The Ideological and Political Construction of Environment: Air Pollution Policies for Mexico City 1979-1996

José Luis Lezama de la Torre

University College London

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Abstract of thesis

The research analyses air pollution policies for Mexico City. Based on the existing sociological literature, particularly on those authors that analyse the social construction of environmental problems. This thesis pretends to contribute to this field of knowledge. It assumes the relevance of the social dimension of environment and analyses its ideological and political dimensions. The main purpose of the research is to prove that air pollution is not only a technical problem but also a socially constructed one. There is a chapter in the thesis that demonstrates that air pollution programmes for Mexico City during the last two decades, are concentrated on addressing the physical, chemical and technical aspects, but lack an appropriate social approach, and this is fundamental for the efficacy of the programmes. The thesis also shows that the air pollution problem in Mexico City is socially defined. Its ideological and political dimension can be analysed in the contrasting and debated way that air pollution is perceived and conceptualised by different social actors. The thesis shows that this diversity of social actors and air pollution constructions are only incorporated in the official programmes to legitimise them, because they are not taken into account in the actual implementation of solutions to air pollution problems.

The thesis includes, as a starting point, a general description of the air pollution problem in Mexico City, presenting the main data on its magnitude. It also contains a section describing the main existing findings on the health consequences of air pollution for Mexico City’s inhabitants. Both aspects constitute the general background of the problem.
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Introduction

The problem of air pollution in Mexico City has been measured and evaluated in different ways and by a variety of specialists, many of whom regard it as a serious problem. The data indicate the presence of four million tons of substances discharged annually into the atmosphere. The government air quality monitoring system has shown that official environmental standards for ozone are violated over 320 days a year, and 150 days a year in the case of suspended particles. The problem is compounded by the fact that, apart from the substances that are officially acknowledged and regularly monitored, there is also a group of pollutants known as toxic substances that are virtually ignored by official programmes. A number of specialists agree that the latter constitute the greatest risk for the population, not only because of their high degree of toxicity but because of the lack of public awareness of their existence and dangerousness.

Advances in knowledge at the international level and in the case studies undertaken in Mexico City have yielded increasingly precise evidence of the scope of the damage to human health caused by air pollution. The findings of specialists in public health and pollution are beginning to provide proof of the damage caused by substances such as lead, ozone, carbon monoxide and suspended particulates in general. Studies have shown that women, children and the elderly are particularly sensitive to acute exposure to these pollutants. Findings on acute exposure have also begun to emerge, analysis of which requires more sophisticated techniques and time studies that will permit the study of the phenomenon over longer periods of exposure to the pollutants.

However, government policies implemented to solve the problem have failed in their attempts to eliminate or significantly reduce pollution. Between 1979 and 1996, the period analysed in this report, three official programmes have been executed. Following the implementation of the first one, existing data show an increase in the volume of substances discharged into the atmosphere, with approximately five million tons of substances being released annually into the atmosphere in the mid-1980s. During this period, urgent additional measures were implemented. Thus, in order to reduce the concentrations of lead in the atmosphere, petrol distributed in
Mexico City was reformulated to reduce its lead content. Shortly after this measure was introduced, the concentration of lead in the atmosphere began to decline although at the same time, ozone began to emerge as a serious problem, as evinced by the growing violations of standards that began to be recorded from the mid-1980s onwards. Significant increases were also registered in the presence of hydrocarbons in the atmosphere. According to certain critics of government policies, the abrupt introduction of a new type of petrol into the market caused alterations in the atmosphere of Mexico City, which translated into a modification of its chemical composition which, in turn, led to a sudden increase in atmospheric ozone. Subsequent programmes implemented in 1990 and 1996 have achieved a partial reduction of substances such as sulphur dioxide and carbon monoxide, yet have failed to decrease the problem of ozone, suspended particulates and hydrocarbons. The most recent programme, implemented in 1996 and known as Proaire, achieved a certain degree of progress as regards the conceptualisation and characterisation of the problem in Mexico City. Nevertheless, its contributions to the understanding of the problem have not been consistent with the policy measures it proposes. Under these circumstances, it has become little more than a document with a purely rhetorical content.

Despite these achievements, in general terms, the situation continues to be severe. This in turn reflects the presence of numerous problems regarding the conceptualisation, diagnoses and policy measures that have been introduced to prevent the deterioration of air quality.

The severity of the air problems in Mexico City has sparked interest among the scientific community. Fairly detailed studies have been undertaken of the chemical composition of the substances, their reactions and synergistic effects on the atmosphere and the geographic and meteorological conditions that exacerbate and in some cases disperse pollutants, together with major sources of emissions, particularly sectoral contributions by industry, transport and services. Significant progress has also been made in the study of the effects on human health caused by air pollution.

Nevertheless, these studies have focused on the physical and chemical dimension and technical aspects of air pollution. The consequence of these disciplinary or partial approaches is that they have ignored many relevant aspects for
which no solution has been provided. This is particularly true of the social aspects of pollution. The very prevalence of the physical, chemical and technical aspects of the air problem prevents its understanding by the population, which in turn makes it more difficult for the public to identify with the environmental cause or make a commitment to the search for solutions for solving the problem.

A review of the current state of knowledge on the issue shows that there is a field of analysis which has reflected on environmental problems from the perspective of the social sciences, emphasising its social construction. This is the field of knowledge to which this research belongs and to which it seeks to contribute. It takes the importance of the social perspective as its starting point and attempts to add to or enrich the knowledge of environmental problems such as air pollution as well as characterising the form of their social construction in the case of Mexico City. It aims to prove the relevance of this perspective and to emphasise its importance, by showing that it is applicable to the case of air pollution in Mexico, on the basis of the fact that in this specific case, the social dimension has not been incorporated into either the official programmes for dealing with pollution or the studies undertaken to describe and understand the problem. By referring to the social dimension of air pollution problems, this research focuses on its emergence as a valuational reality as a result of perception and awareness.

The specific perspective to which this research belongs, which some authors have called the constructivist approach, is linked to the classic ideas of Berger and Luckmann on the social construction of reality, outlined in the 1960s. According to this perspective, social problems and the methodologies for its study are not universal in nature. Each society attributes a specific meaning to its social events according to its social order and the values prevailing in the latter.

Several social scientists hold that there is a social dimension to environmental problems, as in the case of air pollution, which contain the same status of reality as those that emerge from their physical dimensions. This form of existence of problems depends on a process of social construction and concerns its perception and public recognition. From this perspective, a problem may have a physical existence, but unless it is socially perceived and assumed as such, it become socially irrelevant. The authors who have reflected on the social dimension of environmental problems
from the field of sociology seek to explain the social mechanisms which, at a certain
time, enable certain aspects of reality to acquire a special meaning and significance
which makes them emerge on the public scene.

For the specific case of environmental problems, authors such as Douglas and
Wildavsky have opened up a field of research linked to the cultural and social
construction of environmental problems. According to the latter, as a means of being
constituted as such, societies select the type of problems with which they wish to
concern themselves and those they decide to ignore. This selective process occurs
together with the selection of the type of institutions, standards and values within
which a society decides to live. If this selection of problems did not take place, the
enormous quantity of risks that genuinely or potentially threaten a society and its
members would render the latter defenceless and unable to lead a life, at either a
community or an individual level.

These authors argue that it is society that gives meaning and importance to and
ranks problems, regardless of the intrinsic importance of the latter. Pollution, for
example, is a problem that concerns some societies more than others. This concern
does not always reflect the severity of existing problems; but instead reflects the
historical and social process of appraisal characteristic of every society. According to
these authors, ideological factors exist which explain the emergence of a problem as
an object of concern at the community level. People share values, feelings,
perceptions and forms of knowledge in their process of constructing a social identity.
Nevertheless, they discover that in addition to these shared values which intervene in
the selection of problems, there are also political factors which influence or bias their
selection. According to these authors, the political and ideological factors present in
the social construction of environmental problems explains the fact that societies do
not always choose the risks that would cause the greatest damage. The ideological
and the political emerge as general factors of bias in the selection of what is risky and
what is safe.

Crenson, another of the authors considered in this research, goes beyond these
political factors. In his view, a power structure has been created to devise various
means of preventing a real, important problem from emerging on the public scene. In
In this context, he suggests the importance of analysing the socio-political process that prevents a problem from becoming an object of public concern.

All these authors emphasise the social construction of environmental problems, particularly their ideological and political components. Yet despite considering and emphasising the social aspect of environmental problems, this perspective does not deny their physical and chemical existence, which it uses as its starting point. Nevertheless, it emphasises the analytical need to separate the social existence of problems from their physical and chemical existence, thereby giving rise to their disciplinary study from the perspective of the social sciences. In this context, certain aspects of air pollution or pollution itself and environmental aspects in general are regarded as more important in certain communities. In other societies, they are not even regarded as such. These authors attribute these different responses to the physical presence of problems to the value that communities themselves assign to environmental problems within the set of problems that have to be dealt with, within the context of the existing social order at a set time in their history. In Crenson's classic work, the mechanisms that permit or prevent the emergence of problems not only operate at the community level but also within the economic and socio-political structure. In Crenson's view, it is the subtle mechanisms of power and social conflict management that determine the success or failure of problems in their attempts to reach the public scene.

At the same time, certain sociologists not only refer to the social nature of problem selection but also to the separation often observed between the scope of problems and their emergence as an object of interest for both the general public and those who reflect on it analytically. After comparing countries with severe environmental problems with others where they are less acute, Beck and other authors suggest that countries with the most critical problems appeared to be less concerned about environmental deterioration. Conversely, countries with fewer environmental problems appeared to be the most concerned. In this author's view, cultural standards and the will to perceive certain problems constitute decisive factors in the emergence of awareness about high-risk situations and the establishment of what society defines as acceptable or unacceptable damage.
This is the context of this field of analysis within the sphere of social sciences, in which this research posits the need to study environmental problems, such as air pollution, as socially constructed problems. This does not mean including isolated economic, political and social variables in order to explore various aspects of environmental problems that could be added to chemical, geographical and meteorological aspects. The inclusion of a social dimension for analytical and programmatic purposes should not be restricted to incorporating a section on the processes of urbanisation, industrialisation or demographic concentration into research projects or government programmes. One must also reflect on the process which enables an environmental problem such as air pollution to emerge as the result of phenomena related to the social interaction in which valuational systems play a key role.

Some research and certain government programmes assume that the social aspect of environmental issues can be reduced to mentioning the influence of these processes on the air pollution problem. According to this logic, government programmes designed to deal with air pollution point out, in their diagnoses, that the problem of air pollution can be explained by the enormous demographic, industrial and vehicular concentration which in turn leads to enormous fuel consumption. However, the theoretical framework within which this research has been carried out holds that these problems of concentrations are not the only social factors behind air pollution, but that there are others linked to ideology and power which should be explored in order to undertake a more comprehensive social analysis.

The specific area of knowledge to which this research belongs corresponds particularly to the social dimension which emerges from man’s relationship to his natural environment, in which the latter is perceived through values, assumptions and judgements as well as interests. It therefore refers to social aspects as a mechanism whereby a form of reality is created. This is why this research is based on authors who posit the social construction of reality, since from this perspective, the existence of environmental problems is due less to their scope, severity or mere physical existence than to the way in which society, social groups and individuals assign a meaning, value and connotation to them which makes them emerge as an object of concern.
This research posits that government programmes designed to deal with air pollution in Mexico City lack an appropriate social dimension to complement their predominantly chemico-physical and technical approach. It also posits that this social dimension, particularly in its ideological and political form, is present in the heterogeneous, hotly debated and contradictory way in which the air problem in Mexico City is perceived and constructed by the actors involved in it in various ways. This leads to an inability on the part of government programmes to solve the air pollution problem, since by failing to incorporate a social dimension, they are unable to achieve an integral view of the problem and end up by proposing predominantly technical solutions. Under these circumstances, these programmes are unable to be more effective, since there is a corresponding inability to mobilise the social forces that would be most likely to fight for better air quality in Mexico City.

As shown in one of the chapters of this thesis, the three official government programmes implemented to deal with air pollution between 1979 and 1996 lack a dimension that would enable them to conceptualise air pollution problems as the result of a social construction and therefore subject to perception, appraisal, ideological bias and political distortion. Consequently, they cannot conceive of problems as the result of debate, discussion and disagreement. Nor can they conceive of the process of government intervention in the conflictual situation in which they occur. From this point of view, the programmes and those who propose them, conceive of their planning as something that takes place or should take place within the realm of science and unvarying truths, rather than within the sphere of ideology, values and political aspects, aspects which, in official discourse, tend to emerge as elements that distort both the understanding of environmental problems and the programmes for their solution.

The programme currently in force, Proaire, includes social and cultural phraseology, albeit for rhetorical rather than analytical purposes. At first sight, certain aspects of the social construction of Proaire seem to be not only social but radical in nature. Closer examination, however, reveals that they are only radical at the discourse level. Some parts of the programme lack a clear understanding of social events while others are simply superficial. Proaire’s social perspective often appears
to be have been added as a means of achieving legitimacy by adding as many factors as possible to the programmes.

The air pollution analysed in government programmes consists of a description of the various sources of emissions, a study of the chemical composition of the substances involved, the selection of a group of pollutants to be regarded as the principal objective of the programmes, modelling the pollutant chosen to be regarded as the most dangerous pollutant, namely ozone in this case, in order to find out more about it, and determining the toxicity levels regarded as harmful in order to establish the required standards and above all, monitoring the substances regarded as being the most important. The type of solutions best suited to this technical description of the pollution problem are therefore obviously technical. If the diagnosis states that the bulk of the problem is due to the quality of petrol used and the number of cars on the city’s roads, then the measures selected will include reformulating petrol and reducing the number of vehicle on the road. This has been the central objective of the official programme known as “Unable to Circulate Today.” Other complementary measures include the introduction of catalytic converters for vehicles, filters in factory chimneys, etc. This approach concentrates on technical aspects in both the diagnoses and the solutions proposed. Behaviours, values and individual, group and collective interests are conspicuously absent.

There are no social actors in this scenario dominated by the technical approach to air pollution in Mexico City. Actors occasionally appear, although mainly in their capacity as producers and consumers, rather than as the embodiment of social relations, perceptions, values and power. At other times, social aspects are reduced to their physical expression, as when one of the main causes of pollution is said to be the concentration of both people and vehicles and industries in Mexico City. However, this is depicted more as a concentration of objects, than of social actors and socially significant relationships and exchanges between them.

The research reported here seeks to contribute to this field of knowledge. It assumes that there is a social dimension to environmental problems and focuses on their ideological and political dimensions, as outlined in general terms by the authors studied in the chapter on the review of the current state of knowledge. It attempts to prove that government programmes fail to include an appropriate social dimension.
Above all, it seeks to show that air problems are not merely technical but also have an ideological and political dimension the incorporation of which is crucial to the effective management of environmental problems and in this particular case, to the policies designed to deal with air pollution. In order to prove this, a chapter is devoted to the analysis of government programmes. The research also attempts to show that environmental problems, particularly those involving air, are socially constructed and that their ideological and political dimensions are evident in the varied, contrasting and hotly debated way in which the air problem is perceived and constructed by the principal agents involved. The research contains a chapter showing the subjective variety of ways in which the problem of air pollution in Mexico City is constructed, even in the sector of so-called specialists and academics. This variety of perspectives only emerges partially and in certain fragments of the programmes, although generally for a purely rhetorical purpose. This is particularly true of Proaire.

Within this context, the first hypothesis of this research posits that there is a lack of incorporation of the social dimension of air problems into official programmes and that the latter contain a predominantly physico-chemical and technical view of the air pollution problem. The second hypothesis propounds that a construction of environmental problems exists in Mexico City that can be reconstructed on the basis of the ways in which the various social actors involved perceive and construct air problems. This dimension is not actually included in the programmes, which is why it is assumed that it is potentially capable of preventing them from solving the problems, since the population regards the definition of problems as alien, which prevents them from identifying with them and becoming more involved in the search for solutions.

The methodology used was as follows. In order to test the first hypothesis, government programmes for combating air pollution from 1979 to 1996 were analysed. Indicators were then constructed to classify the programmes according to whether they met certain requirements, meaning that their diagnoses and proposals could be classified as Level 1, since they focused on physical-chemical and technical aspects, or conversely, whether they fulfilled the conceptualisation requirements to enable them be classified as Level 2, which included a specifically social dimension,
in that they included social actors and the ideological and political forces they embodied. The programmes were analysed on the basis of these criteria.

In the case of the second hypothesis, interviews were conducted with social actors regarded as crucial because of their proximity to some of the components of the air problem in Mexico City. In this respect, government officials, representatives of the business sector, environmental organisations, the academic sector, political parties and certain international organisations linked to environmental problems were interviewed. The aim was to reconstruct, by means of the set of questions included in the questionnaire, the way in which the actors interviewed conceived of various aspects of environmental problems, with particular emphasis on air pollution. These interviews were interpreted according to the category of ideological and political constructions. The resulting chart showed that the air problem is conceived of and constructed in a heterogeneous fashion.

The principal findings of this research support the view that government programmes are constructed on the basis of a predominantly technical view of the air problem, lacking an analytical content which incorporates the social dimension. Another finding was the lack of a homogeneous view of the air problem among the actors involved. The field emerges as hotly debated, diverse, contradictory and ambiguous in many respects. Despite this diversity of constructions, the latter have only been partially incorporated into the most recent programme, Proaire, not for analytical purposes or decision-making but as a legitimising form of discourse. Its rhetorical nature is evident is the fact that the specific actions undertaken or promoted by the programmes bear no relation to the diagnoses.

This report consists of six chapters organised as follows. The first chapter contains a review of the literature. This chapter focuses on the social construction and emergence of environmental problems and the notion of ideology. It seeks to explore the literature on environmental problems, from the perspective of social sciences. It also focuses on the authors who have discussed the notion of ideology in three of its main meanings: as a means of constituting society, as a social mechanism of domination and as a form of knowledge. The two topics included in this chapter contain the main concepts for conceiving of the social dimension of air pollution
problems in accordance with the general plan and analytical purposes of this research.

The second chapter contains the theoretical framework and the methodological proposals for testing the two hypotheses of this research. The theoretical framework is constructed on the basis of two notions, the first of which involves air pollution as a form of socially constructed risk. The second is related to the notion of the *environmental ideological and political construction* of air pollution. Both notions constitute the conceptual framework for regarding air pollution as a socially constructed problem.

The third chapter presents a general background to the air pollution problem in Mexico City. It contains a description of the main features of air pollution in Mexico City and presents the most relevant findings on the relationship between air pollution and health, according to specialists on this topic.

The fourth chapter contains an analysis of the three main air pollution programmes implemented by government from 1979 to 1996. Its analytical purpose to test the first hypothesis of this research which states that all three programmes fail to include an appropriate social dimension of Mexico City's air pollution programmes.

The fifth chapter contains an analysis of empirical data to test the second hypothesis of this research. This hypothesis affirms that there is a social construction of the air pollution problem in Mexico City which can be analysed through the various ways the many social actors involved in air pollution perceive and construct the air pollution problem. The data for testing this hypothesis are drawn from a set of interviews with key actors involved in the problem.

The last chapter contains the conclusions of this research. It aims to explain the two hypotheses through the results of the documents and data analysed in Chapters IV and V. The purpose is to reflect the main findings of the research and their relation to the two hypotheses.

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Chapter I. The social construction of environmental problems: Literature review

1. Pollution and Society: General Considerations

Pollution\(^1\) is a product of life itself, not only human life but any form of life. The mere satisfaction of the most elementary needs activates the basic processes that produce it. Fire, one of the basic discoveries that marked the beginning of civilisation, is the first known source of air pollution. Agriculture, a fundamental human skill in the process of civilisation, has had an inauspicious relationship with the environment. Evidence of pollution has existed, not just since the industrial age, with which it is readily associated, but in all the societies that have existed at different times and in different places. Many of the plagues and epidemics of ancient times and in earlier and later periods are clearly attributable to forms of pollution linked to problems of sanitation (Markham, 1994). The image of an ecologically pristine pre-industrial world is both idyllic and wrong. Environmental damage is universal and its manifestations can be proved across time and space. Modern society is not the only society to pollute, since it is possible to find ecological changes and the social consequences of the latter in both simple societies, far removed from our own, and complex modern societies, whether highly industrialised or otherwise. Human activities generally lead to the redistribution of materials and energy. When this redistribution jeopardises the health of well-being or humans or threatens the safety of other forms of existence, then we are dealing with an obvious example of pollution (Modati and Kormondi, 1989).

The main difference in the modern age lies in the scope of the forces mobilised and the impact of their destructive action. Current technology has created new

\(^1\)Some authors such as Weale (1992) hold that natural sources account for a large share of pollution. This report will use Holdgate’s definition which is restricted to pollution caused by human activity which entails the introduction into the environment of substances or energy which represent a threat to human life, damage to food sources, damage to structures or amenities or interference with the normal uses of the environment (Holdgate 1979). For Mellanby (1988), pollution consists of the presence of toxic agents in the environment introduced by man, and the disruption of natural soil or the water regime as a result of the mobilisation or displacement of natural substances. Modati and Kormondi (1989) hold that it is not the substance itself which causes pollution but rather the degree to which this substance is mobilised. Thus, for example, water vapour is not a contaminant in itself, but if it is concentrated in large amounts as a result of human action, then it constitutes a case of pollution. Likewise, Holdgate concludes that a pollutant is something that is in the wrong place at the wrong time.
possibilities for altering ecosystems. To cite just one example, the introduction of approximately five hundred new chemical products into the market every year (Truhaut, 1989) has led to a considerable increase in the total number, which rose from approximately 600,000 in 1942 (Longren, 1992) to the present total of nearly 11 million, 100,000 of which are used commercially (Truhaut, 1989; Longren, 1992). The potential for pollution of these products is undoubtedly immense, whereas man’s ability to discover the damage they might cause to human health is fairly limited, not only because of the difficulty of analysing the causal relationship between this vast number of substances and specific diseases in concrete situations, but also because of the time required to prove that they actually cause damage, and the financial costs of such an undertaking. Adding the pollution caused by industry, transport, chemical arsenals, human waste and radioactive and bacteriological pollution gives an approximate idea of the scope of the phenomenon.

