¹.

The CFC issue was resolved through the setting up of a global environmental regime on the basis of the Montreal Protocol and its London amendment allowing a ecological modernization trend to establish itself strongly in the international negotiations on global change. Global climate change rode the wave of media concern with the Ozone hole and skin cancer as CFCs were also one of the 'greenhouse' gases. This concern was connected with new dread factors and spectacular events [Ungar 1992]. Examples of the former were a world food crisis due to increased aridity and sea level rise resulting in the inundation of entire countries. These were reinforced by the spectacular events like the hot summers witnessed in the 1980s (George [1992:6] points out that six of the warmest years since weather record-keeping began occurred in the 1980s)⁵², droughts in some parts of the world etc.

At the same time, a consensus among scientists on this issue became essential so that scientific advice for policy purposes was plausible or in other words, legitimate. This consensus extended to integrate national science institutes in various countries in the research. The establishment of the IPCC was crucial for this purpose.

While the central thrust of the IPCC was the establishment of a scientific consensus on the issue of global climate change, the results of the WKII and WKIII created a lot of controversy. This must not take attention away from the 'scientific' research being done in WKI. The methodology adopted in looking at various scenarios by WKI points towards this. As per Boehmer-Christiansen [1994:148(fn33)] WKI looked at the doubling of CO₂ by specific dates (2030, 2060, 2090) and then adjusted other factors like GNP, rates of emissions etc, resulting in a difficulty in establishing the economic and technological causes of the emissions. These methodological 'weaknesses' have been since

51 Interested readers are referred to 'Mending the Hole in the Sky: the Ozone treaty' [Agarwal & Narain 1992] especially pp 6 for the role of DuPont, the Chemical multinational.

52 During the same period the United States Senate Committee on Energy and Natural Resources held a hearing on the greenhouse effect in which Dr. Hansen of NASA testified that the world was committed to a certain level of warming. This was widely reported by the media in the drought hit USA in 1988. Hansen is reported to have responded to a query by saying 'it's time to stop waffling so much. It's time to say the earth is getting warmer.' (as cited in McKibben 1990).

corrected but would have contributed to the 'dread factor' in 1990 when the first report was presented.

The presentation of this report further legitimized the work of the IPCC and the contribution it could make towards the management of the global climatic change issue. However, with the increased politicization of the issue of greenhouse warming and climate change, the IPCC has restructured itself to provide policy neutral 'scientific' advice. We can view this restructuring and redefinition of roles as an effort to maintain the legitimacy of the IPCC which has been increasingly questioned over time.

CHAPTER V

INTEREST GROUPS AND THE POLITICS OF GLOBAL CLIMATE CHANGE

Those who think we are powerless to do anything about the 'greenhouse effect' are forgetting the 'White House effect'. As President I intend to do something about it⁵³.

While the issue of global climate change potentially affects the entire world, the causes of the enhanced greenhouse effect point towards certain actors that have an interest in addressing the issue. These actors are primarily the people involved in various production systems [whether private or public], and institutions like the nation states in which most human activity is organized nowadays. At the international stage, we can identify three major interest groups who have been involved in the climate change issue. These are nation-states and their governments, private interests (like energy companies and cement producers) and the environmental non-governmental organizations (NGOs). They have played a major role in shaping the current debate on climate change. Within each of these categories there are different perceptions and reasons for being involved in the climate change debate. While all these influence each other to a smaller or larger extent but the influence of nation states in the process is very large. This, as mentioned before, is because the chief organizing units in the world are nation-states. This does not mean that other class of actors are not as important. In fact the operation of the transnational corporations and the international NGOs span across countries but they are dependent on the structures of the nation states for their operations⁵⁴.

The Nation-States as Actors

There is going to be differential impact of global climate change in different regions of the world. This makes the nation-states the primary actors involved

53 President Bush's election year pledge [as cited in Bodansky 1994:49].

54 While the TNCs and NGOs both have been able to influence policies of particular nation states, in some cases unproportionately to their interests in that country, the structures of the nation state are important for these class of actors.

in the process of cooperation/coordination at the global level in order to utilize or stop the exploitation of the global commons in the interest of the long term survival of the human species and the planet as it now exists. In the case of global climate change, this means that the human contribution towards the emissions of greenhouse gases has to be reduced and preferably stopped. However, this is where the problem lies!!