It is this destructive capacity of contemporary industrial society that enables authors such as M. Francis (1994) to speak of changes not only at the level of plagues and species which are deliberately destroyed but also of consequences at the level of food chains, which leads to emergence of toxicity at the ecosystem level. In this case, what is important is precisely the relationship between the species, rather than the mortality conditions within simple species, to give one example.

Industrial society’s² capacity for pollution and destruction appears to continue unabated, despite the consciousness raised in recent decades and the measures implemented to counteract its most negative tendencies. The developed world, where activism is more intense and prescriptive action more energetic, has increased its energy consumption and ability to pollute in recent decades. Thus, in OECD member countries alone, pollutants increased as follows: nitrogen oxide emissions rose an average of 12% between 1970 and 1987; waste production increased by an average of 26% between 1975 and 1980; the use of nitrogen-based fertilisers rose 48% between 1970 and 1988; carbon dioxide (one of the principal causes of global warming) rose 15% in OECD countries and 43% on average for the world as a whole.

²Eckersley (1992) holds that industrialism constitutes the general spirit which informs the modern outlook on life, committed to economic growth, expansion of the means of production and with a materialistic ethics as the best means of satisfying human needs. Likewise, Weizsacker (1994) describes the present period in history as one that is characterised by its prevailing interest in ensuring economic benefits and short-term prosperity and neglect of the environment. J. Porrit (1984), the well-known, and highly successful Green activist, embraces the idea of radical ecological thought according to which all the evils of the modern world can be traced to industrialism, regardless of the type of social organisation in which the latter occurs. Porrit holds that all the known economic systems share the same perception and behaviour towards the environment, according to which the environment exists for man’s benefit alone.
between 1971 and 1988. Now, more than ever before, rivers, lakes and oceans have been effectively polluted by both common substances and microbes derived from human waste (Weale, 1992).

The evidence on the nature of pollution and its destructive potential make it unnecessary in this thesis to emphasise its harmful effects on life in general, both at the level of species as a whole and individuals. The same is true of the negative effects on the environment caused by development, particularly in the context of the prevailing tendency in the modern world to pursue economic growth at all costs.

Interest in pollution is not the same in every society. Since levels of development, social organisation, values and productive systems differ, people's approach to pollution varies according to the society involved. In general terms, the industrialised world faces a different set of environmental problems from those of the non-industrialised world. In the former, concern over pollution tends to focus on chemical substances, radioactive waste and the more recent developments in genetic engineering. In the latter, barring a few exceptions, (mainly certain industrialised, metropolitan areas in the Third World), most nations face serious problems provoked by biological pathogen agents which are expressed in high levels of morbidity and mortality. Nevertheless, the international agenda promoted by the industrialised world has shifted from the local and regional sphere to the global problems. As a result, interest is currently focused on such areas as the destruction of the ozone layer, global warming, the decrease in the troposphere's oxidation capacity, the long-distance transportation of toxic substances and the destruction of chemical weapons. In the meantime, environmental problems of poor countries are regarded as less important for the international agenda.

In underdeveloped countries, the environmental agenda is closely linked to poverty, desertification, and food and water pollution. This agenda is part of a larger agenda, and one which is nearly always top-priority, concerning the need to gain access to economic development, the payment of foreign debt and the procurement of food for the population. The options for economic development and environmental preservation are often regarded as mutually exclusive (Hardoy, Mitlin and Satterhwaite, 1992).

Pollution is not just an object of analysis due to its physical or chemical aspects, but also from the perspective of its social construction. This means that
pollution can be studied as valued risk according to a socially constructed scale of values. In short, pollution has to be incorporated into the social notion of well-being of a particular society. From this perspective, pollution can be discussed in the context of a specific social organisation, not only because it is linked to the social manipulation of nature, but also because the social sphere affects the way individuals experience, perceive, suffer and react to its negative consequences. Pollution, as will be explained below, is also a social construction in which, in addition to its physical characteristics, it is the result of economic, political, cultural and psychological forces, as defined by the authors who will be analysed in the next section.

The social construction of pollution is a phenomenon which involves the formation of social and individual images and translates into the mobilisation of meanings by the different social agents who appear as the bearers of resources (both economic, political and ideological). This mobilisation concerns various ideological aspects of social life and is at the same time rooted in the structure of power, since it involves the social construction of basic needs and the extension or reduction at the level of the social group or the set of elements comprising well-being. Including the quality of the environment in this set of elements translates into a redistribution of wealth which will affect relations between social groups, and eventually constitute a redistribution of power.

The idea of pollution as socially constructed does not deny its physical and chemical existence; instead, it uses the latter as a necessary starting point for exploring this other dimension of environmental problems. Faced with similar environmental problems, people can react in different ways. This opens up a thought-provoking field of analysis which in fact has been studied by different authors. It is in the context of this social dimension of environmental problems that this research will be carried out. The following section is devoted to the analysis of some of the main authors who explore and define this social dimension of environment and air pollution.
2. -Sociology and the social construction of environment

2.1. Sociology and nature

Sociology has been thought of as a modern science or the science of modernity (Habermas, 1985; Giddens, 1984; Beck, 1992). As such, it embodies all of the main characteristics of the modern historical period and all of the principles that make modernity a particular organisation of social life. In fact, the emergence of sociology in the nineteenth century was thought as both a scientific and a moral project. Comte (1958) saw his discipline as one that must be considered as positive in a double sense. First, positive meant to assume that the social world existed as an knowable reality external to the subjects and that it worked according to general laws that have to be discovered by science; from this perspective sociology was conceived of a positive science. Second, sociology was also considered positive with respect to its attitude of acceptance to the way in which reality worked. Being positive, from this perspective, meant the opposite of being negative (rejecting and changing reality) toward reality and its laws. Science had the task to discover the general laws of society and people had to behave according to these laws without questioning them. The moral intention of reaffirming the principles of modern society prevailed over the will to understand reality as it worked (Marcuse, 1972). Therefore, the moral project ended up prevailing over the analytical project. Comte wanted to explain social change in order to prevent it and to assure the permanence of the industrial society project (Marcuse 1972). Sociology had to provide the moral principles needed for industrial society to survive.

The general framework to explain society in the social sciences of the XIX century was imported from the natural sciences. References to objectivity and subjectivity had to do with the meaning of these notions in those disciplines. Marx, in different works, intended to explain society as a product of social forces, intentionally avoiding naturalistic explanations of how society worked. Most of his critique of social thinkers was based on his rejection of both understanding the modern social period, in which he lived, as the last stage in human development and finding bourgeois social categories in all the pre-existing societies. To him, modern society was only a transitory period in human history. He explained the evolution of society as the result of the dynamic of productive forces and the relations of
production, the former being the driving force of history. But here is where some current social thinkers have found the main problems with Marxian theory, regarding both its naturalism and its lack of reflection on the ecological damage provoked by the development of productive forces in modern society. In the Rules of the Sociological Method, Durkheim (1938) intended to establish the analytical rules to analyse society according to social and not natural principles. As Macnaghten and Urry (1998) point out, Durkheim wanted to carve out a distinction of the social, which could be analysed autonomously; such sphere of knowledge has to be separated from nature. Social behaviours, according to Durkheim, must be understood and studied as facts, existing independently of subjects. From this point of view, social facts constituted an objective reality that has to be analysed without the intervention of human prejudices and preconceptions.

Both Marxian and Durkheiniam approaches have been criticised for failing to give a truly social explanation of social facts. According to Eder (1996), Marx's proposition to give a main role to the social development of productive forces and Durkheim claim to do the same with the increasing social division of labour share a naturalistic understanding of society because:

They measure the reproduction of society against a standard which is characteristic of the evolution of nature: the standard of adaptability, the standard of the control over the resources which make survival in nature possible. (Eder, 1996:8).

The main problem that Eder emphasises is that both Marx and Durkheim reduce what has to be assumed as the social construction of nature to a social appropriation of nature. To appropriate nature in this context means to subjugate it. Eder refuses the idea of reducing the social construction of nature to a simple history of domination; for him the social construction of nature involves a cognitive, moral and aesthetic interaction between society and nature. Eder proposes to rethink the sociological approach based on a radicalisation of the culturalist tradition, reinforcing the idea of social facts as socially constructed. But differing from Marx and Durkheim, he suggested to include the symbolic world of social life as a social constitutive element of society. To him the appropriation of nature is not only an adaptation to nature. Contrary to the naturalistic analysis of the relationship between society and nature, the culturalistic interpretation views nature as symbolically constituted and not as something objectively given. Eder wants to construct a human
history of nature based on three main assumptions: a) The first is that there is a cognitive construction of nature arguing that the way in which people cognitively interact with nature determines specific types of relationships between men and nature. b) The second has to do with the normative construction of nature. According to this assumption, nature is the medium of social exchange and distribution processes and is also affected by them. c) The third has to do with the symbolic construction of nature. In this case socially produced nature works as a semiotic system to symbolise 'unknown and uncomprehended thinks to make them communicable' (Eder, 1996). What is important for Eder is to understand the transition from nature to culture, what is called the social construction of nature as a symbolic appropriation of nature.

Analysing the emergence of environmental discourse and its influence in the policy-making process, Hajer (1995) also recognise not only the social nature of environment but also its implications for the policy making process. The natural environment appears in Hajer's perspective, as something that is shaped by images and discourses. Nature emerges as the result of perceptions and these are the products of experiences, language, images and fantasies. Some societies have an image of nature as something fragile, while others perceive it as robust and able to resist disturbances. People have different ideas regarding the ecological crisis and consequently, they have different solutions for what they have perceived and defined in their own terms. To him:

> Reality, then, is always dependent on subject-specific framing or time-and-place specific discourses that guide our perceptions of what is the case. (Hajer, 1995:17).

Macnaghten and Urry (1998) understand the relationship of nature and society, which constitute the subject matter of the environmental sociological reflection, as something mediated by specific social practices. These practices have their own forms of knowledge, which structure the responses of people to what is considered as nature. For them, nature means different things for different societies. For this reason, there is no possibility of explaining nature abstracted from society.

There is another set of implications in the naturalisation of social sciences that is also present even in those sociological approaches integrating the constructivist perspective. The later thinks of nature as socially constructed, but in
many occasions reducing this social construction to either a cognitive or normative construction as well as symbolic, but not as the combination of the three. On the other hand, the Marxian tradition is also a naturalistic approach because it assumes that the natural evolution of society, which culminates in the modern industrial society, represents the higher and last stage in the human development. To Eder, bourgeois society represents the culmination of a natural evolution of modern society but not the culmination of all the forms of relationship between nature and society; in fact, it represents the culmination of a pathological form of relationship, since it is the expression of an exploitative relationship that ends in the destruction of nature, that is the foundation of both social and natural life. Functionalism also naturalises the relationship between nature and society when it understands the differentiation process as an extension of nature, providing a secondary naturalisation of social differences among people.

The main streams of sociological theory, namely Marxian historical materialism and Durkheimian functionalism, reduce the interaction between nature and society to a question of utilitarian appropriation of nature, which culminates in the victory of humans over nature. Both share the assumption of nature as an object of domination. To Marx, this domination is carried out by means of the development of productive forces. To Durkheim it is the division of labour and the subsequent process of differentiation what makes possible the subjugation of nature. The differentiation process appears as a sophisticated evolutionary system developed by society to optimise its appropriation of nature.

In the Marxist (1975) view, the control of nature through the development of productive forces constituted a means of man’s self-fulfilment. Adorno and Horkheimer (1979), founders of the Frankfurt School, pointed out that this attitude toward nature is derived from the Enlightenment tradition in which the ascendancy of instrumental reason over a more objective and critical reason meant the equation of human progress with the instrumental manipulation of nature. In this context, man emerged with a sense of self-importance and with a compulsive desire to subdue nature (Eckersley, 1992). According to the above-mentioned authors of the Frankfurt School, for Marx, nature was merely raw material fit for exploitation. Marx gave to the productive forces a revolutionary role and to the relations of production a conservative role. But according to some environmentalists, the development of productive forces guided by a utilitarian reason is the main source of current
environmental destruction. Marx' faith in progress prevented him from foreseeing the problems associated with an increasing development of science and technology. To Marx, it was only the oppressive nature of the relations of production what would be seen as the central problem to be solved in modern society, to free all of the libertarian forces of this period of human history. The productive forces always appear to be making progress possible and providing society with wealth and freedom. The moral intervention of men to change society consisted only in providing adequate free relations of production framework to promote the development of productive forces.

2.2. Sociology and the environment

The scientific atmosphere of the nineteenth century was dominated by the model of biology, as the sole means of engaging in science. The founders of sociology seemed to react against this general influence, creating a social science, which, despite using certain conceptual analogies with biology, emphasised the need to establish a very distinct approach for studying social facts. This historical context has been mentioned by some authors to, partially, explain the sort of taboo that prevented contemporary social theory from incorporating ecological variables into its analysis. Buttel recognises the influence of this historical context and the presence of some anthropocentric overlay and a sceptical posture toward biologism in the classical sociological tradition. Nevertheless, he states that this does not prevent contemporary sociology from taking advantage of the criticism these authors made:

against oversimplified views of societal-environmental relations and in establishing a comparative framework for more meaningful analysis of these relations (Buttel, 1986: 343).

For some authors, in order to evolve as a distinct scientific discipline, sociology had to separate itself from such fields as biology and psychology (Benton, 1994). This process involved the exclusion of relations between nature and society as an object of analytical concern. This is one of the reasons given by Macnaghten and Urry (1998) to explain the neglect of the 'social' in the environmental literature. According to them, this fact has partly stemmed from sociology's own process of development. Sociology has pretended to constitute itself through an "undesirable
distinction between society and nature." Goldblatt (1996) pointed out that if sociology were to emerge as a distinctive body of knowledge, then its subject matter—society—would have to be cordoned off from the realm of biology and nature.

Dunlap and Catton (1983), among the first social thinkers to include the environment as an object of sociological reflection, point out that a set of assumptions which they call the "human exemptionalism paradigm" (HEP) prevented nature from being incorporated into the sociological tradition. According to this paradigm, and in the context of sociology as part of the anthropocentric perspective of Western culture, humans are separated from and above the rest of nature. Under this paradigm, nature is regarded as something that exists for the sole purpose of serving human needs. The further evolution of Western society during the nineteenth and twentieth centuries, toward an industrialised and urban society separated from agriculture and rural settings, reinforced this image of a society independent from nature. Dunlap and Catton propose an alternative to the HEP which they call the "New Environmental Paradigm" (NEP) which views humans as one of the many interdependent species existing in the world. Under the NEP, humans are thought of as living in a finite world that is affected by human actions with unintended consequences. For Dunlap and Catton, in order to construct an environmental sociology it is necessary to think of human society in the context of the natural world and to analyse how societies interact with nature and the resultant impacts (Dunlap and Catton, 1983).

That was the subject matter for the sociological reflection on environment started in the late seventies by Catton and Dunlap. They outlined a new human ecology whose main analytical interest would be the relationship between physical environment and social organisation and behaviour (Hannigan, 1997). Another influential social thinker, Schnaiberg, in his seminal work, The Environment: from surplus to scarcity, states that since ecological and human societies are driven by different dynamics, they must be considered within different conceptual frameworks (Schaiberg, 1980). Buttel and Taylor (1992), in an attempt to reconcile both the biophysical and the social nature of environmental problems, affirm that:

the global construction of environmental issues is as much or more a matter of the social construction and politics of knowledge production as it is a straightforward reflection of bio-physical reality (Buttel and Taylor, 1992:39).
Other social thinkers have explored various aspects of social constructions of the environment, but their approaches are rather partial, focusing on certain aspects yet failing to take the whole problem into account. This is true of certain sociologists such as J. Coleman and D. Cressey (1980) who emphasise the social nature of environmental problems, pointing out that an environmental problem only becomes a social problem when environmental activists convince others to worry about pre-existing problems. In their conclusions, however, they do not fully acknowledge this social existence of problems. Similar ideas are expressed by one of the first contributors to this debate, Mauss, who, in *Social problems as Social Movements*, emphasises the cultural dimension of environmental problems (Mauss, 1975). These social constructionists frequently make analogies to environmental problems to illustrate non-environmental problems yet fail to address the environment as an object of study in its own right. Giving account of the increasing interest in environmental problems from different variants of the constructivist approach, Buttel (1987) pointed out six areas of interest for the environmental sociological perspective: human ecology; environmental attitudes, values and behaviours; the environmental movement; technological risk and risk assessment; the economics of the environment; and environmental politics. To this author, sociology as a whole has not been profoundly affected by environmental sociology. The latter has evolved as a sub-discipline. He suggests that for environmental sociology to be a more relevant area of social reflection it must focus on the society as a whole since the latter is affected by the environmental crisis.

As it can be observed when analysing the sociological literature, most social thinkers have reduced the problem of the object of study for an environmental sociology, to the definition of some topics of research. This form of conceiving of the analytic problems faced by the environmental sociology does not participate in the complex epistemological and sociological discussion around the issue, concentrating in the different practical ways in which many social thinkers have engaged in the analysis of the emerging environmental problems.

It is the discussion of the deepest causes of the failure of social theory to constitute itself as a real social explanation of environment, which has contributed more to the outline of an environmental sociology. Beck (1995), Hajer (1995), Eder (1996) and Macnaghten and Urry are among those social thinkers that have contributed more to this discussion. For them, a crucial aspect of thinking
sociologically about the relationship between nature and society, is to analyse the way in which socially produced knowledge, norms, symbols, images and discourse, create a social structure that allow people to perceive, to live and to face in very different ways the necessary interaction between man and nature.

They sustain that a sociology of nature has to be constructed based on the nature-society relationship that takes place by means of such social practices as consumption, knowledge and social and symbolic exchanges. Nature, from this perspective, not only appears as a social construction, but also as a diverse and contested product of different forms of interaction. These very forms of living with nature also explain the different responses from people when facing environmental problems.

From some of these authors, the naturalistic explanation of society provided by the sociological tradition, both functionalism and Marxism, not only consisted in importing some isolated categories from natural sciences, but also by giving a naturalistic meaning to supposedly social concepts, such as the process of differentiation, the process of labour, the social division of labour, the exchange value, etc. Eder (1996) affirms that a sociological theory in terms of cultural theory must break with those sociological traditions that have equated social development with the development either of the productive forces or of social differentiation, because they are essentially naturalistic theories of social evolution.

Marx insisted that in the production process, only its valorisation component, rather than the labour process, was of interest to the social sciences. Nevertheless, according to Marx, the labour process establishes the closest link between man and nature. Marx stated that this relationship was not relevant to his critique of political economy (Marx, 1975). For functionalism the changes in social structure formation is seen in terms of the availability of power resources. In this perspective, there is a continuum in terms of evolution from natural to social evolution. What makes nature and society different is only the greater complexity of the later. According to Eder:

Differentiation theory thus leads to a naturalistic evolution theory. In that way it operates parallel to Marxian theory. It treats nature as mere environment, and the relationship between nature and society as a mere difference of complexity. (Eder, 1995: 16).

Functionalism is criticised for reducing the nature-society relationship as merely instrumental. Both Marxism and functionalism do not go deeper in the role
played by culture as a decisive factor in the social evolution of society. Regarding the Marxian tradition, Eder (1995) thinks that the secret of the social relationship between nature and society has to do with the evolution of the use value, since it embodies the symbolic appropriation of nature that takes place through consumption. The history of exchange value is very close related to the history of modern society, to its productivist bias, and to the birth of the utilitarian reason that has provoked the destruction of nature in the industrial society. Eder locates the problem of the sociological explanation of nature not only in the alleged need to separate what belongs to the realm of nature, from what can be considered as integrating the social sphere, but also to the persistent presence of a naturalistic model in most sociological approaches to the relationship between nature and society. For him the problem of sociological theory is that in spite of its efforts to expulse the naturalistic model in the explanation of social facts, it ends up reducing society to natural categories.

For the German sociologist Ulrich Beck, the reason for the neglect of environment in sociological theory, has to do with the close relationship existing between sociology and modern society. According to him, the environment is not one of the primary categories of modern societies. He argues that sociology is not the science of society but of bourgeois society:

its issues and polarities reflect the issues and polarities of this historical society type and its epoch: the class issue, the antagonism between labour and capital or between culture and its material basis, social movements and parties, ethnic differences, the nation-state, the welfare state, and so forth (Beck, 1995:119).

Beck affirms that sociology has felt obligated to this framework even where it is exploring new dimensions for a more general notion of society. Beck thinks that since bourgeois society has depended on the development of labour, which transforms the resources of nature into commodities, the science of this society, sociology has to analyse the process of abstraction from nature involved in the transformation of nature by the labour process. From this perspective, sociology is unable to pay attention to the environment, first because it is not one of the main contradictions of bourgeois society, and second because fundamental changes in the modern process are required in order for environmental problems to emerge (Beck, 1995).
The very fact that the environment has been emerging as a matter of sociological reflection during the last decades has triggered a discussion on it. Many social thinkers have been discussing recently on the main factors associated to this eruption of environmental concern in a discipline that in the past was rather reluctant to give a theoretical account of this issue. The next section will discuss some of the main arguments included in this debate.

3. The construction and social emergence of environmental problems

For some social thinkers the main factor behind the emergence of sociological reflection on environmental problems is the severity of the current damage occurring throughout the world. Some authors observe that social science researchers only began to pay attention to the environment in the seventies and the eighties, when problems were perceived as extremely urgent (Hannigan, 1997). This is why, when sociologists started to think about the environment, they had an image of physical damage. Environmental problems appeared so real, identifiable and harmful that they needed to be socially reflected and dealt with politically. It was assumed that environmental problems were being considered both as a matter of reflection and of governmental action because of the damage they were inflicting on humans and nature (Wright and Weiss, 1980).