Even after establishing that there is direct connection between the emission of these gases as a by-product or waste of processes of energy generation, deforestation or the practice of wet agriculture [the proximate sources of greenhouse gases], it is difficult to reach a co-operative solution to reduce emissions into the atmosphere on the one hand and increase gas absorption processes on the other. This is because these processes are intimately tied with present day economic activities⁵⁵ [the driving forces of modernization]. To take a simple example, present day transport is chiefly dependent on the combustion of fossil fuels for energy. This however, emits CO₂ and NO₂ which are both greenhouse gases. Any attempt to consider the protection of the atmospheric commons has to take into account the entire issue of transportation - use of public transport, personal transport⁵⁶, requirements of transportation over long distance linked to the issue of trade, replacement of fossil fuel based engines, viability of alternatives etc. Agricultural practices and organization are even more complex. As discussed above, the impact on different agro-climatic zones will be different and the social infrastructure and organization of agriculture will play a major part in the extent of the impact on any particular area.

Having said that, a negotiation process between nation-states on the issue of global climate change has been initiated and 155 countries signed the United Nations Framework Convention on Climate Change [FCCC] establishing the basic principles for further negotiations between nations. This was preceded by a series of activities which were able to create a seemingly consensus on the issue of global warming reflected by the signatures of the representatives of

55 There is a vast literature emphasizing or denying the role of climate change on economic activities. To get a general overview and estimates, see: Nordhaus [1994], Cline [1992], Dornbusch & Poterba [1991].

56 See Greenpeace [1991].

these countries⁵⁷.

I will start by looking at the positions of the participating groups of countries in the negotiations towards the FCCC. At the contextual level, I would like to reemphasize the dichotomy of the North-South positions⁵⁸. However, while saying this, it is clear that there are different positions in both these groupings.

Interest groups in the Negotiations.

As far as the role of the various countries in this negotiation process is concerned, we can see some clear interests. As per Paterson and Grubb [1992], there are four 'fault-lines' of the political conflict in the negotiations.

Firstly, the North-South divide on the issues of sharing of the burden of reducing emissions, historical and current emissions, mechanisms to transfer resources and technology etc⁵⁹.

Secondly was the stance of the major energy producing countries which perceived a direct threat to their exports and well being due to the requirement of reducing energy consumption or even raising the prices of fossil fuel based energy. This included the OPEC countries as well as coal exporting countries. Another group within this were countries whose energy requirement are chiefly met by fossil fuels and they were

57 Paterson [1992] divides international response to global climate change into three distinctive phases.

- Increased scientific cooperation in developing the knowledge of what the precise problem of global warming is {1970s-1988}
- Formalization of the scientific enquiry {IPCC} and politicization of the issue, especially on response strategies{1988-1990}
- Negotiation of the FCCC through the INC.

58 As the South Commission [1990:258] points out:

'Singling out developing countries as a main source of the threat to the global environment obscures the fact that the ecological stress on the global commons has in large part been caused by the North. The North, with only 20 percent of the Earth's population, accounts for 85 percent of the global consumption of non-renewable energy.'

59 See Hyder [1992] who highlights North-South issues in the negotiations.

pressurized by internal lobbies to maintain the current sources of energy [USA, China].

Thirdly, the split between countries that have the capability or resilience to counter the possible impacts of global warming on their economies and those not in a position to do so [example of the former is the Netherlands and that of the latter, Bangladesh; both of which would be threatened by a rise in the sea level].

Fourthly the 'differing attitudes to environmental impacts and inherent scientific uncertainties' where policy makers seemed to defer action due to this uncertainty and concentrate resources in areas that are of 'immediate' concern. On one hand this split is clearly demonstrated by the differing attitudes between the USA position of wait and see and that of countries like Germany, Norway and Sweden which were pushing to have firm commitments while on the other that between the AOSIS which feel directly threatened by sea level rise and other developing countries.

As would be obvious, these categories do not conform with a industrialized/developing country divide but show complex interests and political cultures that have to be integrated in a process of negotiations at the global level⁶⁰. However, we can see the IC-DC divide clearly in the manner in which there is an emphasis on the transfer of additional resources and technology on the one hand by the developing countries and the attempt at the global monitoring and control of the sinks of these gases like tropical forests by the industrialized countries⁶¹. As far as the developing countries were concerned, there was a deep distrust about the stated concern of the

60 To emphasize this point, we can look at the groups in the South. Roughly, we can divide them as :

- (i). The Energy Producing Nations associated with OPEC which had strong reservations against any kind of control on CO₂ emissions.
- (ii). The countries associated with the ALLIANCE OF SMALL ISLAND STATES [AOSIS] which face a direct threat of submergence from even a small rise in ocean levels.
- (iii). The newly industrialized countries which need to continue to use greater amounts of energy and thus produce emissions in order to maintain the pace of industrialization.
- (iv). Countries emphasizing equity and developmental concerns.

61 For instance, setting of firm targets might have been a point of contention between the USA and industrial countries of Western Europe but they had a common tough stand on the issue of level of financial assistance for full incremental costs as well as access to advanced technology at concessional terms [Nitze 1994:194].

industrialized countries intentions of pursuing the Climate change agenda. According to Nitze [1994:196], this distrust was at least because of three reasons:

'[T]hey perceived the rich countries efforts to get them to reduce their greenhouse gas emissions as a device to gain control over their development and a threat to their sovereignty - a form of eco-colonialism. Secondly, they saw the climate change issue as a pretext for the OECD countries to divert development assistance funds from something more important to them - economic development - to something that was more important to the rich countries - preventing long term climate change. Thirdly, they believed that the rich countries demands on developing countries to restrain their emissions were hypocritical [because] rich countries had created this problem through their own polluting growth patterns and their continuing over-consumption.'

Politics: the emerging dimension.

There has been the politicization of the issue of global warming and climate change, especially from the mid-eighties. There are various reasons for this. At an earlier period, it was chiefly an issue being dealt by scientists⁶². But since the late 1980s, it has represented the interface of 'scientized policy' and 'politicized science'. There has been a lot of scientific enquiry so as to formulate policy as well as the politicization of science in order to fulfil certain interests. At one end is the use of uncertainty and at the other the justification or the rejection of alternative policies. For example, the USA position on the issue at the time of the negotiations was 'to wait and see'⁶³ ie. it would not make sense to make commitments as there is uncertainty about the extent and the impact of global warming - policy was not formulated as there was lack of scientific justification of the phenomenon of global warming.

62 See Boehmer-Christiansen [1994] for an interesting analysis of the scientific communities role in the preparations for the FCCC.

63 While the USA position was a 'no regrets' position it changed to this position with pressure from internal lobbies and the stand of the Chief of Staff of President Bush - John Sununu. See Nitze [1994:192-4].

We can see some reasons for the politicization of the global warming debate in the mid-eighties. On the one hand, a growing 'environmental' movement was looking for an issue. This issue was provided by the concept of 'one world' or the global village wherein everything was seen as connected to the larger whole and the recognition, as in chaos theory, that any apparent random change has a systemic impact in other, diverse areas. On the other hand, we also saw the rise of neo-liberalism and the negotiations on trade with the Uruguay round of GATT⁶⁴, both these pushed the initiative of the developing countries in trying to create a new international economic order to the backseat. There was globalization of markets through the use of Structural Adjustment Programmes and neo-liberal policies with the increasing number of countries being forced to open their markets to the international markets in goods and services; the globalization of the environment through the rhetoric of 'our common future' (Chatterjee & Finger 1994:13-29) and sustainable development. The collapse of the socialist bloc reduced the bargaining power of the developing countries, the emergence of a unipolar world with the USA in firm control alongwith a new role for the United Nations in the form of a global policeman and enforcer of sanctions posed a challenge to the DCs.

The Negotiations of the FCCC.

International concern about the global warming and climatic change emerged in the late 1980s, especially after the Villach Conferences mentioned earlier where the conference statement pointed out that ' [al]though quantitative uncertainty in model results persist, it is highly probable that increasing concentration of the greenhouse gases will produce significant climatic change⁶⁵. .

⁶⁴ It is important to keep in mind that the issues discussed in the negotiations of GATT and those being followed in the Climate negotiations were similar with the same parties being represented in both negotiations. Issues of intellectual property, technology transfer and financial flows overlapped in both these process as well in the negotiations of the Biodiversity Convention. For some trade policy aspects of climate change and technology transfer, see Holtke [1992].