Nevertheless, there is a crucial disagreement over whether or not the emergence of environmental problems both as an object of public concern and of sociological reflection was due to the severity of the damage caused by the current process of industrialisation. There is a group of social scientists that denies the direct association between ecological damage, environmental consciousness and sociological reflection. Among them, Douglas (1982), Hajer (1995), Beck (1992, 1995), Eder (1996) and Macnaghten and Urry (1998) state that the emergence of environmental concern is not mechanically related to the extent of the damage caused by an environmental problem but rather to the significance it has for society. Some of them go further by affirming that the emergence of environmental concerns has to do with current changes in the social structures and institutions of modern society. They also talk of the emergence of a new way of perceiving the environment provoked by deep cultural changes that are taking place in the current period of modern society. These ideas will be presented later.
The perspective that thinks of nature and environmental problems as socially constructed, affirms that these kinds of problems have to undergo the transition from being regarded as a purely physical to a social condition in order to become a matter of reflection and of government intervention. In this order of ideas, one should add that the emergence of environmental problems as a matter of sociological reflection has paralleled the emergence of environmental problems as a matter of public concern.

Many environmental problems can be analysed from the point of view of their social construction. Nevertheless, what will be emphasised here, according to the objectives of this research, is the way in which environmental problems emerge as the result not just of the social construction, but also of their political constitution. This entails providing an explanation of the factors that determines the shift in focus from the physical condition of a problem to its political presence. Two authors will be discussed here to give the theoretical elements required to think about air pollution as a socially and politically constructed problem. Maarten Hajer (1995) analyses the policy-making process through the changing political discourse on environment of the current period. Matthew Crenson, who wrote his classical work on air pollution policies more than twenty years before Hajer’s one, gives account of a particular process of social and political emergence of an environmental problem as the result of the interplay between power and moral factors.

This section deals with different aspects of the social construction of environmental problems. The first part presents a brief description of the ideas of some of the leading sociologists working within this approach. These authors give account of some of the main aspects of the social construction of environment. The second part of this section is dedicated to the group of social thinkers who conceive environmental problems in the context of the wider social characteristics and changes taking place in current society. Their ideas are the theoretical reference for the research reported here on the social construction of air pollution in Mexico City.

As part of an explanation of the eruption of environmental issues in the public arena, Stella Capek (1993), quoted by Hannigan (1997) mentions the emergence of an environmental justice framework and its mobilising power in community struggle. Yearley (1992) refers to the increase in environmental awareness during the last two decades as a result of moral entrepreneurship and claims-making. Environmental
problems would be the product of a political effort to vindicate demands for a better quality environment.

In explaining the emergence of environmental problems as a matter of social concern, certain authors have emphasised the crucial role played by the claim-making process. Hannigan cites several analyses of the central role of claims-making activities in shaping environmental agendas, assessments and policies, such as chemical contamination studied from this perspective by Aronoff and Gunter (1992); global climatic change by Hart and Victor (1993), media coverage of environmental issues and conflicts by Burgess and Harrison (1993), and risk and safety issues by Spencer and Triche (1994) and Stallings (1990).

The claim-making process has been analysed by Hannigan in some detail. In his view, three tasks are involved in the social construction of environmental problems, namely assembling, presenting and contesting claims.

Assembling the problem appears to be important to this author since environmental problems often originate in the realm of science and people do not ordinarily have the knowledge required to understand such problems as ozone layer depletion or global warming. Assembling the problem means naming it, separating it from other similar problems, determining the scientific, technical, moral or legal basis of the claim, and gauging who is responsible for taking ameliorative action. As part of the process of assembling the problem, this author mentions that at present, claim makers are more professional, having developed the special skills needed to promote environmental causes and penetrate the media in an effective way.

Hannigan regards presenting the problem as another important aspect of the claim-making process since there are many competing issues. Under these circumstances, environmental problems must be seen as novel and understandable, in order to attract the attention of the general public.

Contesting claims is seen by Hannigan as a necessary step for an environmental problem to be fully acknowledged. The importance of this part of the claim-making process lies in the fact that social problems are defined by the activities of the groups making assertions of grievances and claims to organisations, agencies and institutions about unacceptable conditions (Hannigan, 1997).

In exploring a complementary aspect of the social construction of environmental problems by means of the claim-making process, Best (1985) suggests classifying the entire process into three parts: the claims themselves, the claim-
makers and the claim-making process. When analysing the claims themselves, Best describes them as complaints about undesirable and offensive social conditions made by a group. In his view, it is important to ask what is being said about a problem in this particular context, how the problem is being typified, what the rhetoric of claims-making is and how claims are presented in order to persuade their audiences.

What emerges from this particular author’s perspective is that the way environmental problems are brought to the public’s notice determines the degree of public involvement in them. A problem needs to be presented in conjunction with thought-provoking data and victims linked to real or potential dangers. Victims must be depicted as blameless or innocent and should preferably be linked to principles such as basic rights and freedom.

As regards the claims-makers, Best views the selection of the person authorised to speak on behalf of the environmental problems at stake as a key factor. In this context, medical professionals, scientists, policy makers, politicians, civil servants and others play a leading role since they are the people authorised to speak.

In relation to the claim-making process, it appears necessary to animate the problem by means of advising and imparting skills and information to people and developing constituencies. It is also necessary, for a problem to be recognised, to legitimise it and to produce convincing arguments and data to prove that the problem really exists (Best, 1985).

In order to become a matter of public concern, a problem has to elicit the media’s attention and government involvement while a significant number of citizens has to be or at least feel threatened. Problems must therefore be presented dramatically. Environmental problems have to be depicted in a way that commands attention (Enloe, 1975).

At this point, one should note that defining a problem as socially constructed, does not call into question either the legitimacy of environmental claims or the fact that environmental problems exist. Both valid and invalid social problems have to be constructed. To state that a problem is socially constructed does not deny the independent causal forces of nature but rather takes into account the way a particular social order changes the natural order by giving it a human significance. What is analytically significant from a constructionist point of view, according to Hannigan, are the social, political and cultural processes that make environmental risks socially unacceptable. The problem described by this author is not the lack of certainty in
relation to the existence of environmental problems, but contradictory certainties, in relation to the same problems and their solutions (Hannigan, 1997).

Reflecting on the same problem, Hilgartner and Bosk (1988) state that the public arena is the scenario where different problems compete with each other to gain attention, legitimacy and social resources. This explains why the claims-making process is undertaken by different means to attract attention.

Authors who emphasise the claims-making process as a way for a problem to be socially recognised, focus on the public arena as the main social scenario determining whether or not a problem will be able to make the transition from its physical to its social condition. The public arena, as the social space to be gained for a problem, reflects either the failure or the success of an issue in achieving social recognition. From this perspective, environmental problems emerge as the result of a dynamic social process of definition, negotiation and legitimisation, in both public and private spheres.

Another version of the social construction of environmental problems is presented in the called hierarchy of needs thesis first developed by Maslow (1954). In the context of this thesis, Inglehart (1971, 1990) states that people establish their priorities and their objects of concern according to their socio-economic environment. The version of this thesis proposed by Inglehart is also known as the postmaterialist thesis. This means that people place the greatest subjective value on things that are in relatively short supply. As people's socio-economic environment improves, their value priorities shift from issues of physical sustenance to concerns related to the quality of life.

The called postmaterialist thesis represented by Inglehart states that the relationship between post-materialist values and concern for the environment is rather complex and non-mechanical. It assumes that concern for the environment is not a matter to be examined at the national level but at the individual level. There is no automatic shift from wealth to concern for the environment. This shift is the result of a process and is gradual. On the other hand, there is a strong influence from the formative experiences of different generations and individuals that determine individual and social attitudes and behaviours.

At a certain stage in his argument, Inglehart modifies his post-materialist thesis. In his view, in some poorer countries, the problem is so severe that it threatens the most basic priority, namely survival. For this reason, in these highly polluted
countries, concern for environment is paramount. Although Inglehart provides an account of the positive relationship between deterioration and concern, he also introduces cultural variations to explain environmental awareness. He observes that even in countries whose existence is threatened by ecological deterioration, the most concerned people are those with post-material values (Inglehart, 1990).

Using an environmental protection index, Kidd and Lee conclude that in most low-to-middle-income countries where support for the environmental protection index is above average, environmental deterioration was also high. Of all the low-to-middle-income countries in the sample they analyse (Turkey, Mexico, Chile and Brazil), the percentage of the population holding postmaterialist values is also above average. Moreover, as Brechin and Kempton (1994) themselves point out, these countries tend to be among the most highly polluted in the world. This suggests that in low-to-middle-income countries the combination of severe environmental degradation and a higher-than-average level of postmaterialist values helps explain the greater level of concern for the environment among the populations of these countries. This finding is consistent with assertions made by Inglehart (1990). On the other hand, according to Kidd and Lee, three of the countries that exhibit the highest levels of support for the environmental protection index (Finland, the Netherlands, and Denmark) are relatively free of environmental problems. The percentage of the population in these countries with post-materialist values is also among the highest in the entire sample. This suggests to these authors that support for environmental protection is probably the result of a gradual shift in value priorities rather than of objective environmental conditions in those countries. They also think that these findings are also consistent with assertions made by Inglehart (1990).

Kidd and Lee (1997) point out that not all wealthy countries are uniformly post-materialist, nor are all poorer countries uniformly materialist. National wealth is an important indicator for value change, but there are many other factors that influence environmental concerns such as cultural, social and psychological considerations.

The authors mentioned earlier explore various aspects of the social construction of environmental problems, providing an initial analysis of this perspective, its constraints and its possibilities. Nevertheless, they do not give elements to arrive at a theory for a social construction of environment and an explanation of the general social changes that have provoked the emergence of
environment as a matter of concern. They particularly concentrate on some aspects of
the social construction, but without relating them to the social processes and
practices that make the transition from physical unattended problems to social and
political objects of reflection and social demands. For the analytical purposes of this
research, it would be considered a group of authors who, in addition to taking all
these aspects of the social construction of the environment into account, frame it in a
wider social perspective. Ulrich Beck (1992, 1995), Klaus Eder (1996) and
Macnaghten and Urry (1998) offer the most general social arguments to construct a
sociological approach to the relationship between nature and society, to have a more
comprehensive understanding of the social construction of environment, and to give
account of the emergence of environmental problems as a matter of both public and
sociological concern. In Risk and Culture, Mary Douglas and A. Wildavsky (1983)
explore the cultural and ideological factors that determine the selection of certain
risks by a community; this is the framework within which they analyse the cultural
construction of pollution. Marteen Hajer (1995) presents an innovative approach to
explain the political emergence of environmental problems, by means of a form of
discourse analysis. In his classic work The Un-politics of Air Pollution, Matthew
Crenson (1974) analyses the various political forces behind the emergence or the
removal of air pollution issues from the public arena. The reason why this study
analyses these authors is because they explore the relationship between environment
and society using an approach that is closest to the analytical purposes of this
research.

Beck notes that since the 1980s, sociology has begun to question its
traditionally linear approach to social change. More complex models of analysis and
the idea of non-linear and reflexive change have appeared. Reflexivity is seen as the
modernisation of industrial society, in other words, the de-traditionalisation and re-
organisation of its institutions. What is the main problem behind the failure of
traditional sociology to grasp the most significant aspects of the current period of
industrial society? For Beck it is the fact that the old method of analysis conceives
and researches social inequalities within the categories of commodity and prosperity
production and distribution. Beck states that threats to nature also threaten property,
capital, jobs and the economic basis of entire sectors and regions. Risks split the
economic camps and are generalised to the whole society. According to Beck, in the
old industrial conflict, something positive was at stake (profits, prosperity, etc.), but
now the object of contention is something negative, such as losses or destruction. (Beck, 1992, 1995).

In Beck’s view, some of the main questions to be asked regarding current sociological and public concern about environmental problems include how the ecological issue becomes ‘culturally significant’ and how the perspective on society must change in order to make the ecological issue comprehensible in its cultural, social and political dynamics?

In answering these questions, Beck argues that it is not the increase in the destruction of nature that explains the emergence of environmental awareness. Protests against air pollution, acid rain, etc. were not more intense in places with the most severe problems. In comparing Third World with European countries, particularly Nordic countries, in terms of evaluations and perceptions regarding the same threat or damage, it is clear for Beck that damage itself does not drive protest. Instead, damage and protest seem to be independent. For Beck, cultural norms and cultural willingness to perceive determine which damages are accepted and which are not.

In Beck’s view, what separates devastation and protest is the cultural willingness to accept devastation. Some authors have mentioned the same argument (Wynne and Irwin, 1996), noting subjective perception and the availability of alternatives play an important role in initiating protest. People sometimes choose to ignore problems because they are unable to find a feasible solution to them. It is only when people feel endangered according to their own life conception by threats that they perceive as meaningful that they organise and protest against damage (Wynne and Irwing, 1996). It is interesting to note, however, that the people most affected by environmental damage do not fight as bitterly against damage as the middle class, where the norms of health, safety and well-being have been more consolidated. Beck states that cultural outrage selects the most pressing issues to be dealt with but this selection is not guided by damage but rather by cultural symbols. To analyse environmental damage and protest in sociological terms, it is necessary to describe the symbolism that mediates them. Risk in modern industrial society is so general that it tends to emerge as something abstract that requires the mediation of tangible symbols such as forest devastation, or damage to women’s and children’s health. According to Beck, within this context, the devastation of nature is experienced as a cultural and political alarm. What is in under threat is not nature as such but the
endangering of a certain cultural design of nature, a design that is very closed linked to the conditions of welfare state life, such as that existing in Western Europe. For Beck:

Ecological sensibility and the willingness to protest are certainly influenced by many factors: population density; degree of industrialisation, level of prosperity, bureaucracy, and security; the rules of democracy; and, not least, by the techno-economic resources to confront environmental damage, that is, by winners' interests; but they are also influenced simply by cultural norms and ways of life (Beck, 1995:125).

The most significant aspect of Beck’s thought-provoking argument is the idea that environmental awareness is not synonymous with an awareness of nature but rather an intra-modern, post-industrial horizon of meaning and expectation for which: a) it is important to emphasise the high level of scientism existing in the ecological issue that influences the perception of risks and damages; b) the loss of certainties in industrial society is a decisive factor. Beck maintains that environmental problems are not a problem of man’s environs but rather a crisis of industrial society itself that undermines the foundations of its institutions. To summarise Beck’s argument, it is important to say that the emergence of the ecological issue is not a function of the severe damage inflicted on nature and human health, but of the fact that, on the one hand, institutions created to provide control and security fall short and, on the other hand, that devastation is both normalised and legalised. These are the general arguments Beck presents in response to the need for an analysis of the social construction of environmental problems.

Eder (1996) implicitly thinks of the emergence of environment in the public arena as part of a process of the cognitive, moral and symbolic relationship between nature and society. There is a natural evolution of society guided by the increasing development and complexity of productive and organisational capacity of society that, guided by utilitarian reason of exchange value, has arrived to a destruction of the natural foundations of life. This natural evolution of society is the evolution of modern society. In the current period of modernisation, this utilitarian reason has been challenged by the emergence of new forms of relationships with nature, and by the emergence of an environmental discourse in which, as Eder affirms, alternative rules for consumptive appropriation of nature are defined and new ways of representing nature are emerging. The political and analytical emergence of
environment is thought by Eder to be the result of symbolic conflicts in contemporary society. These conflicts are explained in terms of the controversial nature of what is considered environmentally relevant or meaningful.

Eder sees the emergence of environmental concern and environmentalism as a fundamental characteristic of the current period. They appear as the expression of new possibilities for cultural development and as a cultural response to the ecological crisis:

I claim that contemporary environmentalism is a turning point in the cultural evolution of modernity, in so far as it provides a new cultural orientation by substituting ecology industrialism as the basic cultural model for modernisation. (Eder, 1996:163).

However, modern environmental is also seen by Eder as the consequence of cyclical waves of social protest. The current stage of environmentalism would be the final part of a cycle in which, environmental concern has been publicly accepted and socially normalised. The analysis of this public acceptance and generalisation of environmental protest is a decisive aspect of Eder's interpretation of the emergence of the environment as a matter of analytical and political interest. This can be deduced from the following:

It is our basic assumption that underlying the social and cultural differences that have both fostered and blocked the evolution of modern environmentalism a public discourse emerges which present concern for the environment as a coherent project. The net result is a discursive space with a universal frame of reference based on a particular way of relating man to nature. (Eder, 1996: 164).

The emergence of this public environmental discourse opens environmental concern to the whole society. However, the environmental discourse that has emerged during the last years is no longer the radical environmentalism that dominated until the beginnings of the eighties. It was, according to Eder, in those years when the opponents to environmentalism appropriated the issue. Without its radical content of the past, environmentalism has emerged as a political ideology, becoming a medium of public and political debate. The emergency of what Eder calls a system of ecological communication, in which different groups compete to dominate the green discourse and the public arena, is forcing environmentalism to
transform itself into a well-organised interest group, to allow it to influence the
definition of the emerging environmental discourse. What is finally accepted as what
Eder calls a "masterframe" to perceive social problems, is a very contested definition
of environmental problems. It results from the will of different actors to appropriate
or reappropriate the definition of what has to be the main object of concern in
environmental issues.

Macnaghten and Urry position towards the social construction of the
environment and the emergence of environmental concern is better understood in the
context of their critique to the prevailing theories on the relationship nature-society,
what they have called realism, idealism and instrumentalism. According to them, the
main problem with the realistic interpretation of the environment is that they deny
any possible intervention of human action in the constitution of reality. Environment
appears as a 'real entity' separated from social practices and human experience that
can be scientifically understood and programmatically intervened to correct it.
Environmental idealism, that is the second critiqued doctrine, affirms that the best
way to analyse nature and environment is by identifying a set of crucial underlying,
stable and consistent values that underpin the specific character of nature. The third
critiqued doctrine is what they call environmental instrumentalism. They disagree
with the search of appropriate human motivations to promote environmentally
sustainable practices.

What these authors emphasise in this critique, in relation to the social
construction and emergence of environmental problems, is that these doctrines ignore
the particular social practices through which people respond, cognitively,
aesthetically and hermeneutically to what have been constructed as the sign and
characteristics of nature. There are not such social attitudes toward environment
abstracted from their specific social practices. These practices structure the responses
and define what is considered to be good or bad in terms of the environment and
nature.

Macnaghten and Urry (1998) agree with the assertion that damage and
environmental consciousness and protest are not mechanically related. They affirm
that living in late modernity, with the huge amount of changes in social practices,
have provoked the emergence of very different attitudes and concerns about nature.
New values have also emerged because of a global sense of insecurity, anxiety and
fears. A emergent global community, an imagined community is sharing a general
feeling of dangerousness derived from a destruction of the natural world, that
suddenly appeared very significant for the inhabitants of this changing world. It is
not a refusal to accept the importance of physical damage that makes them emphasise
the shift in culture to explain the emergence of environment as a matter of concern:

We do not deny the enormously powerful effects that the
physical world exerts and in particular its capacity to take massive
and often deserved revenge upon human society. But we are denying
that there is an already formed and causally powerful set of
environmental bads, which in and of themselves can generate such
havoc in the public realm. For example, public awareness of a global
environmental crisis is not simply the product of risks becoming
global. It is partly that a range of diverse environmental issues have
come to be viewed as operating in a global scale, on a scale which
presumes that many people living in diverse societies can imagine
themselves as inhabiting the same environment and thus subject to
international and even global planetary risks which are to some extent

The environment and its concern for both analytical and political reasons are
the consequence of different social practices. There is no one nature that provokes a
set of values to be acted upon. It is rather the diversity of social arrangements that
produce different ways of perceiving and living natures. These authors point out that
what is nature depends in part on how it is perceived by humans. These different
perceptions of nature derived from different social arrangements and values produce
what people consider as different natures. How people are concerned about the
environment, how they value the destruction of nature and even what they consider
as a fair or unfair with respect to nature, depend on the particular set of cultural
symbols that predominate in a certain period of history. The adoption of a particular
set of values for a society in relation to such aspect of life as the environment,
according to these authors depend on people’s temporally and spatially organised
social practices, and on their complexly organised patterns of dwellings. People's
attitude towards environment is ambiguous and contradictory. It is not always of
respect, care and love. In fact the prevailing principles of industrial modernisation
have considered nature as an enemy to be subdued. The new attitude that has been
introduced by environmentalism involves a radical change in this modern utilitarian
way of the nature society relationship.

In 1983, Mary Douglas and Aaron Wildavsky published Risk and culture, a
seminal work on the cultural construction of risks. Among the different aspects of the
relation between risk and culture, this report will focus on their social definition of
risk. Douglas and Wildavsky state that risks are ubiquitous. People are surrounded by a number of dangers, most of which they are unaware of, although they must act as if they were aware of them. Many risks are known by experts but not by the general public. The central point for these authors is that since people do not know and cannot worry about most of the risks they are exposed to, a sort of risk selection is undertaken by ordinary people and society as a whole. The questions these authors want to answer are how people decide which risks to take and which to ignore, and on what basis certain dangers are guarded against while others are relegated to secondary status?

Douglas and Wildavsky mention three characteristics of risks, the first being its controversial character, since people disagree over what is risky. The second is that people differ over the kind of risk to worry about, since they disagree over what qualifies as a risky situation. Third, there is not always a direct link between knowledge of risks and actions taken to cope with them: the main problem in this case being what to do about risks (Douglas and Wildavsky, 1983).

Among the various aspects of risk mentioned by these authors, it is important to focus on the way people and society establish their system of preferences for selecting the risks, about which they wish to worry. The existing level of ignorance about risks threatening people in the modern world is steadily increasing the gap between what is known and what is desirable to know. It is impossible for either a person or a society to know all of the existing dangers. Douglas and Wildavsky point out that the mere idea of thinking about what categories of objects a person might be concerned about is alarming. Since such a task is impossible, it is better for people’s mental health to limit rather than expand their sources of concern. Because it is impossible to deal with every risk, some sort of priority must be established among dangers in order for an individual or a community to be constituted as such. People and societies have to choose the dangers on which to focus their concern. The problem is that the dangers chosen in a scenario of uncertainty are not necessarily the most dangerous for people making the selection.

The guiding assumption of Douglas and Wildavsky’s work is that any form of society produces its own selected view of the natural environment; a view that influences its choice of dangers to solve. What is important for these authors is their idea of the influence of social forms in the choice of risks in a community. They have expressed this in the following terms:
The choice of risks and the choice of how to live are taken together. Each form of social life has its own typical risk portfolio. Common values lead to common fears (and by implication, to a common agreement not to fear other things). The real dangers are not known until afterward (there always being alternative hypotheses). In the meantime, acting in the present to ward off future dangers, each social arrangement elevates some risks to a high peak and depresses others below sight. Risk taking and risk aversion, shared confidence and shared fears, are part of the dialogue on how to best organise social relations (Douglas and Wildavsky, 1983:8).

The selection of risks in a community is closely linked to the selections of social institutions. Since it is impossible for either a community or an individual to look in all directions, the organisation of their biases is essential for social life; it is through this mechanism that people arrange their universe.

For these authors, since people select their awareness of certain dangers to conform to a particular way of life, it follows that people, who adhere to different social forms, will take or avoid different kinds of risk. To change this selection of risks it would be necessary to change social organisation. To understand people's attitudes towards risk it is necessary to move away from the interaction between nature and technology and explain how people agree to ignore most of the potential dangers surrounding them and why they interact in order to concentrate on selected aspects alone.

All of these authors share a particular way of seeing environmental problems as socially constructed. All of them associate the emergence of environmental problems with some social, cultural and symbolic changes that are taking place in the modern world which has put the environment and nature as something that has to be cared for. Environmental protest synthesises major changes that are taking place in the current period of modern society. But the report presented here has also to do with air pollution policies as socially constructed. To provide a general framework to socially think of the logic of the policymaking process in contemporary society, we will finish this section presenting the ideas of Maarten Hajer (1995) and Mathew Crenson (1974). In spite of the temporal distance between both authors, their understanding of the policy-making process is rather complementary. Hajer provides the wider context to understand the environmental policy-making process in relation to the fundamental changes of modern society. Crenson, more than twenty years earlier, carried out an analysis of the social and political construction of air pollution.
that is very closely related to the ideas of the social construction of environment presented before.

What is important for the purposes of this research is to analyse how these authors reflect on the way environmental problems undergo the transition from being regarded as a purely physical to a social condition in order to become a matter of public recognition and of government intervention. According to Hajer, the developments in environmental politics critically depend on the specific social construction of environmental problems. For this author, the policy making-process can not be only thought as a mechanism to find solutions to preconceived environmental problems, but also as a practical way for modern societies to regulate latent social conflicts, such as those produced by the environmental crisis. The policy making process is thought of as a process of redefining of the problems to be addressed and finding solutions according to a set of socially accepted practices. Hajer perceives the policy-making process as something that takes place in a context of and through fragmented and contradictory discourses, not only within but also outside the environmental sphere. The policy-making process has to do with the creation of problems to be handled institutionally by means of ad hoc solutions. In this context he affirms that:

Policies are not only devised to be able to solve problems. Problems also have to be devised to be able to create policies (Hajer, 1996: 15).

Hajer suggests using discourse analysis as a method to uncover the social and cognitive basis of the way problems are constructed. He analyses the interaction between social process that make actors mobilisation possible with those ideas that permit people to share similar understanding and common environmental goals. Political decision-making appears in a very disputed scenario of competing social constructions of environmental problems. In this public domain gained by conflictual points of view, some consensual images of what is good or bad and of what is risky or safe are constructed. It is in this scenario of fragmented and contradictory discourses that decisions are taken.

But what is interesting from Hajer's point of view is his understanding of the policy-making process as something that is not conceived to solve problems but as a set of practices aimed to construct the adequate problems that institutions can handle
adequately. The policy-making process is, in this context, a very important factor of the creation of consensuses, to legitimate not just a way of solving the problems, but also a way of thinking about and conceiving of the environment.

Hajer sees the policy-making process as an interpretative activity of multiple and contradictory discourses that have to be judged, compared, combined and acted upon. This is a crucial aspect in the critique of some existing assumptions in government environmental offices about the scientific or sound foundations of the decisions taken. Opposing that interpretation, Hajer affirms that there is no possibility to take for granted any definition of an environmental problem. Claims appear as socially and historically defined processes. He exemplifies this with the acid rain issue. What he observed was a disputed set of conceptions and opinions by different actors. Scientists, politicians, NGOs, pollution inspectors, and many other actors went to the fore to present and defend their own positions in this problem. Despite this rather confusing way of thinking about a specific problem such as acid rain, at some point a sort of basic understanding was reached and a particular definition of the policy problem emerged.

It is in this context of search for a consensual construction of what will be the environmental problem to be solved with a particular policy that Hajer locates the second characteristic of the policy-making process in modern societies. The process that he calls “problem closure” works also as the aforementioned suppresser of latent social conflicts. The discursive process of defining problems and solutions allow to the institutions of modern society to channel the potential sources of social eruption, without using force or manipulation.

In modern societies the process of regulation, according to Hajer, carry out three tasks: the first has to do with what he calls “discursive closure” which means to suggest certain definitions of problems to give the policy-making proper target. The second is to find ways to contain social conflicts and the third task is that regulation has to provide a “problem closure”, that means to offer a remedy to what was defined as a problem. A very important clarification made by Hajer regarding these tasks of regulation is that they do not necessarily have a mutually supportive character. In some occasion one task can contradict to another one. For example, technical solutions insensitive to common-sense social construction of a problem could result in a regulatory failure. It is also possible that a solution based in a consensual social construction could aggravate a problem in spite of achieving a great social support.
In the context of a disputed scenario of contested truths, the art of regulation is viewed by Hajer as consisting of finding ways to secure credibility, make measures acceptable and to generate trust for the institutions with the role of finding solutions to environmental problems. Discourse is considered here as the strategy used by both the policy-makers and their critics because Hajer views all the process of definition of problems and solutions as taking place in the terrain of historical references, symbols and metaphors.

Hajer's discourse analysis has an institutional dimension. What are important is not only what is being said, but also where things are being said, and how some ways of seeing are structured by society and simultaneously participate in the structuring of society. Discourses are not only viewed as social constraints for action, but also as instruments to recreate society. The crucial aspect of discourse analysis is related to the constitutive role that Hajer gives to discursive argumentation and discursive coalition in the process not just of implementing policies but also of transforming society. To him, discourse can be defined as:

A specific ensemble of ideas, concepts, and categorisations that is produced, reproduced and transformed in a particular set of practices and through which meaning is given to physical and social realities. (Hajer, 1995: 264).

The regulatory function of government environmental institutions is dependent on the discursive construction of problems. It is not the physical crisis of environment that provokes social change, nor the destruction of certain valued social assets, but the creation of some images, identifiable emblems that allow people from different positions and perspectives to share a common image of what can be considered as a problem. These emblems permit the creation of discursive coalitions that make it possible to construct a dominant vision of what the problems are. In the discursive process the meaning and the importance of some problems are susceptible to change, and the positions and interest of people can also be transformed.

Government policies appear in Hajer's perspective as a socially accepted set of measures to deal with what has previously been defined as the problem. But what can be considered as a factual reality or as an objective problem is rather the subjective result of social interaction. These sets of facts are not the same as those empirically defined as the physical facts associated with environment; instead they emerge as socially constructed.
This theoretical position denies the determinant character given by the Marxian tradition to material and economic factors in the definition of interest. Social constructs, as Hajer conceives them, are not the result of the interests of a group of actors. Language, considered as an integral part of reality, appears as communicative practice that has crucial influence in the definition of interests and preferences. There is no possibility, in this interpretation, to think of interests as something given, but as the result of subjective discursive interaction, and from this point of view, as subject to negotiation and change. For this reason, Hajer argues that some political and environmental discourses can modify people perceptions and interests. The key role played by discourse in the political change depends on the assumption that, operating in the context of given institutional practices, discursive interaction is a social constitutive factor that change cognitive patterns and generates new ways of seeing and of positioning in the political arena. Politics from this perspective is considered as a “struggle for discursive hegemony” that takes place in a specific set of social practices. And it also implies a mobilisation in search of support for some claims of reality.

Finally, it is important to emphasise Hajer's ideas regarding the way in which knowledge on environmental problems are constructed through a bargaining process in which different claims of truths are presented in the public domain to get public support. The knowledge that is used in decision-making is produced by a continuous struggle for discourse hegemony. What he calls reflexive institutional arrangements to deal with environmental problems can not be thought of as institutional bodies working with pre-conceived problem definitions. He argues that:

"politics is a process of the creation of discursive-coalition based on a shared definition of reality....This implies, first of all, that if one seeks to design reflexive institutional arrangements one should take into consideration the socio-cognitive basis of discourse coalitions. (Hajer, 1995: 287)"

Analysing two case studies, Matthew Crenson (1974) provides another perspective to analyse a concrete policy-making process, emphasising the specific way in which the air pollution policies were designed, as a result of the interplay of social, ideological and political forces. What Crenson is interested in discovering is the social mechanism that explains the emergence and concealment of air pollution from the public arena. He asks a very simple question. Why is there no agreement
between the size of an environmental problem and the degree of public alarm? It is necessary, according to Crenson, for a social scientist to ask why certain problems that should be a matter of concern are not. If a social scientist fails to ask this question, a complete area of social inquiry is neglected. Yet this is a crucial area of analysis. Crenson holds that people with different opinions concerning the value of human life might arrive at different conclusions. There are social and political factors that explain the increase, decrease or disappearance of awareness of a real problem such as air pollution. For this author, government neglect of a problem such as air pollution cannot be thought of as normal, natural or justifiable, but as an object of analytical concern. His criticism is directed at both the dominant pluralist approach and community perception of problems. With respect to the former, he criticises the idea that the only problems of concern for political analysis are those that are clearly represented in the political sphere. According to the pluralist analysis that Crenson criticises, in an open and democratic system, all the real problems faced by a community can be brought to the fore through the existing channels provided by the democratic structure. If a problem fails to appear in the public arena, it is because is unimportant. The only thing an analyst has to do is to analyse problems that are present in the political scenario. According to Crenson, the pluralist approach assumes that the American social system does not produce non-issues. With respect to the latter, Crenson holds that it is necessary to uncover the factors behind a community perception that fails to react in accordance with the true dimension of an environmental problem.

Crenson opens up a very important area of analytical concern: decisions that are never made. In his view, the kinds of demands that rise to prominence are partly determined by politics itself. For Crenson, political systems may be 'impenetrable' for certain issues. For example, when a group of local policyholders acts directly or indirectly to suppress an embryonic political issue, the problem then appears not to exist. The methodological principle guiding Crenson’s proposal is that researchers should not restrict their analysis to political activists and their actions, but must also analyse the power of obstruction of ‘non-decision makers’, in other words, people whose political power consists of their ability to prevent the consideration of certain types of issues. The reason for this approach is that Crenson’s analysis of political activities in key issues has shown that political and economic forces can act to
prevent certain issues from reaching the public scene, meaning that these are eventually concealed from the analytical probing of researchers (Crenson, 1974).

According to Crenson, the presence of this power at the community level to prevent a problem from becoming an issue is not surprising. He sees nothing unusual in the fact that a community should find ways of restricting its political attention and energies to a handful of issues if it is not to be overwhelmed by demands on its attention. He quotes Schattschneider who suggests that some institutions promote bias in the selection of political issues as a way of managing conflict. He maintains that it is the only way a regime can survive (Crenson, 1974).

Crenson carried out a study on air policies on two twin cities in the United States: Gary and East Chicago. Using the methodological principles already mentioned, he reveals the social, economic, political and ideological factors that prevented the town of Gary from implementing a stricter air pollution policy and those which enabled East Chicago to do so, given that both cities had the same air pollution problem.

In Gary, the presence of a large steel company, the dominance of a single political party, the lack of a diverse productive plant and the reputation of power inherent in the steel company, were decisive factors that helped prevent the air pollution issue from being brought to the political scene as an important civic claim. The steel company did not have always to exert direct pressure on the local political institution to defend its interests, since many other people took it upon themselves to do so. No-one wished to prevent the company from providing jobs and prosperity for the community.

East Chicago was not economically dependent on a single large company, nor was it dominated by a single political party and its occupational structure was fairly diverse. Air pollution problems had more opportunities of becoming an issue. This city could promote a more aggressive air pollution policy earlier. In either case, social, economic and political features determined the presence or otherwise of an air pollution policy. The severity of the air pollution problem was not the main factor behind the emergence of air pollution as a political issue. Although both cities had the same level of air pollution, their economic, social and political characteristics were different, meaning that air pollution was treated differently.

It is in the context of the ideas discussed above on the social construction of environmental problems that this investigation is located. Those ideas frame the two
guiding hypothesis of this research. Mexico City's air pollution problem, that is the object of analysis of this investigation, can be analysed from a double perspective. First, as a socially constructed problem. Second, as a policy making process that is carried out in the context of a very disputed social and political arena.

Regarding the first perspective, the authors reviewed in this chapter give account of a social dimension of environmental problems that is separated from its physical level of existence. This social dimension is produced in the process of different social practices that are taking place in modern society. These practices have made possible the emergence of environmental problems as a matter of reflection and of public concern. According to these authors, consciousness and protest are not directly dependent on the damage infringed on nature and on its consequences for human quality of life. All of the authors analysed in the last sections of this chapter agree with three basic ideas: first, that consciousness and protest on environmental threats are not a direct expression of a real, objective, physical problem; second, that they are the result of all the social and cultural factors involved in subjective human interaction, and third, that those environmental problems that emerge in the public arena, are not necessarily the most important problems, in terms of their danger.

There is a social construction of environmental problems, and there is a process of selection of what can be considered as risky and safe. That process takes place in a symbolically constructed world, and is carried out by means of symbols, language, words, and discourses. Ideological factors and political forces are mobilised and displayed in this constructed world made possible by human interaction.

Regarding the second perspective, a discursive process of problem creation takes place in the environmental arena. Problems are discursively and politically constructed to match with a set of policies and with the consensual paradigm dominant in a certain period. Actors agree or disagree during the process of political bargaining. It is as the result of such a process that some perspectives or discursive coalitions are integrated to constitute what is socially recognised as the environmental problems of concern.

It is not the logic of scientific knowledge that dominates in the policy-making process, but that of political and ideological negotiation around some meanings, perceptions, hopes, fantasies and interests. As Beck (1992) points out, rather than being based on objectives scientific foundations, decisions are taken
guided by moral and political principles. This does not mean that science is irrelevant in the policy making process. What it means is that scientific findings have to be considered, as a relative body of truths and public attitudes toward science have to change from faith to doubt and criticism. In a terrain dominated by contradictory and ambivalent scientific findings, it is not possible to base government intervention in a non-existent body of irrefutable truths. It is not only environmental claims that are contested but also the available knowledge on crucial environmental area of problems. Many decisions have to be taken in a scenario where uncertainties play an important role.

The research reported here assumes this social construction character of environmental problems and this debated ideological and political scenario where the policy-making process takes place. The two main hypothesis of the research, regarding both the lack of a social dimension in Mexico City's air pollution government programmes and the existence of a social construction of air pollution problem among different actors in Mexico City, are theoretically framed in the aforementioned sociological interpretation of environmental problems.
4. Ideology and society

4.1 General aspects

Ideology has been thought of as the result of a historical process. It was part of a social and historical process of change begun as a result of the disintegration of the feudal system. Before modern society, the subject of ideology was never discussed. In this respect, it is possible to regard it as one of the many signs heralding the advent of modern society. Likewise, the problem, which later led to the current notion of ideology, was an expression of the political and philosophical confrontation between the New World and the outlook, agents and institutions of the feudal world. As part of the confrontation between these worlds, the "philosophers" of the emerging modern society undertook the task of demolishing the very philosophical and moral basis of the old society by proving that there was another way of dealing with the world different from that recognised by feudal institutions. This method was very closely linked to an emergent idea of describing the world not as it should be but as it really was, in other words, what Habermas (1985) qualifies as knowing the world in its internal structures which marks the emergence of the principle of reason in the modern world. This is the same change in the historical process of knowledge described by Giddens as the transition from tradition to modernity. According to this author, in the modern era, knowledge, even scientific knowledge, is not a source of consensus but of disagreement and dispute because the written text allows multiple interpretations (Giddens, 1990). In fact this is what the founding fathers of the Marxist tradition meant when they stated that scientific, as opposed to philosophical and religious knowledge, analysed the world as facts rather than as pre-conceptions or religious prejudices (Engels, 1955a).

However finding out about the world in a rational way, was not only part of a scientific project but also part of an ideological and political one since knowledge and science were portrayed as a means of achieving happiness (Minogue, 1988). This moral recourse to ideology was accompanied by an ethical appeal to a form of cognitive hygiene (Minogue, 1988) to free men from the ideological chains which were seen as the real causes of human oppression. This is the reason why the initial conceptualisation of ideology sought to emphasise two main aspects of the ideological problem: one was to combat the ideas which threatened human beings because of the fear of living in a distorted world, promoted by the Church which strove to support the feudal order;
another was to oppose the ideas which prevented people from knowing about the world as it actually operated (Marcuse, 1972). Overcoming this means of constructing and experiencing the world would only be possible as a result of agents and instruments committed to a different world, a different historical project, and with different interests and perspectives (Gouldner, 1973). These agents and instruments sprang up in the sixteenth and seventeenth century as a result of the various changes operating in people’s material lives and are associated with the consolidation of the bourgeoisie as a political, economic and social group and with a more rational and instrumental relationship with a world governed by science and technology (Nisbet, 1966; Zeitling, 1970).

Having emerged as one of the mechanisms which permitted the spread of the social, political and philosophical principles of modern society, the notion of ideology in the Marxist tradition retained part of the meaning it had had in the enlightenment tradition while incorporating different meanings and aims (Zeitling, 1970). In Marx’s view, ideology was clearly identified as part of the bourgeois modus operandi for maintaining and reproducing the social order. According to Marx and Engels, the difference between the recourse to ideology by the bourgeoisie in the feudal context and that of bourgeois society is that in the former, it was an instrument for liberating itself as a class while at the same time, it liberated the forces propelling history toward modernity, while in the latter, ideology appears as a mechanism for concealing the irrational means of social reproduction in modern society (Marx 1955a, 1955b; Engels 1955a).

In its classical formulation, the Marxian notion of ideology has been highly criticised. Among the main crucial aspects of the critique to this conception of ideology are the following: a) The reduction of ideology to a consequence of material factors, such as economy; b) The reduction of ideology to relations of power; c) the elimination of the constitutive role played by ideology since it is confined to the realm of superstructure; d) the empiricist and naturalistic conception of reality involved in Marxian notion of ideology; e) the idea that only scientific relation with nature result in trust knowledge.

It is not possible to embark in the different implications of those critical aspects of the concept of ideology. However some delimitation has to be done to clarify the notion of ideology being used in this research. First, the concept of ideology in this report will be understood in three specific meanings. a) One of these uses has to do with
ideology as a set of ideas, institutions and practices whose main purpose is to constitute a social system; b) another notion of ideology is also used to describe a set of social ideas and institutions that overlaps with its constitutive role, expressing relations of power; c) finally, another aspect explored under the concept of ideology is related to knowledge; according to this dimension, the concept of ideology gives account of the condition of the production of scientific and non-scientific knowledge as socially produced. The aspects of the notion of ideology emphasised in these three definitions are not constrained to the Marxian orthodox concept. Ideology in this research is a wider concept and involves different areas of human subjectivity, not only those related to economic life. It is in this sense that the authors supporting this more comprehensive notion of ideology reflect on it, as a very important and active factor of social life.

Second, ideology will be mainly discussed here as the discursive component of social life. From this perspective, it will be considered as both constitutive and constituted factors of social life. Constitutive because symbols transmitted by ideology are part of the definition of a society in terms of values, beliefs, hope, fears and fantasies. Constituted because ideology is also the result of social practices. Beliefs and different ways of relating with the world are dependent on the social and cultural relations in which people are engaged.

Third, the theoretical assumption of the social construction of environmental problems makes it necessary to give a more active role to the notion of ideology in the structuring of society. From this perspective, the mechanical and more orthodox way of seeing ideology in the Marxian tradition can not completely grasp the idea of a socially constituted world. Many aspects of what has been defined as pertaining to the realm of ideology in the orthodox conception, are in this research being considered as a very active component of social life. Ideology, in this sense, makes social life possible not just as passive social cement but also as an active meaning producing activity. It is in this context that environmental problems are considered as socially produced. In this research, ideology, as a general system of ideas, is a constitutive factor of society.

Fourth, ideology considered as a constitutive factor, has to do with social practices. Systems of beliefs, attitudes towards life and nature, such as those emerging from modern bourgeois society, have been considered as crucial to the development of any society. For instance, Weberian assumptions on social developments consider that the spirit of Protestantism was one of the key factors in the emergence and consolidation of industrial society. They are some ways of dealing with the world that
are provoked by certain beliefs. From this point of view, ideology works as a causal factor rather than simply mirroring reality.

Fifth, the empiricism and naturalism that Eder finds in the orthodox Marxian notion of ideology, rests on the assumption that Marx conceives his idea of false consciousness assuming that it is the manifestation of reality what deceives people and that individuals are at the mercy of the false world. Eder goes further affirming that understanding does not follow from experience, but organises it. From this perspective, Eder thinks that Marx' notion of ideology is naturalist because natural facts determine people's consciousness and it is also empiricist because of the causal factor attributed to experience. The chapter on the Method of the political economy in the Marx' contribution to the critical to the political economy is just the opposite to what Eder misunderstand as the naturalism and empiricism in Marx' notion of ideology. However, this research will not argument around this issue and will be constrained to the three notions of ideology as will be exposed in the following pages.