⁶⁵ WMO/UNEP/ICSU Report of the International Conference on the Assessment of the Role of CO₂ and of other Greenhouse Gases in Climatic Variations and Associated Impacts, Villach, Austria, Oct9-15, 1985 as cited in Bodansky [1994].

The concern created by the scientists required a policy response. It was realized that cooperation would be required at the planetary level to be able to address this issue. One of the early international response emerged in the Toronto Conference on 'The Changing Atmosphere: Implications for Global Security' in June 1988⁶⁶. It recommended that:

- * a 'World Atmosphere Fund' be created to address the issue of climate change financed partly from a levy on fossil fuel consumption in the industrialized countries,
- * there be a 20% reduction in global CO₂ emissions from the 1988 level by 2005,
- * a Global framework convention for protocols on protecting the atmosphere be drawn up.

In late 1988, the IPCC was established by UNEP and the WMO at the instance of governments 'to provide internationally coordinated assessments of the magnitude, timing and potential environmental and socio-economic impact of climate change and realistic response strategies'⁶⁷, [Churchill & Freestone, 1991:241]. This was a research body established by the governments and asserted state control over an sensitive and potentially political issue which had earlier been largely in the hands of scientific and environmental communities [Bodonsky 1994,51].

Even though the formal political process of the FCCC was done through the INC, there have been several influences which shaped the discussion. Apart from the Toronto Conference already mentioned, there was an international conference organized at the Hague in the Netherlands in March 1989 attended by 24 head of state or governments. It called for the creation of a 'new institutional authority' to protect the atmosphere and argued for 'fair and equitable assistance to compensate' the developing countries to take measures to

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For the text of the full statement see Churchill & Freestone [1991:367-72]

67

UN General Assembly Resolution 43/53[5]. Protection of global climate for present and future generations of mankind, Dec 6 1988.

counter the impacts of climate change [Borione & Ripert, 1994]⁶⁸.

Another venue where climate change was discussed was the Group of Seven (G7) industrialized countries meeting in Paris in July 1989⁶⁹. This was also the venue where differences within the approach of different G7 countries became visible. The USA clearly reasserted its position that it was not willing to accept any binding commitment on the levels of emissions in the November 1989 Ministerial Conference on Atmospheric Pollution and Climatic Change at Noordwijk, the Netherlands [Borione & Ripert, 1994].

In Sep 1988, Malta proposed that the issue of climate change be put on the agenda of the United Nations as a 'Conservation of climate as a common heritage of mankind' [Birnie 1991:2], however a UN resolution (no. 43/53) in Dec 1988 only recognized that 'climate change is a common concern of mankind, since climate is an essential condition that sustains life on earth' [emphasis added]⁷⁰.

The INC negotiated the FCCC in five sessions beginning from Feb 1991 and ending in New York in May 1992. These negotiations were also open to business and environmental NGOs but were primarily limited to bargaining among governments. Some of the official governmental delegations involved people from the business community as well as environmental policy groups. These groups organized themselves under different networks like the Chemical Manufacturers Association, American Forestry Association, Global Climate Coalition and the International Chambers of Commerce and the Business Council for Sustainable Development for the private sector [Faulkner 1994]. The NGO participation was chiefly organized within the Climate Action Networks apart

68 Declaration of the Hague on the Atmosphere - March 11, 1989 as cited as Appendix C18 in Churchill and Freestone [1991:318-9].

69 In the 1989 Paris Summit of the G7, the industrialized countries underlined the dependence on nuclear energy using the context of climate change. 'We are committed to maintaining the highest standards for nuclear power plants and strengthening international cooperation in safe operation of power plants and waste management, and we recognize that nuclear power also plays an important role in limiting output of greenhouse gases' [Paris Economic Summit. Economic Declaration 16 July 1989[41] as cited in Churchill and Freestone [1991]; emphasis added].

70 This points towards the apprehension that the industrialized countries had on the concept of common heritage as it had been used in the Law of the Seas negotiations with regards to deep sea mining and to celestial bodies in international law. In international law, common concern has not been explicitly defined and can be interpreted in a number of ways. For clarification on various concepts of international law applied to the atmosphere, see Boyle [1991].

from the involvement of international environmental bodies like the Friends of the Earth, Greenpeace and the World Wide Fund for Nature [Rahman & Roncerel 1994].