Sixth, it is assumed here, that scientific knowledge is not the only way of producing knowledge, in fact all the dimensions of the cognitive relationship between nature and society can be defined as a knowledge-producing activity. But, being scientific does not mean being irrefutable. Science is a very contested activity. Today, scientific findings are contradictory, ambivalent and controversial.

4.2. Ideology as a way of constituting society

When a particular society is analysed, its system of ideas (i.e. that part of conscious life which constitutes people's means of social communication) emerges as the abstract and symbolic expression of the way society works, not only within one of its spheres of reproduction, such as the economic one, as the orthodox Marxian tradition thought, but within the different spheres of human society. Among the set of ideas generated by social life in general, there is one set of ideas clearly (at least from an analytical perspective) delimited by its relation to the reproduction of the class system and the system of domination that a class or group of classes uses to reproduce the social relations which make it possible. However, there are different sets of ideas
derived from other aspects of human subjectivity, not related to the economic sphere, which determines the class structure but to the different projects and spheres of social life in which, as Touraine (1987) notes, men are forced to live. In some of their works, Marx and Engels gave this wider meaning to the concept of ideology (Marx 1955a; Engels 1955a): this definition of ideology can be regarded as the general system of ideas of any society.

From this perspective, ideology is a way of feeling, thinking of, experiencing and communicating people's existence in the world as human beings. This general definition of the concept of ideology interprets the notion of people's material life in society in a very broad sense and avoids reducing it to economic relations; in this context, material life includes any social practice which generates meanings to make a particular significant system of exchange possible, one which may eventually become a source of conflict. For Marx, material life comprises the social conditions of human existence. It is in this sense that he states that social existence determines social consciousness; in other words, the production of material life determines the production of the social ideas (Marx, 1970). Despite in many occasions Marx reduces his notion of material life to the concept of relations of production; the former mainly refers to a set of social practices where people interact among them. From this point of view, Eder's (1996) critique is only right when he equates naturalism with production, and this with the meaning he gives to the concept of exchange value. Ideology, as a general system of ideas, makes social life possible because it constitutes a sort of glue (Althusser, 1971) that binds the various members of a society together. The world of ideology is the only social world in which people live. This is the product of the representations, symbols and codes that emerge from people's material life. But this realm of the ideological world is in some sense also assumed by the Marxist tradition in its active role, as provoking social change, (Marx, 1968). This aspect of ideology is linked to Berger and Luckman's (1967) idea of the social construction of reality in the sense that for these authors, the ideas, which constitute reality, depend on the social characteristics of each society. There is a contradictory social process, which determines the construction of reality, through which people accept and experience this reality in the same contradictory way as the normal way of life. There are no general social facts but rather ones that are socially constructed in a specific way by each society. What is appropriate for one society might not be appropriate for another, since each has its own set of values and perspectives on life according to which social facts and social behaviours in general
acquire significance. This socially constructed set of ideas on life shared by people at a communitarian level is what integrates ideology as a general system of ideas.

In this context, the concept of ideology will be understood as the set of ideas, which express the various spheres of human subjectivity (Therborn, 1980; Thompson, 1990). On the one hand, these ideas express the feelings, hopes and wishes of the people. On the other hand, they are the abstract result of a relationship of knowledge between men and nature. Knowledge includes not only scientific knowledge, but all kinds of practical approaches to a world which implies a specific understanding of the way in which it works to improve human life or to make it possible. From this point of view, a society's system of ideas comprises all of the ideas embraced by mythology and religion and manifested in everyday life, and those ideas resulting from a spontaneous blend of common sense and more rational knowledge, as they are internalised in everyday experience.

Social life is made possible by these ideas produced by practical life since they constitute the possibility of linking people and allowing them to think as a whole; from this perspective, ideology works as a social glue, but this idea of social glue does not imply lack of conflict since, in the very logic of the modern life, as many authors (Giddens, 1984; Touraine, 1985) have pointed out, conflict is always present in the various spheres of society. The general system of ideas contains the elements which make society a set of symbols, meanings and institutions; from this point of view, this is the main aspect in the constitution of a society, since the exchange of meanings for symbols is a key element in all kind of exchanges involved in creating a society. Moreover, this system of ideas lends significance to material life by creating a spiritual meaning for human and social life; the creation of meaning in social life can be overlapped by the system of domination existing in society but it is not merely restricted to this aspect. From a different sociological tradition, Merton (1984a) refers to this general system of ideas that constitutes a society when he emphasises the role of rituals and beliefs in making a group of individuals feel and behave as a social group.

Exploring this dimension of ideology as a general system of ideas comprising various aspects of people’s social life, Therborn (1980) has portrayed the broad nature and scope of human subjectivity as a product of ideological processes. Therborn regards the space of human subjectivity, described by this general notion of ideology, as the meaningful social context that allows people to perform roles and social functions. This is an important conceptual framework for the purposes of this research, since these
ideas on the constitution and function of human subjectivity are the scenario within which social actors perceive and construct social problems such as air pollution. For this author, the importance of ideology in social life is due to the fact that it:

Involves the constitution and patterning of how human beings live their lives as conscious, reflecting initiators of acts in a structural, meaningful world (Therborn, 1980: 15).

The human subjectivity constituted by ideology apparently finds it extremely difficult to grasp the vast universe. However, Therborn proposes a means of classifying this universe of ideological influence by distinguishing two dimensions of "man's being in the world" as a conscious person. He sets these dimensions on two axes. The first refers to "being"; the second to "in the world". Being a human subject can denote an existential character, namely, being a sexual individual at a particular point in the life cycle; but it also implies being a historical character since people live in a particular society, at a particular moment in human history. On the other hand, the second dimension of human ideological influence denoted by the condition of being in the world, constitutes an inclusive situation because people live and belong to a meaningful world and it also implies a positional condition because people occupy a "particular place in the world in relation to other members of it." From this point of view people have a specific gender, age, occupation, ethnicity, etc. The combination of these different types of ideological influence on the constitution of human subjectivity tries to embrace the manifestations of ideology not only from an economic perspective but also from the different angles of human action. From this point of view, ideology appears as the expression of human life in such dimensions as the deepest human feelings associated with death, the suffering expressed in religion and mythology; people's feeling of belonging to a tribe, village or nation; the differences created by gender or the simple distinction between the idea of self and others; and the ideological expression of being a member of a family, ethnic group or social class.

The importance of taking Therborn's notion of ideology into account stems from the fact that he posits some of the dimensions of ideology with which this research is concerned, to analyse environmental problems as ideologically and politically constructed. The way people perceive and construct their environmental problems is related to the different spheres of human subjectivity in which they live.
When an agency, such as the industrial sector, academia, environmental groups, political parties, etc., presents a particular perspective and an appreciation of the environmental problems in a given social context, it is acting out a discursive order in which, as Therborn states, a set of ideological preconditions has been established. This set includes the more or less clear definition of what exists, in the sense of who we are, what the world is, what nature, society, men and women are like, as well as what is good, right, just, beautiful, etc., and also establishes what is possible and impossible. In environmental terms, the ideas of risk, pollution, health and illness are embedded in the system of values of a particular society; such values express the “feelings” of a society. They indicate what measures society is prepared to take to ensure its well-being, what sort of goods have to be included in the satisfaction of its basic needs and what level it wants to achieve vis-à-vis these components of its well-being. In terms of environmental quality, a society only goes as far as its system of values defines as being environmentally and socially meaningful (Douglas and Wildavsky, 1982; Douglas, 1992). When a particular order of discourse is constructed as a consequence of struggles waged by different kinds of social forces, it often, as part of its maintenance, determines in an institutionalised fashion who may speak, how much may be said, what may be talked about and on what occasion; in this context:

the existing order of ideologically constituted subjectivity implies that, in a given situation, only persons of a certain age, sex, knowledge, social position and so on are allowed to speak about a set range of topics for a set length of time (Therborn, 1980: 83-84).

However, when dealing with the ideological contents of social life, it is possible to distinguish several levels of ideological influence. As was analysed earlier in the works of Douglas and Wildavsky, the selection of risks can be seen as a mechanism for individuals and groups to become a society. From this perspective, ideology operates, at a general level, as a means of organising the dangers that a society wishes to confront according to the particular way of life predominant in that society. For these authors, the elevation of ideology is a decisive factor in lending order to the entire social universe. Yet when a society selects some risks and averts others, apart from ranking its problems and priorities, society is constituted itself as such. Ideology from this point of view is not a choice or something to be discarded but an integral part of social life and the only way to integrate a human community. Ideology, in the different aspects which have been defined above, helps to explain this mechanism for creating social consensus and
sheds light on the higher level of social agreement as a result of which society not only chooses the kind of issues it is willing to worry about, but also decides how to lend sense and order to social life.

In this research, all of these aspects of ideology as a mechanism for integrating a society are crucial to an understanding of the way people conceive, feel and construct environmental problems. This social construction, as it appears in this dimension of the notion of ideology, is an important aspect to be considered in the design of public policies.

4.3. Ideology as a means of domination

The notion of ideology as a mechanism of domination assumes that the general system of ideas that makes social life possible is not neutral and that meaning is not a spontaneous means of seeing the world, but a mobilised meaning resulting from social forces, interest groups and dominant classes. Within this context, Thompson (1990) suggests that ideology serves to establish and systematically sustain asymmetric relations of power. For Thompson what confers specificity and separates ideology from the circulation of symbolic forms in general is the fact that it serves the purposes of domination by individuals or groups over the rest of society. Thompson suggests restricting the sphere of application of the concept of ideology to those situations in which the meaning mobilised in symbolic forms serves to establish and sustain relations of power and focus analytical attention on an inter-subjective space in which meaning intersects with power in certain ways.

Ideology as a mechanism of domination is regarded as such because, according to the Marxist tradition (Marx, 1955a; Marx and Engels, 1973), the social capitalist order is irrational. It is forced to conceal or distort reality inasmuch as the way this reality operates is contradictory, irrational and oppressive since it is the expression of particular interests depicted as being in people's general interest or advantageous, necessary or unavoidable for most of society. Some authors explain that the distorted knowledge generated by ideological approaches is not the result of a will to misrepresent reality but the reflection of distorting factors operating within the most profound mechanisms of social reproduction in capitalist society. From this perspective Larrain affirms:

_A real inversion at the level of essence is responsible for the inversion at the level of appearances (Larrain, 1979: 57)._
This set of ideas, which is derived from society's contradictory modus operandi, is not the result of a deliberate attempt to conceal, distort or lie but the manifestation of the contradictory modus operandi of social relations which permeate society as a whole. It is important to emphasise here that this distortion of reality is not intentional, at least there are not necessarily individuals or groups consciously working towards this.

The relationship between reality and ideology becomes crucial in this aspect. It is important just to mention that Eder's culturalistic critique of what he assumed to be a Marxian naturalistic approach, consist in reducing reality to a static condition. The Marxian assumption of the determination of consciousness from material life assumes that material life, what constitutes reality, is a socially produced reality, made by the same social beings that are determined by it. The central argument of Marx consists in explaining that capitalist society makes possible the creation of an artificial world of social relations that, in the form of machines and capital, dominate its own creators.

Other authors agree with this role of ideology as a mechanism of domination, but suggest that this domination is not only due to economic factors. Therborn (1980) and Thompson (1990) point out that ideology not only reflects a class perspective but also the different kinds of domination in which meaning is mobilised, such as the relation between the sexes, ethnic groups, individuals and the state and so on, and the various zones of conflict generated by the diverse and, in some cases, opposing perspectives and interests that people have as a result of occupying a different niche in society. Therborn suggests, however, that in a class-based society, the class struggle and the class perspective, to a certain extent, have an important influence on the shape of other conflicts and systems of domination. Indeed, Marx and Engels held that it is only in the last resort that economic forces and the class structure become the determinant factors in the shaping of all social institutions because, in specific circumstances, every system of domination has a particular margin of autonomy and, on many occasions, these non economic systems are the real scenario in which problems are solved. Engels explains this as follows:

According to the materialist conception of history, the factor that in the last instance determines history is the production and reproduction of real life. Neither Marx nor myself have ever affirmed more than this. If somebody misrepresents it saying that the economic factor is the only one, they will transform that thesis into a vacuous, abstract and absurd phrase. The economic situation is the basis but the various factors of the superstructure – the political forms of class struggle, the juridical forms,
and even the reflections of all these real struggles in the brain of the participants, the political, juridical and philosophical theories, religious ideas and their further evolution to become a system of dogmas—also exert their influence over the course of history and in some cases determine their shape (Engels 1955b, 490).

The difference between ideology as a constitutive general system of ideas and ideology as a mechanism of domination can be summarised as follows: the former implies the mobilisation of meaning to sustain relations between individuals and groups since it constitutes the only world to live in; ideology in this sense is integrated by all the symbolic products of social life that make possible the constitution of a meaningful world to live in, whereas the latter appears when, at a certain level, this mobilisation overlaps with relations of power, and is able to create, institute and maintain relations of domination. Both aspects of the notion of ideology have the ability to mobilise meaning to create reality, but while the former works at the more general level of creating a minimum consensus for establishing a society, the latter uses this consensus to implement a system of domination.

Moreover, according to Therborn (1980), ideology should not be regarded as either a static, defined body of thought or as an elaborated, solidified text to be acted out or rejected but rather as an ongoing social process which constantly constitutes and reconstitutes who people are. However, this is a process that affects the unlimited number of subjects who constitute human subjectivity. Since ideology interpellates human beings in the different areas of their subjectivity, ideological discourse can differ, compete and clash:

not only in what they say about the world people inhabit, but also in telling them who they are, in the kind of subject they interpellate. And these different interpellations of what exists are usually connected with interpellations of what is right and what is possible for such a subject (Therborn, 1980: 78).

This is one of the reasons why, when analysing the ideological character of social action to discover the real system of domination behind an ideological discourse, it is necessary to analyse each particular situation since reality is constantly changing and what is real in one particular social and historical context cannot be real in another one.

To a certain extent, this distinction between ideology as a general system of ideas and the notion of ideology as a means of reproducing a system of domination, is somewhat similar to the distinction made by Eyerman (1981) between false consciousness and ideology. The former refers to the diffuse and fragmented mental
state of individual consciousness produced by the various practices in which people are engaged in all their life activities. The latter concerns the set of socially produced ideas and systematised justifications:

which are associated with the production of ideas or knowledge and offered to explain experience and thus to legitimate (Eyerman, 1981: 306).

4.4. Ideology as a means of knowing the world

The Marxian tradition has an ambivalent position regarding the production of knowledge, its role in social life and the relationship between scientific and ordinary knowledge. All the discussion in this tradition has consisted in distinguishing both ways of the cognitive relation with the world, assuming that the scientific way is a more effective way of knowing the world and of controlling nature. Eder's (1996) critique of this interpretation consists in giving a central role to the cognitive relationship between nature and society, and thinking that non scientific ways of relating and knowing the world have been crucial to the social development of humanity.

In the Marxian tradition, scientific knowledge has played the central role in the development of productive forces and in making social development possible. Even those social thinkers who developed the theory called sociology of knowledge participate of this dualistic conception of knowledge, in spite of considering both ways cognitive relations as socially produced.

According with this theory, common sense knowledge has to do with the learning process generated by the practical and utilitarian life experienced by people on an everyday basis. This knowledge is not systematised, nor is it ruled by the logic of science but rather by the demands of practical life. The importance of this kind of knowledge is the way it solves the problems people face in their everyday lives. This knowledge is a mixture of beliefs, assumptions, scientific truths, mass media information, religious beliefs and cultural values. Knowledge, from this perspective, is closely linked to social values. Values constitute a means of seeing and thinking about reality and for that reason knowledge appears to be socially constructed. This kind of knowledge can be related, to a certain extent, to the orthodox Marxist notion of ideology as a false consciousness. In his letter to Mehring, Engels defined this notion in the following way:
Ideology is a process that is operated by the so-called thinker consciously, sure enough, but with a false consciousness. He is unaware of the real driving forces that move him; otherwise it would not be an ideological process. (Engels, 1955d: 499).

Yet knowledge is also the result of a scientific process whose aim is to grasp the internal structure of reality. In this respect, the notion of ideology has been used to denote the kind of knowledge that results from a failure to grasp reality due to conscious or unconscious factors. Ideology is seen from this dimension as opposed to science. From the point of view of the sociology of knowledge, even scientific knowledge is the result of a social construction. This discipline does not deny the possibility of having an objective, but sees it as relational, changing and influenced by the social and historical order.

The sociology of knowledge created by the German sociologist Karl Mannheim is not regarded as relativism but as a form of relationism that seeks to relate knowledge to social circumstances as influential factors in the process of knowing about the world. In this author’s view, social problems can be analysed as the result of different perspectives or opinions. These differences in the perception and understanding of problems are related to the social conditions in which people live (Mannheim, 1973). Mannheim’s ideas on the relationship between reality and knowledge are derived from the Marxist notion of ideology involving the relationship between infrastructure and superstructure (Marx, 1970). According to this perspective, changes in the infrastructure of any society cause changes in the superstructure. This can be understood in the sense that changes in material life lead to changes in the ideas men have about their problems.

When it appears in the consciousness of men that the prevailing conditions are irrational and unfair, that reason has become unreason, and that blessing has become plague, these are merely signals that transformations that disagree with the social order have silently occurred in the production methods and in forms of change. This implies that the new relations of production also contain the means of solving emerging problems (Engels, 1955c: 134).

It is important to mention the way Mannheim has understood the subjective nature of the process of knowing the world, together with the social factors that influence the knowledge produced in that process. In this author’s view, the process of knowledge begins with the individual, but this individual does not face the process of knowledge as an autonomous individual but as person who belongs to a social group by which he is socialised and determined: the individual in Mannheim’s work is a social being, he is the embodiment of society.
Mannheim understands knowledge as a co-operative process. The social group experiences problems, whereas the solution of common problems by members of the group makes each individual participate in the act of knowing those problems and solving them. In a larger, class-divided society, dominant and dominated groups face different problems and perceive these problems and their own reality in a different way from dominant groups (Mannheim, 1973).

Mannheim’s sociology of knowledge does not hold that all kinds of knowledge are relative but rather relational to social conditions. This relational character of knowledge means that some assertions can only be formulated in relation to the social determination of the subject. Mannheim establishes a relational perspective on knowledge, which means that the cognitive relationship is not passive but active, and that all kinds of scientific truth are not static and eternal but dynamic and historical. Mannheim, and this is important for the purposes of this research, believes that both the subject and the cognitive process are socially determined and the product of knowledge activity has to be thought of as a process.

Adam Schaff provides further elements for reaffirming the social construction of knowledge. To him, the cognoscente subject is made up of his social relations. On the one hand, the perception of the world and the way people distinguish some of its elements and discard others are related to language and to the conceptual apparatus provided by society. On the other hand, individual and group judgements are conditioned by values, and values are class-based. In this context Schaff states that:

The cognoscente subject is neither a mirror nor an apparatus that passively registers the sensations coming from the world. He is the agent who controls the apparatus and the process; it he is who guides and rules it and transforms the data derived from reality (Schaff, 1974:94).

To this author, in the cognitive process, the subject takes a picture of reality by means of a socially produced apparatus, and transforms the information he receives using the conceptual framework provided by his social determinants. Yet, when Schaff speaks of the social factors that determine knowledge, he includes language, class situation, interests and conscious and unconscious motivations and the social practices of individuals. The world of subjective influence taken into account by Schaff includes all the various dimensions of social life.

Finally, Eder thinks of the process of knowledge as one of the fundamental aspects of the relationship between nature and society. The crucial difference in Eder's
approach to knowledge is that it represents a constitutive factor of reality. This understanding of knowledge, that means a cultural construction of reality, gives to the cognitive relationship between nature and society an active role in the creation of social life and, from that perspective, it would be different from an orthodox Marxian conception of ideology and knowledge, which thinks of ideology as part of the superstructure of a society and, as a consequence, as a dependant variable. Eder affirms that a natural division of people results from the transformation of knowledge about nature. According to him it is the division of activities what determines interaction with nature. He distinguishes three constitutive stages in the cognitive relationship between nature and society. The first one is what he calls the organic state of nature which:

Is characterised by the invention of a type of interaction with nature which is distinguished from the activity of the farmer by its shaping and forming character: nature is transformed into something different in the hands of the craftsman. The production of metal objects makes a second nature of nature. Eder, 1996: 21).

The second stage is the mechanical state of nature:

In the mechanical state of nature, nature is not only transformed; it is recombined. The steam engine is the symbol of this new relationship with nature. Nature can be formed and transformed by the constructive will of those who employ it. (Eder, 1996: 22).

The third stage that corresponds to modern society is the cybernetic state of nature. This new stage of the natural division of labour is triggered by the increasing domination of knowledge of nature by science. Eder affirms that this happened when:


From Eder's perspective, nature appears as the result of human practice and the cognitive process of the relationship between nature and society allows society to appropriate nature. This is what he calls the material appropriation of nature. But, according to him, this appropriation can not be reduced to a relation of exploitation of nature, but has to be explained as a constructive process of learning. Nature is not considered as an objective constraint to human action and society is not anymore
viewed as an attempt to break up this objective control; nature appears instead as socially constructed by means of this interactive process of knowledge. This research will adopt some of Eder’s corrections to the Marxian notion of ideology, regarding the production of knowledge, as an important contribution to understanding the active role of ideology and of the cognitive process in the social construction of nature and of environmental problems.

5. Final note on ideology and the social constructionist perspective

The social constructionist approach, particularly the corrections made by Eder, Hajer, Macnaghten and Urry disagree with the orthodox Marxian definition of ideology. There are several aspects in which these differences are more apparent:

First, the cultural and symbolic world in the social constructionist perspective is not allegorical, but constitutive of social relations and of social facts. It has to do with very deep human feelings and ways of interacting among people and between people and nature. Ideology on the other hand appears in the classical interpretation as a body of ideas, feelings, beliefs and institutions that are the result of social life. They are determined by the material life of people, which means by social practices, mainly by relations of production. At some point, ideology becomes a libertarian set of ideas that makes change possible. But it is only when some combination of economic and political factors coincide that ideology shifts from being the support of the status quo to a source of change and social constitution, otherwise, ideology will be the mirror of something else.