The FCCC was signed by 155 countries and came into force in March 1994. The implication of this is that the Conference of parties has to be called as soon as April 1995. Germany agreed to host the First Conference of Parties (CoP) which will be held in Berlin during April 1995. However, there is not much chance of any substantive proposals or protocols emerging from that conference due to the working procedures set in the FCCC.

It is important to analyze the FCCC in light of the present world economic and political situation. This means that we should be clear that the FCCC and the likely protocols coming after that on the issue of climate change have to be considered in the light of current trends in the world economy. As Dasgupta [1994:131] points out that '[a] climate convention could constitute a major multilateral economic agreement. The sharing of costs and benefits implied in the convention could significantly alter the economic destinies of individual countries.' Even if the goal is the stabilization of greenhouse gas concentrations⁷¹, current world energy scenarios make a very pessimistic outlook. There is also the question of establishing responsibility which has been skirted in the FCCC by mentioning it in the Preamble but not including it in the main legally binding text of the document. Linked to this issue is the allocation of the rights of determining the limits to pollute that each nation state has. There is widespread discussion by economists about the feasibility of creating energy taxes or using permits to control emissions. Apart from the difficulty of implementing such measures, the further (and crucial) issue of the distribution of the revenues garnered by this process will have to be considered. We also have to consider the intergenerational issues in the operationalizing any policy with regard to climate change. While all these issues are and have been central in the international negotiations around the issue of global climate change, the exact debate cannot be spelled out in this paper. However, to familiarize the reader with the complexity of

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The objective of the FCCC 'is to achieve...stabilization of greenhouse gas concentrations in the atmosphere at the level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.'

the issue, I will briefly attempt to summarize the issues.

A Brief Overview of Climate Change Debates

The FCCC does not set out any targets for the reduction of Greenhouse gases but section 2(a) and (b) might be read together to imply that Countries in Annex 2 of the FCCC should limit emissions by 2000 to 1990 levels [Brown-Weiss 1992:816, Holmberg et al 1993:25]. 'The IPCC has calculated that merely to stabilize the composition of the atmosphere, there must be cuts of over 60 percent in carbon dioxide emissions, 75 to 80 percent for nitrous oxide, 70 to 85 percent for CFCs, and 15 to 20 percent for methane' [Hall & Hanson 1992:89]. Whatever the levels of emissions and the reductions that are being negotiated in the FCCC, we have to consider the level of emissions after 2005, which is only eleven years away. In order to be able to address global climatic change, a longer view is required as well as long term planning of the way industrial activity should be modified to deal with this issue. It is in this context that the patterns of development in the North and processes of development in the South have to be critically re-examined.

While recognizing that global climate change may occur, it becomes important to establish the reasons for it. The entire process of industrialization is chiefly responsible for increasing concentrations of greenhouse gases in the atmosphere and thus industrial countries are chiefly responsible for these emissions. This has been recognized in the Preamble of the FCCC⁷², after a lot of resistance from the industrialized countries. However, since the global climatic change would be a result of both the present as well as the historical emissions into the atmosphere, we also need to consider the role of emissions and the sources of these emissions in the future.

Responsibility cannot just be established for the past and the present activities but has also to be determined for future activities. While the argument that the effects of emissions into the atmosphere were not understood in the past can be used to counter the charge of historical responsibility, it no longer holds water to continue the same levels of emissions. In fact,

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The FCCC states that '[n]oting that the largest share of historical and current global emissions of greenhouse gases has originated in developed countries...'.

this recognition itself has led to the further politicization of the debate. This is because the North is trying to put the emphasis on the amount of deforestation in the South as one of the major reasons of release of greenhouse gases into the atmosphere⁷³ while the South insists on the right to development and the release of emissions that would occur as an unavoidable by-product⁷⁴. Projections show that the emission levels from the South will exceed that from the North early in the next century. While this is a matter of concern by itself, we cannot expect the South to be able to manage its own house when the North not only carries on its excessive consumption but also adversely affects the South by its control over the world economy.