Second, ideology would be understood in the social constructionist approach, particularly in Eder’s corrections, as a crucial factor in the social constitution of reality by knowledge. It is the evolution of the cognitive relation between nature and society that allows the material appropriation of nature by humans and that explains a fundamental part of social development. The orthodox Marxian notion of ideology reduces ideology to a false consciousness. This idea of false consciousness has many analytical and political implications: a) One of them is that the theory of ideology implicitly denies any possibility to have a real representation of nature and social life since all knowledge would appear as socially distorted. From this point of view, the world cannot be known; b) another implication is that since ideology is only a reflection of reality, it cannot allow by itself any social change. It is only by the
mediation of economic and political factors that its potential to make consciousness emerge; c) ideology also appears as a solidified body of ideas to be acted upon. It works as a solid structure that constrains the social actor’s behaviour. There is not visible way of getting out of this structure. This ends as a structural determinism.

Third, an everyday and practical relationship with nature is one of the main sources of knowledge and of social development. Eder views the inventive capacity of society as a result of everyday relationship between nature and society. In the orthodox Marxian conception of ideology the practical relationship of nature with society, does not allow people to cognitively grasp reality as it really operates. Ideology gives an incomplete and distorted representation of life.

This research takes into account these limitations of the Marxian notion of ideology. In fact the original texts by Marx allow multiple readings and some variations exist in what can be considered as ideology. In some definitions Marx gave to the concept a very active and constitutive role, that is the case of those statements where he affirms that ideology is the realm where the oppressed classes take consciousness of their alienated conditions and provoked the necessary changes to free themselves from exploitation. But there are other texts where ideology only has to do with a false consciousness denying people the possibility either to know the world or to liberate from oppression.

This research will work with a notion of ideology restricted to the three main aspects already mentioned and it will also take into account the six clarifications that were made at the beginning on this section. These definitions, as was explained before, are not constrained to the Marxian conception. In that sense, they assume the constitutive role played by ideology; they recognise the cognitive role of those everyday social practices by means of which society interacts with nature and they assume that the world can be known by means of a cognitive relationship, and also that it can be transformed by human cultural and symbolical actions. But those definitions also recognise that at some point, the constitutive role of ideology overlaps with relations of power.

This chapter has explored the existence of a field of analysis for environmental problems that emphasises their social nature. According to existing literature, there is a social dimension of environmental problems that has been analysed by different authors which should be incorporated into official programmes for dealing with problems such as air pollution. The last section of this chapter
analysed the social construction of these problems, and of social problems in general, from the perspective of ideologies. It is assumed in this research that the three dimensions of the notion of ideology revised here: ideology as a means of constituting society, ideology as a expression of relations of power and ideology as a means of knowledge, are present in the way people perceive and construct environmental problems, particularly air pollution problems, the subject matter of this research.
Chapter II. Theoretical and methodological framework

This chapter, which constitutes the theoretical and methodological framework of the research, is organised as follows. Section 1 contains a general introduction to the theoretical framework, establishing the field of analysis of this thesis, the object of research, the hypothesis and the assumptions. Section 2 explains the problem of environmental risk as being socially constructed, a reflection which constitutes the general theoretical referent for one of the dimensions of the social construction of environmental problems. Section 3 reflects on the use of the notion of ideology applied to the problem of the social construction of environmental problems and air pollution in particular. It ends with the introduction of the notion of Ideological Construction and Environmental Policy which, in this research, refers to the perceptions and constructions of the various actors considered here concerning environmental problems. Section 4 provides a summary of the two previous sections, in other words, ideas on environmental risk as being socially constructed and the constructions of the actors as Ideological and Political Constructions concerning air pollution. Both these theoretical constructions constitute the conceptual framework which serves as the theoretical referent for this research. Section 5 contains the methodological proposals for testing the two principal hypotheses guiding this research. Section 6 contains general comments on the fieldwork.

1. Introduction

As analysed in the previous chapter, the area of analysis opened up by those responsible for the social construction of environmental problems, to which this research belongs, is extremely broad. Indeed, all social problems can be analysed from this perspective. What is of interest here is its application to the study of a specific environmental problem, namely air pollution, and the policies designed to deal with the latter during the past twenty years in Mexico City.

According to the literature reviewed, the emergence of environmental problems as facts of conscience undergoes a process of social appraisal in which risk perception and its social acknowledgement constitute dimensions that are more or
less separate from their physical existence or the real or potential damage that they represent. Risk often emerges in public awareness as the result of the activism of environmental groups. On the basis of information generated by groups of experts or by those who, at some time, are directly affected by an environmental problem, these environmental groups set about mobilising various sectors of society in order to pressure public authorities to take preventive or corrective measures, as a result of which the environmental problem appears on the public scene. Another of the interpretations already mentioned in the previous chapter speaks of a valuational change operating at the community level which, once the primary needs of a social group have been satisfied, enables the latter to aspire to the satisfaction of secondary needs, understood as those that are not directly related to survival. Awareness of and concern over environmental problems tend to emerge more clearly in societies that have achieved a certain degree of material comfort. The authors who have worked in this direction stress, however, that this awareness does not emerge automatically. The authors most directly linked to the line of research followed here point, on the one hand, to the presence of global valuational changes in a society that creates the conditions for examining certain problems that were ignored in the past. They also mention a process of social constitution through which social groups choose the problems that will become the objects of their concern, while pointing out the mechanisms of power behind the process of selection of the problems that worry or concern society.

Speaking of the social construction of environmental problems implies acknowledging all the factors that determine or affect the process of their construction. In other words, it is equivalent to recognising social, cultural, ideological and political issues as constituent factors that lend air problems an additional aspect to their physical dimension. A broad field of analysis exists for the study of problems such as air pollution from a social perspective. Indeed, each of these aspects, in other words, the process whereby a society is created around a set of values and the process whereby specific relations of power create the conditions to ensure that certain problems are either acknowledged or kept outside the realm of public opinion, could in themselves form part of a major research project or develop into specific studies describing the social, cultural, ideological and political
constraints on processes whereby certain problems with a particular physical existence emerge as socially acknowledged problems.

This research recognises the need to research and reflect on this broad field of problems, but its aims are more restricted. On the one hand, it underlines the need to study the social aspects of air pollution problems as an area of analysis that does not exclude approaches derived from the natural sciences or from a technical perspective but instead serves as an additional aspect that lends a greater richness to its understanding and from which more comprehensive policy measures can be proposed for dealing with it.

Interest in analysing this problem was spurred by the need to seek alternative or complementary forms of studying the problem of air pollution in Mexico City, in view of its persistence despite government efforts to solve it. A review of current programmes suggested that a social dimension was not satisfactorily included. The social dimension included was regarded as inappropriate since, on the one hand, it failed to provide an adequate explanation of the way environmental problems emerge as a result of social processes, and on the other hand, because it fails to consider the way in which the various social agents, referred to here as social actors, perceive, conceive and construct the problem. Government programmes view the process of formulating and solving air pollution problems as a predominantly technical problem, or as an interpretation of social aspects in which pollution appears without social actors and without the subjective dimension which the actors themselves contribute to the problems in their relationship to them. Both aspects of the social construction of air pollution problems of interest here can be analysed as regards their relationship to the social, cultural, ideological and political processes mentioned above. As noted earlier, the analysis of the social dimension of air pollution problems proposed in this research is extremely broad and complex. This study merely seeks to contribute to the aforementioned aspects. However, in subsequent research, it would be important to use case studies to analyse certain aspects of a more general order, in order to understand the ways in which cultural and socio-political factors, which are merely regarded as assumptions in this thesis, are expressed. For example, in the line suggested by the authors in Chapter I and in the context of the themes studied in this research, it would be useful to study the changes occurring in present-day Mexican
society that would explain the emergence of environmental issues as a phenomenon of collective awareness, or the processes that explain why this emerging awareness still lacks the importance warranted by the scope of the problems involved, as borne out by available data. It would also be useful to analyse the specific process of social constitution whereby certain environmental problems emerge as an object of community concern while others are ignored.

In Mexico City, there is a certain degree of consensus regarding the importance of the problem of air pollution, although there are also certain authorised voices which claim that there are other more severe environmental problems that pose a greater potential risk. An analysis exploring the mechanisms of power that could influence the marginalisation of certain risks from the public scene could also prove valuable. For example, in the case of Mexico City, a number of researchers mention toxic contaminants which are ignored by government programmes despite the fact that the risk they pose means that they warrant more attention. All these aspects of the social construction of environmental problems fall within the proposals put forward by Beck, Douglas and Wildavsky and Crenson, mentioned in Chapter I of this research. If these aspects of the environmental problem became an object of study, it would not only facilitate an understanding of the air problem but also the prevention and solution of the latter.

Of all these lines of research considered from a social perspective, this study is restricted to an analysis of some of the most basic aspects, such as the way the social aspect of air pollution is handled in government programmes in order to deal with air pollution in Mexico City. It also documents and characterises the presence of the social construction of air pollution in Mexico City, which does not necessarily bear any relation to the physical-chemical dimension studied by natural sciences.

This research seeks to undertake a study aimed at proving the lack of a social explanation in government programmes and the presence of a social construction of both environmental issues and air pollution among various key social actors, as will be explained below.

The principal hypotheses to be proven and which guide this research are as follows: first, that the programmes for dealing with pollution implemented between 1979 and 1996 in Mexico City fail to include an adequate social dimension of
environmental problems. This hypothesis is tested by analysing government programmes designed to combat air pollution between 1979 and 1996. Second, that in Mexico, air pollution problems are socially constructed by the various actors involved in the problem in various ways which is not incorporated into the programmes. This second hypothesis is tested by analysing one of the dimensions of social aspects that is missing from the programmes and describing its characteristics.

The characteristics of this research and the limits of its aims require the introduction of certain assumptions. These are derived from the ideas reviewed in chapter I, which contains a review of the literature, and from the theoretical reflection included in this chapter. The first hypothesis of this research seeks to prove the lack of an appropriate inclusion of the social dimension of air pollution in government programs. In Chapter V, this hypothesis is tested by means of the review and analysis of the three main programmes implemented by government authorities between 1979 and 1996.

However, the analysis of government programmes is carried out on the basis of two general assumptions. The first is that government programmes are themselves the result of a process of social construction in which the introduction or otherwise of a social dimension is linked to the social, ideological, cultural and political factors mentioned in the previous chapter. The authors mentioned there hold that these factors explain the emergence or public marginalisation of environmental problems. This thesis does not study the processes that explain the presence or absence of social aspects in government programmes. Its analytical interest is restricted to proving the inadequate inclusion of social aspects. An explanation of what is meant by an adequate inclusion of social aspects is provided later on. The second assumption regarding the first hypothesis refers to the fact that the lack of a social aspect in government programmes constitutes a potential element of failure in the search for solutions to pollution. Within this context, it is assumed that programmes designed in this way can only provide technical solutions and that these solutions can only provide partial results which, by failing to include social processes and actors, ignore proposals of action which, on the one hand, would permit the assumption of the implementation of an environmental policy as a process of negotiation in the context of diverse views and interests concerning environmental issues and on the other
hand, would permit the inclusion of the perspectives of the actors involved and the correction of collective and individual behaviours that harm the environment. These aspects, regarded as prior assumptions of this research, constitute subjects of analysis and reflection for future research.

The second hypothesis to be proved, and which holds that there is a social construction of air pollution in Mexico City, is linked to the first hypothesis. This is why it explores one of the expressions of this social construction and provides arguments to prove that pollution problems cannot be reduced to technical solutions. In order to prove this hypothesis, a study, described in Chapter 5, is undertaken in order to show the variety of ways in which the air problem is perceived and constructed by various actors. The characteristics of these constructions are described in order to analyse their inclusion or otherwise in the programme. Nevertheless, the principal assumption of this hypothesis is that the social nature of these constructions means that they are influenced by cultural, ideological and political factors, as argued in both chapter I and this chapter. It is therefore assumed that these constructions are an expression of the prevailing values in society and the various forms of knowledge whereby public images are constructed, which in turn are influenced to varying degrees by relations of power.

The field of analysis underpinning the research issues in this thesis is that of the social construction of environmental problems. Air pollution as a socially constructed phenomenon is perceived or otherwise as a form of risk linked to damage to health, the economic, urban and rural infrastructure, the quality of life and ecosystems. Pollution, in its social dimension, in this specific case of analysis, is a fact of perception and awareness. The following section provides a theoretical reflection on environmental pollution as a socially perceived and constructed form of risk. This constitutes the notion of air pollution as a socially constructed phenomenon, as understood in this research.

2. Risk as socially constructed

The theoretical field in which this thesis is situated is that related to the social construction of social problems. Pollution in this context is understood as something
that concerns values, perceptions, ideology and power. The purpose of this section is to present a reflection on the social nature of environmental risk in order to specify the notion of the social construction of air pollution, as understood in this research. From this perspective, the aim is to express the idea of the social construction of environmental problems assumed in this research.

The idea of environmental pollution as something that is subject to its own, scientifically sound objectivity is something that has been increasingly questioned in the field of cultural theory and sociology. Mary Douglas, one of the authors analysed in Chapter I, has investigated these issues in several of her works. The same could be said of those interpretations which assume that the generation of a specific awareness of problems, the population's behaviour in the face of environmental risk and the various elements which constitute public policies can be explained solely on the basis of scientific rationality.

The idea of the social construction of risk and environmental damage, essential to an understanding of its incorporation into public policies, can be examined through two of its key aspects: 1) environmental risk as a socially produced form of knowledge and 2) environmental risk and the social process of its incorporation into well-being. An analysis of these aspects helps to explain the inclusion of the environmental problem in two complementary and interdependent agendas: the civic or rather, social agenda and the government agenda.

2.1. Environmental risk as a form of socially produced knowledge

This research has to do with air pollution as a social construction. Its aim, on the one hand, is to discover why air pollution programmes for Mexico City fail to include an appropriate social dimension of air pollution problems. On the other hand, the research suggests that there is a socially produced dimension of air pollution problems among the various social actors involved in the problem. This section of Chapter II explains how environmental risks can be understood as a product of social interaction.

Socially-constructed environmental risk emphasises the sphere of the generation of knowledge in determining individual and group behaviour through the
creation of a certain perception of risk and environmental damage, as well as the ideological and political elements surrounding the process. In order to analyse environmental risk as a social construction, it is necessary to establish an analytical difference between the two different ways it is conceived. First, environmental risk can be considered from a supposedly inherent objectivity, meaning that it could be linked to its own real independence, regardless of any interaction with a subjective entity. Second, risk can be regarded as a social construction, which relativises the role attributed to its physical objectivity and emphasises the importance of social and subjective aspects as key elements in its construction. This is the way Douglas and Wildavsky talk about pollution as being socially constructed, as was mentioned in Chapter I.

In the first case, it is believed that the risk, as in the case of environmental pollution, "is there" and that it exists regardless of human perception, meaning that all people have to do is "go out for a look" to find it. To the extent that the risk exists, its consequences will also have that unquestioned presence. The proof of objectivity would lie in the damage to people's health reported by the population, as well as in the objective fact that people would be able to confirm the ravages of ozone for themselves, as well as the fact that they are affected by lead and breathe in or otherwise assimilate the vast quantity of chemical products discharged into the atmosphere annually. In Mexico, as in other parts of the world, data and studies exist to prove this.

However, the perspective concerning the social construction of problems states that environmental risks are not necessarily "out there" and that people do not always find them when they "go out for a look," because, on the one hand, their presence and the perception of these risks is not necessarily restricted to their physical nature. Noticing or discovering risks is something that is socially induced. First, people have to know that such a risk exists, meaning that they need the eyes and senses of those who have previously identified and defined it in order to be able to encounter or perceive its presence as an environmental risk. In the case of pollution, as in any type of risk, the certification or criterion of the authorities (whether government, technical or scientific) is required to be able to recognise their existence. People's perceptions and behaviour are induced by the opinion or assessment of those who know or
represent some type of authority. However, at the same time, these opinions are constantly being questioned and this questioning is not only due to technical or scientific divergence or opposing conceptions but rather to perspectives stimulated by diverging values, changing ways of life and also by relations of power. A highly specific result of what Beck (1992) calls the reflexive stage of current modernisation, is the questioning of the monopoly of knowledge production by official science and the emergence and legitimisation of other sources of knowledge production, which may sometimes cast doubts on the veracity of the knowledge created on the basis of monolithic and bureaucratic schemes in which the principle of criticism, essential to any analytical work, has been lost or lacks the vigour required to produce new truths.

For this author, risk is not merely another element in modern society. Instead, it constitutes one of the most significant features in the shift from primary modernisation, typical of 19th century industrial society, to the reflexive modernisation of the present. Risk is synonymous with the dynamics of modernisation when the latter is reflexive, i.e. when it becomes an object of its own process for change. The over-development of the productive forces that make this possible leads to the pollution of the sources of the wealth created. Risk production shifts from a marginalised to a widespread condition. The collateral risks of modernisation increase to the extent that the scope of the forces mobilised increases. According to Beck (1992), environmental risks, resulting from the intensive use of current technological capacity, are not confined to their places of origin, i.e. to the space corresponding to industrial plants; their damage potential threatens all forms of planetary life. The categories used by 19th century industrial society to calculate its own risks are no longer suitable for current risks. The notion of accidents, the terms under which insurance companies operate and the very concept of traditional medicine seem to reflect a situation which no longer exists. The destructive capacity of current technology is no less than its ability to create wealth. This is also true of the potential and real effects of nuclear energy, chemical substances, genetic engineering, etc. Their scope is not restricted by time or space.

At the same time, this “going out for a look” regarded as proof of the objectivity of environmental risk is a social act; people go out either aware or unaware of the presence of danger and their knowledge or ignorance depends on the
aforementioned "official" versions through which people govern their lives. In the last analysis, the notion of objectivity is nonsensical if it overlooks subjectivity, not only because the proposal itself is now a problem of the subject in question, but because it is precisely its link with subjective aspects that gives objective aspects their true ontological status.

In the case that concerns this research, the objectivity of environmental risk is therefore not something that depends unilaterally on the object of reference, in this case, physical risk. It is also the action of the subject and the latter's social context that permits the shift from potential to actual risk. This is valid, whether people are coping with the risk derived from the harmful potential of any chemical substance or one derived from risks that have been amply borne out by everyday experience (the "real" risk of being run over by a car or experiencing a violent death, etc.). In an article on the social and political context of risk creation, John Adams (1995) concludes that the consequences of the latter increase or decrease according to the responses elicited from subjects when they are in a high-risk situation. This is included in his notion of "risk compensation." Thus, for example, the reduction of child deaths as a result of car accidents is due less to a real improvement in road safety systems than to changes in behaviour through which the population deals with the actual sources of risk. This is the case of children who have stopped playing in the streets or no longer walk to school.

In this research, it is assumed that objective environmental risk acquires its status as such by means of the process of knowledge, derived either from everyday life or scientific reflection. Trial and error is what becomes the criterion for truth and what turns risk into a social entity, acknowledging it as a social object of concern. However, at the level of individual behaviour, the trial and error method does not suffice to cope with a situation of danger, inasmuch as the external influence mentioned above is a decisive factor in shaping behaviour.

Everyday experience regarding the sources of environmental risk is not uniform either. At the individual level, risk is experienced according to personal characteristics related to a person's sex, age and reference group (Adams, 1995) and the value given to the multitude of risks faced at both the individual and the social group level. However, it is necessary to distinguish the risks that are either
consciously or unconsciously ignored at the group level from those that are the result of a deliberate choice by individuals or organisations. In the first case, the risks faced are the result of a selective mechanism of a social nature, the aim of which is to preserve the group’s existence through the creation of identities and the search for common goals. This is true, for example, of people’s perceptions and attitudes towards the presence of substances or various sources of danger that might have repercussions in the future or in a distant territory. In these cases, people feel they are safe because of the apparent distance in space and time. The same is true of the risks that people perceive as remote because of the fact that they belong to a specific social group (Mayo and Hollander, 1991). In the second case, risks are the result of actions undertaken by private enterprises to obtain the maximum economic benefits or to pursue political goals within the rationality of government action. (Björkman, 1987).

Objectivity is not solely derived from the intrinsic nature of risk. The harmful or dangerous nature of a source of risk is not only related to the source itself, but also something that depends on the relation of the subject to the risk itself. Within the act of “going out for a look,” an apparently sufficient condition for discovering the risk and gauging the actual degree of risk involved, social and subjective constraints come into play which make it possible to talk of a “loss of control”\(^1\) of the objective risk or the physical risk over its consequences. These social constraints are experienced at the individual level as attitudes and types of behaviour, thereby giving rise to the aforementioned shift from potential to actual risk.

In analysing the “going out for a look” method used to confirm the objectivity of risk, it is possible to realise that people go out fully clothed in their social apparel, which they have adapted to fit their individual measurements. This is the social dimension of such risks as air pollution which this research seeks to explore analytically. But discussing social aspects does not merely involve discussing perceptions and conceptions. It means discussing the context of the ideological and political aspects in which this occurs. Thus, when risks are considered in this context, together with the individual behaviour regarding this, it is also necessary to consider

\(^1\) The counterpart to this is what Beck (1992) called the loss of “cognitive sovereignty” which is produced as a result of the individual’s inability to determine the risk involved in certain circumstances produced by modern society and his dependence on the judgement of external bodies.
the interests that determine whether it is positively or negatively appraised which may also lead to its denial, concealment, minimisation or being ignored. Indeed, these are the ideas behind Douglas and Wildavsky and Crenson’s notions of the social and political determination of pollution, as was analysed in Chapter I.

In the case of air pollution, which is an actual, objective fact, much has already been written. Studies have also been conducted which have proved the link between certain atmospheric pollutants and specific illnesses. However, there are still huge gaps, areas which have not been subjected to observation and experimentation. Experts know little about the real composition of suspended particles and their various effects on health, or about the hundreds of chemical products which, as mentioned earlier, are launched every year. In other words, people are unaware of many of the risks associated with air pollution.

In short, in the context of the social construction of environmental problems, these suggestions are aimed at discussing the idea of risk as something which exists, and which people merely have to approach to confirm its presence. According to this research, no risk exists in isolation. The criterion of objectivity can only be established through a strictly subjective relationship. However, the main point of this discussion on the objectivity or subjectivity of risk is that these arguments describe something more substantial, in other words, the ideological and political nature of the construction of risk in general and the risk caused by the pollution of the environment in particular. In this context, it is worth pointing out the fact that, on the one hand, individual behaviour in the face of risk, the perceptions underlying this behaviour, and the official certification of risk by government and technical and scientific authorities are influenced by values and conceptions which are not necessarily neutral but loaded with certain meanings mobilised by specific interest groups which, at the same time, operate within a broader context of relations of power. People’s attitude to risk, essential to preventing, neutralising or solving it, depends on its official handling and its transmission to the individual through the mass media and what is held to be public opinion. Risks as social constructions have to do with ideology and power. From this perspective, they must be regarded in the

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2 Several specialists believe that suspended particles should be the main cause for concern as regards atmospheric pollution in Mexico City, rather than ozone and lead.
context of the notion of ideology analysed in Chapter I. In addition, however, concepts related to ideology need to be adapted to a notion of ideology closer to a more concrete social problem such as air pollution constructions. This aspect will be analysed in the following section.

2.2. Environmental risk and the social process of its incorporation into well-being.

A complementary aspect of the social construction of environmental problems that it is important to analyse here as part of the assumptions of this research concerns the notion of risk as a socially recognised matter of public concern. Analysis of the social construction of risk makes it necessary to reflect on another aspect of the social conditions that permit the transition of a problem from its physical to its social and political presence at the community level. Air pollution is regarded here as a sort of socially produced and constructed risk. This study will briefly discuss some of the different circumstances which explain: a) the incorporation of environmental risk (and any form of damage caused by environmental degradation) into the set of elements which constitute the basic components of well-being and ensure that a specific problem warrants social concern and is therefore susceptible to civil demands; b) the inclusion of this same risk and environmental damage in the government agenda, after it has been incorporated into the package of well-being and emerged as a community demand.

The foregoing assumes the incorporation of environmental aspects, and in the specific case of the air problem, its inclusion in the “cultural package” including the conditions of well-being of a specific community which enable the latter to incorporate it into its value system. It must also be incorporated into the “package of social demands” so that this community will be prepared to negotiate its inclusion in civic or social demands in general and the “package of political demands” so that it can be incorporated into the government’s agenda as an aspect of governance and legitimacy.

It is essential to analyse this process of social construction of problems to be able to provide an analytical description of the incorporation of a specific problem, as
in the case of air, into the government’s agenda. This eventually reflects the way and extent to which the community has incorporated the environmental problem into its value system and expectations of well-being. Once environmental issues have been incorporated into the conditions of well-being, communities will be able to propose acceptable levels and determine the price they are prepared to pay for each of these elements which constitute the “package” of conditions of well-being. This is what lies behind the system of social preferences by means of which social groups establish the order of priority of their concerns and is what determines the position of problems such as the environment in relation to others regarded as objects of concern, such as employment, safety, education, housing, etc. It is in this context that the incorporation of the air problem into the government’s agenda and the degree of commitment in the search for solutions by both the community and the government can be explained. The way society constructs environmental problems has a direct effect on its construction in the government agenda, particularly at the level of the diagnoses and strategies established in official programmes.

The quality of the environment is, to a varying extent, an element of well-being for many communities, the difference being the degree to which its deterioration is accepted. In some developed countries, the degree of social tolerance is lower than in others. This is due to a number of reasons. Some of the authors analysed in Chapter I hold that the existing differences between the greater interest or concern of developed nations regarding environmental issues derives from the fact that these countries are able to focus on a specific need, often regarded as secondary, once primary needs have been met. In this order of arguments, the lower degree of interest shown by poor countries towards environmental degradation could be explained by the fact that these countries have failed to meet the population’s most basic needs. These arguments have to be analysed with the same concepts used by the constructionist approach. From this perspective, it is also possible to speak of the social process of constructing the two types of needs mentioned earlier. In this respect, it is necessary to talk about an ideological and political process of constructing this package of elements which constitute quality of life and well-being in both types of countries, meaning that it is possible to talk about the concealment of a set of problems of which awareness is only created through the formulation of critical and socially
committed knowledge, or else when environmental problems assume catastrophic proportions or when their magnitude makes them emerge quite clearly.

In countries such as Mexico, the environment experienced a severe process of degradation from the start of the industrialised period in the 1940s. Air quality in particular deteriorated drastically in the main centres of industrial activity, particularly in the country’s three main metropolitan areas. However, this did not translate directly or proportionally into the emergence of a more active environmental awareness that would include environmental quality as a basic feature of well-being and civic demands.

In the early 1970s, the environmental issue emerged in Mexico as an ideological governmental banner in the context of an international ecological movement which had led the United Nations to organise the Earth Summit in Stockholm in 1972. This did not mean that environmental problems were unimportant in Mexico, but rather that they revealed a range of possible demands linked to government and party needs for legitimacy. They were restricted to their usefulness as a political banner and as a means of legitimising government action in the international sphere and certain sectors of Mexican society. This incorporation “from above” of environmental issues into the government agenda explained the ineffectiveness of the actions undertaken and the faulty construction of the problem in government programmes. The definition of the environmental problem and its incorporation into the official agenda as the only result of the government’s monopoly on policy design have yielded extremely poor results in terms of improving the quality of the environment since problems constructed in this way are remote from what the community perceives and experiences or at least from issues that they would find it easier to embrace. These are some of the elements that help to explain the inclusion of environmental issues in the citizens’ agenda, and their inclusion in the government’s agenda as determined by the ideological and political context in which they take place.

Finally, and by way of a conclusion, it is necessary to emphasise the analytical importance of considering the two factors mentioned here to explain the shift from physical risk to socially acknowledged risk, i.e. a risk experienced by the population and on the other hand, to be able to describe this process of social evaluation which
permits the incorporation of environmental damage and the quality of the environment as part of the conditions of well-being which a society chooses for itself and which may therefore be incorporated into both the civic and government agenda. Both forms of the construction of risk and environmental damage occur within a context of ideological relations and relations of power which are expressed by symbolic mobilisations (to encourage one particular or certain interpretations of environmental deterioration) and on the other hand, through political resources. Discussing the meanings and political resources being mobilised entails discussing the construction of both individual and social behaviour as well as public policies resulting from ideological or political bias. This is why it is necessary to introduce a derivation of the notion of ideology to describe this idea of environmental problems arising from social agreements or disagreements over risk and environmental damage. Thus, neither the truth nor the falsity of perceptions nor the kind of knowledge mobilised constitute the decisive factors in this discussion. For this reason it is not the laws of natural sciences which are able to explain these phenomena, but rather those of political games, and ideological coexistence and confrontation on which actual communities are based. Thus, it is the categories of political analysis which are best able to describe the inclusion of certain interpretations of environmental aspects and specific scientific documents and the exclusion of others as well as the incorporation of certain ideologies and the elimination of others in public policies. It is on the basis of these ideas and knowledge of environmental issues, constructed using all the elements on which political and ideological exchange are based, that public policies are constructed and decided. The following section will show the importance of analysing these characteristics of air pollution constructions using a concept that is able to deal with ideological and political forces.

3. Air pollution as an ideological and political construction

As explained in the previous section, environmental risk is a social
construction shaped by ideology and politics. Since one of the hypotheses of this research seeks to prove the existence of a social dimension of air pollution problems and one of its expressions concerns the way in which people perceive and construct it, this thesis suggests that these constructions can be analysed using a derivation of the concept of ideology.

In this thesis, the way people perceive and construct environmental problems has been called Environmental Ideological and Political Constructions (EIPC) to emphasise their social nature and to distinguish them from the physical aspect of pollution and conceptualise their constituent social features. The various ways social actors perceive and construct environmental problems and air pollution in particular, are considered under this notion. Calling them ideological and political is not intended to give this way of thinking about environmental problems a negative connotation, but to emphasise its social nature. These constructions can either resemble or differ from the characteristics of pollution described by official data. They have a margin of variability in relation to physical pollution that depends on the kind of social actor by which they are expressed, the kind of knowledge that is available to social actors and the intentions behind the actors’ discourse. This variability also depends on the group, sector, or institution the actors represent and on the interests they are representing or mobilising.

Why are EIPC socially constructed? Because they are mainly constructed according to individual or group perception, and because these constructions do not always correspond to the physical dimension of the problem as described by existing data. They are constructed by values, assumptions, different forms of knowledge and interests. Why are they ideological and political? It is assumed in this research that different social actors’ perceptions and constructions of air pollution are a combination of ideological and political factors in the sense explained in Chapter I. When these social actors give their opinion on air pollution problems in Mexico City, it is assumed that they are embodying a social discourse that allows them to speak as socially recognised actors who have the right to express their views on certain issues. For example, the academic sector is recognised as the social actor who is best qualified to speak objectively about air pollution, but among the former, specialists in public health and pollution are regarded as the most highly qualified to discuss these
issues scientifically. All the social actors comprising the universe to be questioned in this research represent something related to environment and air pollution that makes them eligible for social recognition. It is also assumed, however, that the way people perceive and construct environmental problems is not necessarily a neutral way of contemplating the world, but one that can be influenced by interests and relations of power. As explained in Chapter I, the general system of ideas that comprises one of the dimensions of the notion of ideology and whose function is to help integrate society, is overlapped by relations of power. EIPC are also political constructions since power is also present in the way reality is perceived and constructed. However, this is an area of research that should be analysed in concrete situations. As mentioned in Chapter I, Crenson undertook this analysis for two American cities and demonstrated how these political mechanisms determine whether an issue will emerge or be socially ignored.

In Chapter I, the social construction of environmental problems was thought of as being something derived from values, influenced by political factors and constructed according to constitutive ideological principles. It is assumed here that the way the interviewees replied to the questions they were asked reflected the aspects of ideological discourse analysed in Chapter I. For example, the way social actors rank environmental problems can be explained in terms of the different kinds of knowledge they possess. It is also possible to relate their constructions to the economic and political interests they represent. But their constructions may also share points of view and perceptions with other social actors. Air pollution constructed by these actors may contain elements commonly perceived by other actors. From this perspective, this construction is made up of the constitutive elements of social integration, since shared beliefs and perceptions make a social group exist. However, such a construction of air pollution may express the unilateral perspective of one social actor. It is sometimes also possible to detect a clear class perspective, although this is not always evident. Some actors may find it extremely difficult to express a unified perspective on air pollution problems, not necessarily out of a desire to conceal problems or to lie, but because most actors perform a variety of roles. For example, they may be owners of a business, representatives of an economic or political group, members of a family and as such parents of children.
sensitive to air pollution damage. In these different dimensions of their social life, actors reflect perspectives and interests and assume different values.

4. Environmental risk and environmental ideological and political constructions

The reflection presented in the previous sections is the conceptual framework for regarding air pollution problems as socially constructed for the purposes of this thesis. It is not possible for this research to analyse all the aspects linked to the ideological and political factors in the concrete situations that, according to the literature analysed, determine the emergence of environmental problems and explain the perceptions and construction of air pollution by social actors. Under these circumstances, this thesis accepts the views of the authors analysed in Chapter I, on the social construction of environmental problems. In this context, EIPC, in other words, the name given in this research to the perceptions and constructions of environmental problems by social actors, are regarded in this study as the result of the social circumstances surrounding them.

The logic of EIPC is as follows: there are certain problems whose existence can be demonstrated by existing data. Nevertheless, these problems are not socially recognised. Some problems may be acknowledged by a group of experts, but denied by others. Others can partially emerge under the form of damage to people’s health or to nature, the infrastructure or the economy. Sometimes, certain sectors of the population perceive the damage, but they do not always associate it with environmental factors. Some associations may be made, either by specialists or by those affected, but there is no wider recognition or this recognition merely emerges as a form of conjecture. For example, in some regions of Mexico, people living near hazardous waste dumps began to associate cases of birth malformation, illnesses, etc., with the substances deposited in those sites. But it was only when scientific findings and people’s claims combined that the issue began to appear on the public scene. The same thing occurred with atmospheric lead pollution and health damage in Mexico. For many years, lead expelled into the atmosphere from petrol-fuelled vehicles was a major problem. Nearly three millions tons of this metal were
deposited annually in Mexico City, yet no-one paid any attention to the problem. It was not until the scientific community started to demonstrate the damage caused to women and children, and these findings were disseminated by the media, that the problem was recognised and government measures were taken.

An EIPC describes the social conditions that determine whether a problem emerges or is ignored. The way an actor constructs air pollution problems is influenced by these social conditions and by the particular way social actors internalise social determinants. But an EIPC also describes the social process that enables an environmental problem to be assumed as such by both the civic and the government agenda. When a problem is socially recognised, it means that the ideological conditions for it to be incorporated as a matter of concern for social organisation and for government programmes are being created.

The choice of the phrase EIPC to describe these perceptions and constructions of air pollution is also related to the fact that these constructions are debated, contested and often contradictory. They do not follow the logic of scientific discourse but tend to obey the rules of ideological and political debate. These characteristics of air pollution constructions by actors are congruent with the definition of EIPC, since this notion comprises values, assumptions, interests and power. What is required to analyse the logic of these constructions are the rules of sociological and political analysis.

It is assumed here that an EIPC, such as those described by the social actors interviewed in this research, consists of a set level of knowledge, the interests resulting from people’s position in the different social spheres they inhabit and their position in a power structure, etc. But there are also constitutive elements of social integration that are present in most of these social constructions. For example, as mentioned in Chapter I, it is possible to perceive a voluntary acceptance of the environmental discourse that minimises the importance of air pollution in Mexico City in the way certain actors perceive environmental problems. Some of the interviewees seemed to display a need to believe that problems are not as severe as they appear in some scientific publications. Some people would prefer not to believe the data showing the magnitude of the problem. It often seemed as though people failed to attach any meaning to the data, thereby avoiding establishing connections
between the data and real or potential damage. It is possible to explain this way of
thinking about environmental problems using the ideas of the authors analysed in
Chapter I. Some of them pointed out that people living in communities with severe
environmental problems and with no available means of dealing with them, find it
safer to deny or ignore the problem. What is expressed in these cases is the need for
a community to exist as such.

It is also assumed that what emerges from these aspects that characterise EIPC
is that, just as air pollution constructions are not solely the result of scientific
knowledge, government decisions concerning air pollution are not necessarily
reached on the basis of scientific objectivity (principal sources, major pollutants,
main polluters, real health effects), but as a consequence of ideological and political
argumentation concerning what should be defined as air pollution, and what should
be agreed on as the most suitable political measures for preventing and reducing it. In
this political bargaining, public, private, governmental and other perspectives, values
and interests are brought together, affecting the perceptions and constructions of
actors and programmes in various ways. These arguments are congruent with
Therborn’s point of view regarding the ideological definition of social facts and
agents, as described in Chapter I.

Environmental risk, and air pollution as a particular expression of the latter,
when regarded as such by social actors, can be analysed on the basis of the notion of
Environmental Ideological and Political Construction, which emphasises the social
nature of these constructions and highlights their ideological and political
components, in the way these concepts were defined in Chapter I.

5. The methodological proposal

This section contains the methodological proposal for proving hypotheses 1
and 2 of this research. Both are intended to demonstrate the lack of an appropriate
social dimension in existing official programmes designed to deal with air pollution
in Mexico on the one hand, and to demonstrate that there is a social construction of
air pollution problems by different social actors that enables them to speak of the
different dimensions of air pollution in relation to that derived from its physical
existence on the other

Before describing the details of the method used to gather the required information to carry out the analysis, a short reflection is presented on the methodological rationale of the research.

5.1. The methodological rationale

There is a close connection between theories, methodologies and methods. This research assumes that theories (functionalism, Marxism, behaviourism, etc.) provide a set of explanatory concepts to think about the problems selected for analysis, as Silverman (1994) points out. Methodologies (positivism, qualitative methodologies, etc.) can be seen as general approaches that help define the ways of analysing specific problems. Methods (observation, interview, focus group, etc.) are specific techniques to gather information on the particular problem to be studied. The research reported here is supported in one of the most influential sociological traditions called the constructionist approach. According to this perspective, social problems are not universal but socially constructed. For this reason there are not universal social laws, but specific social behaviours that are dependent on particular values, norms and ways of organising society. In this context, to understand a specific social phenomenon, it is necessary to explain it in the social context in which it takes place. This is not an appeal to relativism, but to a relational perspective in which, as Schaff (1974) has pointed out, social facts and behaviours have to be related and explained in their social context. From this point of view, it is not possible to find general laws, as positivist think, to explain social facts.

The different methods used in social analysis, in some way, are the expressions of a methodological assumption related to either a positivist or qualitative approaches. Quantitative methods of gathering information are linked to the positivist assumption that reality is neither variable nor subject to human intervention. The role of science would be to discover these laws to guide social life. Humans merely need to understand social life laws and to behave according to them. For them there is a clear distinction between reality and the researcher. The proof of reliability in the process of producing knowledge is the establishment of the separation of what belongs to the
domain of being from what belongs to the domain of knowledge; this means a clear and definitive separation between the subject and the object in the research process. Qualitative methodologies on the other hand, assume that there is not such separation and that both the researcher and the object of the research belong to the same reality. From this perspective the world is the result of both the objective and subjective activity of human interaction. Both the interviewer and the interviewee share a common code of meanings and practices and their perceptions and assumptions are dependent on the social context they live in.

Some researchers have divided of the existing sociological methodologies in two general approaches: a) positivism and b) interpretative social science. Positivism (Cicourel: 1964, Halfpenny: 1979, Silverman: 1994) assumes that it is possible to have access to reality through data. What is important for positivists is to generate information that is valid, independently of both the research setting and the researcher. For this reason they prefer to use standardised interviews as a way of gathering information (Selltiz et al. (1964). For positivists, as Silverman (1994) affirms, the language of the interviewee is just an instrument that allows the communication of facts. If positivists find any interview setting influencing the responses, they will try to eliminate them as it is assumed that they affect reliability. The general principle is that facts have to speak by themselves. Selltiz et al (1964) recommend standardising interview to get comparability. According to them, when an interviewer is gathering his data, he should ask each question exactly as it is worded and in the same order as they appear in the schedule. Researchers and interviewers should not express any sign of approval or disapproval when they are reading or analysing the data gathered; all they have to do is to give an analytical order to the data by means of which reality is represented (Silverman, 1994).

Interpretative social sciences, to which domain this research belongs, are more oriented to qualitative investigation. Marshall and Rossman (1995) mention a large amount of qualitative methodologies that give account of the emergence of a more sociological approach in the field of social sciences dominated in the past by methodologies “borrowed from the experimental sciences”. Based in the works of Jacob (1987, 1988) and Atkinson et. al. (1988), Marshall and Rossman mention some of the major domains in qualitative research. They include human ethology,
ecological psychology, holistic ethnography, cognitive anthropology, ethnography of communication, symbolic interactionism, ethnomethodology, democratic evaluation, critical ethnography, feminist research and action and participatory research. For these authors, these qualitative approaches have a common assumption that systematic inquiry must occur in a natural setting rather than in an artificial one. Their differences are described by Marshal and Rossman as follows:

The approaches vary, however, depending on how interactive the researcher is in gathering data, whether those data document non verbal or verbal behaviour or both, whether it is appropriate to question the participants as to how they view their worlds, and how the data can most fruitfully be analysed, (Marshall and Rossman, 1995: 4)

Qualitative research for Marshall and Rossman (1995) involves the immersion of the researcher in the everyday life of the place and social group selected for the study, in the values and in the conception of the world of those who are the object of analysis. From this perspective, the inquiry appears as interactive process between the researcher and the participants. It is not only descriptive but also analytic, and its main source of data are the world where people live and their observable behaviour.

Baker (1982) emphasises another aspect of qualitative research that reinforce Marshall and Rossman perspective. She pays attention to what people say about the world they live in as an activity that gives meaning to that world. That meaning is both a creation of interactions and a result of the social scenario in which those interactions take place. For this reason, the data generated from qualitative methods, such as interviews, lack sociological sense if they are not referred to the social context; to the values, norms and rules prevailing in a specific society. Silverman (1994) makes a similar argument, emphasising the need to analyse data in specific social settings.

To test the two hypotheses related with the social construction of air pollution of this research, it is necessary to use an appropriate method according to its qualitative nature. Marshall and Rossman (1995) mention four main qualitative methods: 1) participation in the setting or participant observation where the researcher has a close involvement in the social world chosen to study in order to experience reality as the real actors do. This strategy gives the researcher a direct
account of social behaviours; 2) Direct observation is a method where the researcher can note and record social behaviours in the real scenario but without having any particular role; 3) In-depth interviewing considered by Marshall and Rossman much more like conversation is a method of qualitative research in which the researcher wants "to uncover the participant's meaning perspective". Researchers have to be respectful of the way in which interviewees frame and structure the responses. The important factor is the participant's own perspective, as it gives account of his/her particular subjective way in which the world is perceived, which is crucial to any constructionist or interactivist approach.

Other methods of qualitative inquiry such as the aforementioned observation and participant observation, in spite of being considered a more realistic account of real behaviours, do not work properly when the purpose of the research is to provide a specific description of what every individual actor thinks about an issue. What is important in this case is to grasp how different actors perceive air pollution problems differently. Having this information, it is possible to evaluate the congruence of what the actors say with what they think they have to say according to their economic, social and political positions.