The atmosphere is a commons which is being used as a sink of greenhouse gases emitted due to various human activities mentioned above. While recognizing that everyone has a right over this commons, certain rules have to be devised so as to control the emissions into this commons so as to be able to not exceed the ecological limits of the atmosphere (assimilative capacity) to break down these gases ie. the ability of the atmosphere to be able to maintain the normal levels of various gases that compose it. By exceeding the limit of the atmosphere to act as a sink for human activities, we would not only harm ourselves from the direct result of a changing concentration of gases in the atmosphere but also exposing life and composition of the biophysical world on the planet due to the various feedback mechanisms which are as yet not fully understood. The setting of ecological limits with an allowance of a safety cushion to adjust for possible non-linear feedback mechanisms thus becomes important.

While the FCCC does indicate vague ecological limits, it does so in the context of 'food production is not threatened and to enable economic development to proceed⁷⁵'. However, agreement on the right to use the atmosphere as a sink is the most controversial issue in the debate on climate change as we have to establish both the limit of emissions that can be made

73 See WRI [1990:11-30] and also see Agarwal & Narain [1991] for its critique.

74 China, for instance, is one of the fastest growing economies of the world nowadays. Most of China's energy requirements are met by coal fired power stations. China plans to expand this source of energy based on the large amounts of coal reserves available in that country.

75 See footnote 71 above for the objective of the FCCC.

as well as who can make them - the conversion of the atmosphere from an unregulated common to a regulated commons in which all parties with an interest have predefined rights. Various approaches for the determination of these rights have been suggested (both intragenerational as well as intergenerational)⁷⁶.

Establishment of the national rights to emit into the atmosphere would not be the end of the controversy but would just be the first step towards it. As mentioned earlier, climate change is a complex issue because of the multiplicity of actors positioned at various sites. A mechanism to enforce the allocation of rights will have to be created and the conversion of agreements into policy instruments also has to be suitably designed. There are three broad ways in which rights can be determined and the levels of emissions controlled. On one hand we can use energy taxes as a policy instrument to control the demand for fossil fuels [Barrett 1991:30-52] and on the other we can create some sort of optimal/maximal levels of 'justifiable emissions' and then divide the 'right to pollute' between various countries based on a certain normative criteria⁷⁷. This can either be done on a permanent level or have allowance for trade (referred to as tradable permits in the literature [Markandaya 1991:53-62, Grubb 1990:368-73, Barrett 1992:85-113]).

Another important issue is the manner in which the revenues earned in the process of market based instruments of controlling emissions are used. If a suitable instrument to reduce the threat of climate change can be devised and agreed upon, the distribution of revenues that are earned has to be considered. This is because the revenue can be used within the country to finance any activity, or a activity to reduce emissions. On the other hand these revenues may be used to pay other countries to take suitable measures in their countries either as compensation [if the principle of historical

76 See Grubb *et al* [1992] for a wide range of rationales for dividing emissions rights among different countries.

77 As pointed out by Grubb *et al* [1992:309-20] '[t]he permit allocation issue becomes a political issue- to be influenced by equity considerations [emphasis in original]..' They look at various criterion like polluter pays, equal entitlements, willingness to pay, comparable burdens, broader distributional implications, status quo and reasonable emissions. They seek to evaluate a combination of these in terms of ethical appeal as well as political feasibility and look at baselines, targets, reasonable needs, and comparable burdens; willingness to pay, ability to pay and distributional implications; a historic "polluter pays" principle and natural debt; "status quo"(current emissions); and equal entitlements (absolute and modified per capita allocations).

responsibility is acceptable] or as investment [if the principle of joint implementation is used⁷⁸]. This itself is a politically contentious area at all levels; both within as well as across countries.

Since global climate change is a phenomenon that may have implications for all future generations as also the present generation, it becomes the responsibility of this generation to take into consideration the future generations. The literature on sustainable development has illustrated this issue clearly. When we look at the atmosphere as a regulated commons in which the rights of all potential users have to be defined, we have to recognize the future generations as users of the atmosphere. This leads to considerations of equity between generations⁷⁹. Global climate change is clearly related to the issue of intergenerational equity⁸⁰. Since the greenhouse gases accumulate in the atmosphere and the consequence of action now is felt much later on, decisions taken now should consider the implications on not only the present users of this commons but also other potential users, even those who are not yet born.

78 See Kuik, Peters & Schrijver [1994] for legal and economic aspects of joint implementation.

79 This is philosophical as well as a policy challenge. See Weiss [1989] especially pp 345-52 and Broome [1992] for some aspects of this issue.

80 Redgewell [1991] discusses the reasons of why climate change and intergenerational equity has to be seen together.

- UNGA has recognized that climate change is a 'common concern of mankind' and the global climate should be protected for all generations.

- As there is both a spatial and as well as a temporal dimension to the problem She continues: 'Applying intergenerational equity then, global warming evidences all three types of intergenerational equity problem which may arise in the use of planetary resources:(1) depletion of resources for the future generations; (2) degradation in the quality of resources available for future generations; (3) reduced or barred access to the use and benefit of resources passed on from previous generations'.

CHAPTER VI
A NOTE IN LIEU OF A CONCLUSION

Climate change and the 'Right to Development'

Some environmental problems have been raised to the planetary level. Global climate change is one of the issues that have to be addressed in the interest of all humankind. This was the reason it figured so prominently on the agenda of the United Nations Conference on Environment and Development [UNCED]. We should consider this issue keeping the contextual situation outlined above. The entire focus has changed from 'limits to growth' to 'global change' [Buttel et al 1990]; from a fear of resource shortages in the 1970s to falling fossil-fuel prices in the 1980s. Cheap energy has meant a competition among different sources of energy, especially the nuclear energy industry which seems to welcome the issue of global climate change as it legitimizes the use of nuclear power {because it does not emit greenhouse gases in the production process}.

Another important aspect was the realization by the DCs that the attempt to introduce the New International Economic Order has failed and the issue of global climate change and the environment in general is one way of reviving the issue of addressing the international division of labour⁸¹. It is also important to realize that the DCs started raising the issue of responsibility of ICs in the late 1989 when the Socialist Bloc was collapsing and international development assistance was shifting towards the former socialist countries of Eastern Europe. This was clear with the insistence of the DCs as a group to raise the issues of technology and resource transfer during the negotiation process. On the other side, there are certain interests of the North also. There are certain reasons why the North is interested in the this

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According to Dowdeswell & Kinley [1994:117], '[t]he formal international process had become a dialogue among scientists, run largely by representatives from the North. It became increasingly clear that the climate issue was a priority to the North, but less of an urgency in the South, where countries were driven to address more urgent problems of development and basic human needs. Developing country representatives sensed that climate change was an issue that could be used in the long standing North-South debate.'

issue. At one level, we can consider the purely environmental concern that exists in the North. But at another level, there is the issue of technology transfer and then there are certain economic reasons. Clearly, repeating the development pattern of the industrializing countries by the developing countries would mean that global greenhouse gases emissions cannot be avoided. This would mean that developing countries have to jump to a higher level of technology [which are only available in the industrialized countries]. Grubb [1990:367] points out three economic arguments of why resource transfers would be in the interests of the industrialized countries.

- * A general argument that a healthy developing world is in the interests of a healthy world economy.
- * Certain types of resource transfers represent assured exports markets, helping full employment in the industrialized countries.
- * Agreements which create an impetus for more advanced technology tend to return a rapidly dispersing technical monopoly to the more advanced nations.

These issues point out that international environmental negotiations have emerged as the new area of debates and conflicts due to the complex web of interactions in the human short-term economic interests and the planet's ecological interests. In the present circumstances, the former seem to dominate the latter.

While these are the primary and the secondary factors involved in the 'making' of the global climate change as an international issue, there are also other issues which use the climate change debate to forward their own agendas [as is the case with the developing countries and NIEO mentioned above]. These issues themselves have then reflected on the climate change debate in the manner of feedbacks. These will also be mentioned briefly here due to a lack of space. Broadly we can see two major trends coming from the industrialized countries- the undue emphasis on deforestation so as to cover the lack of policies undertaken to stop industrial pollution in the North as well as an unchecked growth of emissions through private transportation and the love affair with the car in the Northern countries. The other major issue is the

raising of the population bogey by the North again⁸². While acknowledging that the last century has seen one of the fastest growth of human population, it cannot be seen as the ultimate constraint on human survival. We have to look at this in terms of intragenerational equity, and in terms of consumption patterns rather than absolute numbers of people. This is because it is not possible to talk about intergenerational equity without considering intragenerational equity and basic rights of all people. Similarly, we have to consider the right of all people in the world to develop. This development does not necessarily mean aping the consumption patterns of the North but achieving a level of well being which keeps people from starvation and fulfils basic human requirements. This clearly means the redefinition of the present power structures internationally, regionally, nationally as well as locally.

The End of the Beginning: What Next?

The process of negotiating an approach towards climate change has begun. There are several countries that have taken unilateral decisions to reduce the levels of emissions into the atmosphere. This includes the USA which has announced an intention of reducing emissions under a new administration of President Clinton. However, there are problems within the European Union, which had decided on a community wide goal to stabilize CO₂ at 1990 levels by the year 2000 [Bodansky 1994:57-8], about how to share the committed reduction of emissions between member countries. There are even differences within the various ministries [Environment, Energy, Commerce] of the same countries about the feasibility of the commitments. As pointed out by O'Riordan and Turner above, integration of emission reduction plans through a 'design palliative' will not create a solution to the problem but may, at best, delay it by a certain period. While the IPCC recommended a 60% reduction in emissions to allow concentrations of carbon dioxide to stabilize at current levels, the nation states and their governments cannot even decide about a reduction of

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The approach is quite straightforward. With global climatic change, the agro-climatic zones will undergo a change leading to potential shortages of food. This is linked to the rapid growth of human population, especially in the developing countries. Increased food shortages and rising populations will create ecological stress which threatens the security of the North as there will be a stream of ecological refugees that the North will have to contend with- both in their countries as well as in others.

20% by the year 2005, and are not considering the effects after that yet⁸³. As long as the proximate sources moved by the driving forces of modernization through industrialization, land use changes and excessive fossil fuel use continue to emit greenhouse gases into the atmosphere, the threat of global climate change will not diminish and we may even see the ramifications of this in the next decades or so.

In this context we have elucidated the manner in which global climate change came on the international environmental agenda through the rise of global ecology and a technomanagerial approach of global environmental management. In this context, nation-states still continue to have a major say about the policies that can be implemented for addressing this issue. However, nation states have their own priorities and pressures and decisions are taken so as to garner maximum benefits for the greatest number of influential pressure groups. In retrospect the status quo, ie. the present elite linked to the industrial system, dominate the decision making processes in both the North and the South. The threat to life support systems and the importance of climatic stability is used by nation states to fulfil their own agendas linked with the interests of the elites. This means that every possible lever of power is used to maximise the interests of the elite by the nation-state including the use of science. The process used in the IPCC is an indication of the use of science where plausibility about the threat of global climate change was created. The INC process also demonstrated the prevalence of global power structure and the use of the economic power to determine the framework of the negotiations. Therefore, the politics of global environmental management are crucial as it exposes the entire working of the present day economic system as well as the lacunae of the political system. Any effort towards creating a greener and safer world has to contend with these issues and environmental issues cannot be compartmentalized into a separate category but have to be understood within economic, social, and political systems acting from the microcosmic to the macrocosmic level.

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Holmberg *et al* [1993:25] point out that 'stabilization of emissions may not prove a particularly convincing and helpful achievement. Firstly, the slow economic growth expected in many industrial nations to the end of the century will stabilize emissions automatically. Secondly, even if the OECD nations meet this target, the rate of warming to 2100 will only be reduced by 5% or so. Stabilization thus represents little more than a commitment to "business as usual".

LIST OF ACRONYMS USED

FCCC	United Nations Framework Convention on Climate Change
IPCC	Intergovernmental Panel on Climate Change
INC	International Negotiating Committee for a Framework Convention on Climate Change
AOSIS	Alliance of Small Island States
IC	industrialized country
DC	developing country
NIEO	new international economic order
OPEC	Organization of Petroleum Exporting Countries
CoP	Conference of Parties of signatories of the FCCC
CO ₂	Carbon-dioxide
NO ₂	Nitrous Oxide
CH ₄	Methane
CFCs	Chlorofluorocarbons
Mtoe	Million tonnes of oil equivalent energy
NIMBY	Not In My BackYard
WMO	World Meteorological Organization
ICSU	International Council of Scientific Unions
UNGA	United Nations General Assembly
UNEP	United Nations Environment Programme
WKI	Working Group I of IPCC
WKII	Working Group II of IPCC
WKIII	Working group III of IPCC
UNCED	United Nations Conference on Environment and Development

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