The interview as a method of gathering information

The subject of the research reported here has to do with air pollution problems as socially constructed. The research aims to test two hypotheses. The first hypothesis states that official programmes designed to face air pollution lack an adequate social perspective. The second hypothesis states that a social construction of air pollution problem in Mexico City exists, and that it can be reconstructed from the heterogeneous ways in which different social key actors think about air pollution. Given these characteristics of the research, qualitative methodologies appear to be best suited to give an account of an analytical problem where a strong subjective dimension of social reality is involved. What is important for the objectives of this research is the construction of the problem, i.e., particular perceptions and points of view of the social actors interviewed. Whether or not the actors have a more or less scientific or objective perception is irrelevant. What matters is the particular way in
which they think about those issues related to pollution. The interviewees have different levels of involvement with air pollution, and their ideas on the issues have important influences in what is assumed to be the air pollution problem of Mexico City, and what is designed as the official air pollution programmes.

This research is based mainly on the analysis of three government air pollution programmes for Mexico City (to test the first hypothesis). To test the second hypothesis, in-depth interview questionnaires were applied directly to a small number of key individuals closely associated with air pollution issues in Mexico City, and analysed. The analysis of the documents containing the government proposals to mitigate air pollution was carried out following a technique explained later, in order to demonstrate the inadequate social perspective in these official programmes.

Interviews were conducted as a method to have access to the way key actors think and perceive air pollution. To explain their use in this research, it is necessary first to make some comments on the importance of interviews to conduct qualitative research. There are many kinds of interviews. In-depth interview is a type of interview that allows the researcher to gather qualitative data, particularly those aspects related to people perspectives and perceptions of some particular problems. This type of research places an importance on understanding various ways in which people perceive and give account of the world. It is not important to evaluate the objectivity of those statements emerging from the interaction between the interviewer and the interviewee, but the meaning they are giving to the world they are living in and the way the world is influencing their perceptions and behaviours. For this reason the problem to be analysed is not the scientific nature of what the participants are saying, but to explore what social implications have these different perceptions of the world in the construction of social images, shared beliefs and public opinion on a problem with an important impact in the social life at the community level.

Since interviews involve personal interaction, Marshall and Rossman (1995) find some disadvantages of using interviews as a tool to gather qualitative data. While in-depth interviews allow the researcher to know some details of the interviewee's thoughts on specific social problems, their effectiveness depends on the collaboration of the interviewee, his/her willingness to express personal thoughts,
and the level of comprehension of the language used by the interviewer. In-depth interviews are not based entirely on structured questionnaires, but are conducted with a general guidelines with open-ended questions. This method is criticised because it does not give account of behaviours but of representation of facts in the way the population perceives them. Positivists think that this kind of interview does not allow comparing data. Some interactionists, on the other hand, think that observation is a better method to gather qualitative data, since they are not dealing with representation of facts but with social behaviours.

There are other types of interviews such as ethnographic interviews, which focus on culture and participant's meaning for events and behaviours through first-hand encounters (Marshal and Rossman, (1995). Phenomenological interviews analyse experiences and the process of putting them together to construct a world view, and elite interviewing is based on gathering information from the influential, the prominent and well informed people.

Another interview method to gather qualitative information is the focus group. The focus group is a method commonly used in exploratory research, particularly when there are not many sources of information. Stewart and Shamdasani (1990) find the focus group as the most adequate strategy when clarifications of perspective, opportunity, and hypothesis generation are required. It is assumed in this method that attitudes and beliefs are the result of interactions and exchanges of meaning among participants. Focus groups are intended to reproduce a natural setting and aim to explore unanticipated responses. It is important to uncover those behaviours and conceptions that are profoundly rooted in the unconscious level but that need some kind of stimulus to emerge to the conscience level. Discussions with a group of people on one particular subject allow people to generate or uncover their own conceptions and perceptions that otherwise will stay hidden or even unknown to themselves.

The technique consists of asking focused questions to a group of 4 or 8 (could be more) persons that are unfamiliar with one another. There is a facilitator who introduces the question following an interview guide in a relaxing atmosphere. The selected group shares some characteristics that are relevant for the research. Some focus group specialists recommend to integrate homogeneous groups according to
age, level of income, education, etc., to prevent wasting time in discussions arising from the social differences among the participants.

There are some disadvantages of this method, particularly in relation to the purposes of the research reported here. One of the most challenging problems is the need to have a well-trained interviewer who is able to focus the discussion in what the researcher and the purpose of the research are looking for. For academic research, the researcher may assume this role to co-ordinate and facilitate the focus groups sessions, as he has the general and specific pictures of the purpose of the research. But this means that the researcher can not delegate this part of the research to others. On the other hand, the interviewer has to be very skilful in co-ordinating the group dynamic, in order to have control of the group, of the subjects to be discussed, and of the different personal characteristic of the participants. In some occasions, as Marshall and Rossman point out, the groups can vary a great deal and can be hard to assemble. In this context, creating an atmosphere of confidence and friendship is not easy to achieve.

Focus group interviews encourage discussions on specific issues, and provide good evidence of the differences and similarities of the participants' perceptions of the problem under discussion, as Morgan (1997) points out. However, individual interviews, such as the ones used in this research, are more useful when the purpose is to have more detailed accounts of individual participant perspectives on each of the topics contained in the questionnaire. Focus groups do not allow each individual to express with details his/her own perspective. In some occasions it is possible that what is being expressed is an opinion generated by the dynamic of the group and not by what each individual could express if he/she were in a different setting (Stewart and Shamdasani, 1990). The amount of information that each individual can provide is much larger in an individual interview in relation to the less amount that each participant can provide in the focus group strategy (Morgan, 1997). In the research reported here, it was more relevant to allow each interviewee to expose without time restriction his/her opinion on a particular subject. This gives the opportunity for the researcher to have an in-depth understanding of the participant's perceptions. A focus group session of 90 minutes, as Morgan (1997) points out, could be insufficient to have complete perspectives of all participants.
On the other hand, the interviewer has more control on the situation in personal interviews. This is crucial when conducting an interview, as was the case in Mexico City fieldwork, to move from one question to another when needed for the purposes of the interview. In many occasions, during the interviews conducted in Mexico, it was necessary to skip from one question to another when the interviewee had already answered a question that came later in the questionnaire. On other occasions, it was necessary to rephrase a question when it was not well understood by the interviewee.

This research gathers its qualitative data on the social construction of air pollution by in-depth interviews. These in-depth interviews differed from the conventional open-ended interviews as characterised by Marshall and Rossman. The questionnaire put into practice in this research has a series of questions that are more or less structured. There are some variations in the wording of the questions according to the characteristics of the interviewee, but in general terms a similar questionnaire was used for all the actors interviewed. The participants were a select group of well-informed and influential people on environmental and air pollution issues, and the aim of the interview was to collect the perception and opinion of the actors on a set of issues that were considered as fundamental in reconstructing specific air pollution social constructions. From this point of view, a sort of elite interviewing was used here. While the questions were well structured, the participants responded in different ways.

In this research, the most important aspect of the subjective construction of air pollution was the convergence or divergence of different actors in the answers given to a particular question. For example, one of the questions asked had to do with the importance they gave to air pollution in relation to other environmental problems in Mexico City. Even in the academic community the answers were different. In this case, the specific question did not prevent the expression of these differences. Those perspectives are the main interest in this research, since they give accounts of variations in perceived air pollution problems, and they allow the display of perspectives and moral forms (Silverman, 1994), which are closely related to the main hypotheses being tested here.

The interview method used in this research presented advantages and
disadvantages. The main advantage was working with a questionnaire with focused questions, which allowed the different social actors to talk on the same issue. This made possible not only to corroborate the existence of a diverse way of perceiving and constructing air pollution, but also to compare those different perceptions of air pollution. The interviews allowed to record the specific way of thinking the problem by a group of different actors. In some occasions it was possible to match some positions with the characteristics of the actor being interviewed. Some of them could express a thought very close to what would be expected from their particular position in the social structure. Nevertheless, in other occasions the actor did not express what could be considered as the natural expression of a specific group, such as the entrepreneur sector, the political party representative, the academic group, etc. Two examples illustrate this situation. The first was the response to the questionnaire by a representative of the industrial sector. He offered a sort of naïve philosophical discourse on the relationship between environment and the human being. But when asked on the particular aspect of Mexico City's air pollution, he did not have a clear understanding of the problem and defended industrial activities with very poor arguments. The second example was the answers given by a group of federal officials who at certain part of their speech, spoke with the rhetoric of some green activists, and in other moments resorted to the language of the scientific community. In other occasions, the answers of the interviewed were not derived from the actor's position in the social structure, but from a combination of the different niches in which a person lives in society. A car dealer, for example, when talking on air pollution as an entrepreneur, showed an interest for environment very closely related to his economic activity. But when talking on air pollution as a head of a family, his concern for environment increased because what he had in mind was the health and safety of his children. Talking from this position made him appear with a radical green discourse.

During the fieldwork different problems emerged with interviews. The first has to do with communication with the interviewees. Some of them did not understand the words and phrases used to ask questions. In spite of the effort to change the wording of the interview to adapt it to the different participants, some of them did not answer what was intended with the question but in some occasions, a
very different subject. The second problem had to do with the accessibility to the interviewee when he was a top public official or private representative. Some of them did not have enough time for answering the questions and tried to finish as soon as possible. The third has to do with lack of patience and intolerance from some members of the academic community. For some of them, the questions seemed very simple and naïve. One of them was very anxious because he felt he knew not only the answer but also the questions, before being completely formulated and he also seemed to know in advance the general purpose of being interrogated in that way. This created an uncomfortable atmosphere. Another problem was the quality of the answers obtained. Despite all the actors interviewed had a close involvement in Mexico City’s air pollution, many of them showed a very general knowledge on the problem. Some of them frequently equalled environment with pollution, and pollution with air pollution. Some responses gave account of an unclear understanding of key aspects of air pollution.

The writing of the fieldwork

The analysis of the air pollution government programmes was systematised in different way in relation to the data generated by the interviews. In the first case, the main analytical and programmatic characteristics of the official programmes were synthesised and presented in a table. It contains the main aspects of Level 1 and Level 2 of analysis (as explained later), which were the categories used to prove the lack of a social perspective in those programmes. For other researchers to analyse these programmes with the same or with other methodology, they could go to the libraries or to the government offices to have a copy of these programmes.

A very different situation was the writing and analysis of the data generated by the interviews. The interviews were recorded and some notes were taken on the general atmosphere of the interview. It was decided to follow a descriptive method to give account of the material collected. Together with the presentation of the transcript, some comments were done relating the actor’s opinion with some theoretical assumptions guiding the research and with some of the other actors' points of view. To have a recording and a transcription of the interview proved to be a
useful tool for the analysis. It was possible to listen and to read the interview in several occasions, to have the real feeling of the topics discussed and of the social atmosphere of the interaction. Comparing with the answers of an interviewee who did not allow recording the interview, it is very clear that those interviews that were recorded offer to the researcher a better quality of data and more material to be analysed. After some weeks of finishing the interviews, the information generated by the unrecorded interview was one of poorest in terms of the words, phrases and expressions it contained. Some details of the interview were not remembered and it was not possible to reconstruct completely his perceptions on the topics demanded. It is possible to argue that some interviewers or observers can be more skilled to register what is happening in an unrecorded interview or observational work. However, the amount of data and the details of a recorded interview are much larger and are also more useful for analytical purposes.

The transcription of the interviews is presented in this report nearly literally. They were edited for easier reading, but without any substantial changes to what was said during the interviews. It was decided to present the material in this way to have a vivid account of what the actors really expressed as their perceptions and points of view. For the researcher, this way of writing the material facilitates the comparison among the different perceptions held by actors. Because of that, the researcher can not only read the material in many occasions, but can also have a visual account of what each actor said. Additionally, the presentation of the transcription in the body of the report works both as the only testimony of the fieldwork and as an empirical material for those researchers interested in the data for different analytical purposes.

As Heritage (1984), quoted by Silverman (1994) mentions, the use of recorded data is a fundamental corrective to the limitations of intuition and recollection. It also makes possible a repeated and detailed examination of what was said, in the context in which it was said. Finally, the presentation of the transcript permits other researchers to have direct access to the sources of what is being claimed as an appropriate analysis of a particular problem. This makes the analysis, as Heritage affirms, subject to public scrutiny, minimising personal biases in the interpretation of the data when doing the analysis.

In the following section, a methodology for analysing Mexico City’s official
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air pollution programmes will be presented to prove the first hypothesis. The method used to prove the second hypothesis is the interview with key social actors involved with air pollution problems in Mexico City.

5.2. Analysis of official programmes

The first hypothesis of this research suggests the lack of an appropriate social dimension in official programmes for dealing with air pollution problems in Mexico City between 1979 and 1996. What this hypothesis suggests is not the complete lack of any social reference in the programmes but rather, the lack of an appropriate one. Air pollution can be analysed in both its physical and social dimensions. But including an analytical social dimension does not merely involve mentioning words that allude to society but entails using analytical concepts in which social relations are involved. Many government programmes designed to deal with different kind of social problems contain two kinds of social allusions. On the one hand they describe social factors through the inclusion of a social chapter in the diagnosis of the programmes. However, they include this chapter in the same way as they include a geographical chapter, a demographic chapter and an economic chapter. In other words, programmes include as many chapters as possible with an additive rather than an explanatory logic. Most of the chapters included at the diagnostic level do not have a cause-and-effect logic which is why they are not useful as an analytical tool for decision-making. On the other hand, there are also cases where certain social terms are included in the diagnosis. Nevertheless, these social terms are not used as part of a conceptual or theoretical framework to which these terms could be analytically referred, but as isolated terms with no explanatory purpose. For example, some programmes mention cultural factors and economic and social processes. They even speak of some social agents and interests, but these aspects do not aim to put any explanatory theoretical framework to work but only to include words rather than concepts.

This research uses the following procedure to analyse air pollution programmes in terms of the inclusion of a social dimension. The first step is to list the factors that
each of the programmes regards as most important in explaining air pollution. The second step is the classification of these factors into two groups, one of which corresponds to what this thesis would regard as a first level of analysis. This includes what have been classified here as physical, chemical and technical factors. Another corresponds to what is called a second level of analysis in this research, in which socio-political factors are taken into account. The methodological principle is assumed that these levels of analysis have a specific degree of explanatory effectiveness on their own, but when placed at the level of public policies, the level corresponding to social aspects is more effective inasmuch as the most important relations to be explained or modified in the implementation of policies are those of a social and political nature. This analytical arrangement does not reduce the importance of the first level; what it does is to link both levels, removing their self-referential nature by giving them relative rather than absolute levels of causality. A factor is classified as level 1 when it alludes to physical and chemical aspects of pollution, or when its explanatory sphere is limited to technical elements, without seeking relations beyond this level of existence. This research classifies a factor at level 2 when it causes elements that transcend level 1 to intervene, by suggesting causal links between the conditions of existence at the physical, chemical and technical level and social determinations or in its links with political forces. To a certain extent, this level includes the embodiment of factors expressed in level 1 at the social and political level. It is essential to point out that at this level, it is not enough for a programme to indicate the incorporation of socio-economic elements or terms for them to be included in level 2. However, as mentioned earlier, it does not suffice to include entire social chapters for no explanatory purpose at the diagnostic level. In order for social chapters, factors and terms to be regarded as social here, precise relations must be established between social forces and specific political forces or the embodiment of level 1 factors at the level of social relations must be described. These agents must be located in the context of what turns them into this type of agents, in other words, the holders of economic, political and social resources which influence or determine the specific shape taken by a phenomenon linked to air pollution. Programmes often mention socio-economic factors, yet restrict themselves to their physical and technical expressions. For example, industrial or population
concentration tends to be regarded as a socio-economic element. In other words, the consequence of a relationship is taken to be the relationship itself, and the virtues of socio-economic aspects are attributed to it. It is worth pointing out that the limits between levels 1 and 2 are merely introduced for analytical purposes and should only be regarded as analytical tools. In fact, these borders do not exist or are extremely difficult to establish.

The aim is to explore the analytical procedure by which each programme hierarchically arranges the causal factors it uses to explain air pollution. The programmatic strategies and their relation and congruence with the construction of the environmental programme will be analysed below. The last stage involves a comparison with a model scheme which includes those elements which, according to this research, should be incorporated into the construction of the problem and into a more objective, more effective policy proposal. The research classifies the three programmes according to their proximity or distance from this scheme. The model is only used to give an account of what is assumed as the real inclusion of a social dimension in a programme in this thesis. Whether or not this way of conceptualising social factors can be implemented in the actual policy-making process is another problem beyond the scope of this research. However, it is assumed here that a policy congruent with a social notion of environmental factors could be classified as more or less appropriate depending on its proximity to or distance from this analytical scheme.

5.3 The social construction of air pollution and interviews as an instrument for information gathering.

The second hypothesis of this research suggests that there is a social construction of the air problem, which lends it a non-physical dimension. To prove the existence of this social dimension, a series of interviews were conducted in order to provide elements that would enable one to speak of a social construction of the air problem.

Moreover, the purpose of these interviews is to prove the importance of the social dimension of environmental problems through an empirical study. The aim is
to document the existence, as posited in the second hypothesis of this research, of a social construction of the problem of air pollution in Mexico City, which provides arguments for positing that environmental problems cannot be programmatically analysed or intervened in by merely taking their physico-chemical and technical expression into account. In order to speak of a social construction, according to the authors reviewed in the existing literature on this field, it is necessary to show that there is a perception and conceptualisation of the problems of air pollution, which lends an additional dimension to its physical existence demonstrated by the data. According to some of the authors reviewed, environmental problems are not necessarily conceived by citizens or communities in accordance with the importance of these problems in terms of their dangerousness or real or potential hazardousness. As seen in chapter II, environmental problems undergo a process of social selection which depends on the valuation assigned to it by the community on the basis of principles such as the quality of life and the type of institutions prevailing in a society. In this research, particularly in chapter V, the aim is to prove that this social dimension exists in the case of air pollution in Mexico City and that it is relevant for the purposes of both analysis and decision-making. Assuming that a socially-constructed dimension of environmental issues exists, this research posits that it can be reconstructed by means of the way in which a group of key social actors linked to air pollution perceives, conceives and constructs it. The technique for gaining access to these constructions conceived by individuals or representatives of groups, institutions or organisations, was an interview based on a questionnaire with a series of questions on relevant aspects for testing the hypothesis of the social construction of air pollution. These interviews were not applied to an open universe but to a small sample of actors regarded as representatives because of their participation in either the generation of the problem, the analysis of its causes and consequences, the generation of awareness of the latter, or in contributing to the understanding and correction of these problems and the proposal of solutions. In this context 30 persons were interviewed between September and December 1996.

Why was the interview technique chosen? Interviews allow one to explore two dimensions of the way in which environmental problems are understood. On the one hand, they permit the analysis of the various ideological and political facets of the
way problems are perceived and thought of. On the other hand, they lend a fresher, more spontaneous dimension to the conceptualisation of problems that can be obtained from written texts. From the interviewees' answers, one can glimpse the values, assumptions and means of coexisting with environmental problems that are usually absent from the depersonalised, rational versions contained in official documents drawn up by various actors or social agents. This research does not seek to explore the various aspects involved in the way actors perceive and experience a problem such as pollution. Instead, it aims to demonstrate the existence of a social construction of air pollution, which should be taken into account in the reflection and planning concerning the problem inasmuch as it adds a dimension whose absence may affect the effectiveness of the solutions proposed.

5.3.1. The universe to be questioned: The selection of actors or agents.

The logic behind the selection of social actors to prove the existence of a social construction of air pollution problems was explained in the review of the literature in Chapter II, particularly in the section on ideology, in which Therborn points out that a particular social order not only establishes the values, norms and behaviours expected of its members but also determines who is entitled to give their opinion, and appraise or express their judgement of society itself. In this particular case of air pollution as a social phenomenon, in other words, as a phenomenon that has been socially perceived and constructed, this research accepts Therborn's view of the existence of these actors who are authorised to determine the existence of social facts, since they are the social repositories of this attribute, in other words, since they possess the socially recognised authority to speak. This research does not seek to analyse the process whereby these actors emerge as such. Instead, it regards Therborn's proposal as useful in explaining the selection of actors eligible for proving the existence of the social construction of air pollution.

The actors selected for interviewing possess a significant degree of information, owing to their involvement in the problem: the interviews are not designed for the general public but for a group of the latter who are more directly
linked to the theme of air pollution and who are assumed to have a significant influence over the images formed of environmental problems in public opinion and government programmes. Interviews offer the possibility of analysing, in a more spontaneous fashion than written texts, the various components of a social construction of air problems, as they are perceived and constructed. This enables the values, assumptions, judgements and prejudices inherent in all social means of perceiving problems to emerge more clearly. Nevertheless, this research does not seek to explore the various aspects involved in the way the actors perceive and experience a problem such as pollution. Nor does it seek to demonstrate who they are or how the ideological and political factors which specifically affect the social construction of problems are linked to specific social relations. Instead, it aims to prove the existence of a social construction of the air problem in Mexico City which lends it an additional dimension to its physical dimension and to show that this social dimension should be considered within government programmes, inasmuch as its absence might affect the effectiveness of the solutions proposed for solving the problem of air pollution. It also aims to provide elements that will enable one to characterise the type of social construction of air pollution in Mexico City reconstructed by means of the interviews with the actors questioned. The following actors were selected:

a) Public officials responsible for dealing with environmental problems at the various levels of public administration in Mexico. These actors were chosen because they are directly responsible for designing environmental policies, particularly air policies. It is assumed that the perceptions and conceptualisations of the members of this sector are not always included in official programmes and that it is important, for the purposes of the analysis of the social construction of problems, to analyse the subjective variety of ways in which air problems are conceived by the different actors, in order to appreciate their degrees of differentiation regarding the ideas and concepts incorporated into official programmes. If differences exist between the problems, as they appear in the programmes and the constructions of the public officials themselves, then this will reinforce the hypothesis of the existence of a social construction of air problems in Mexico City.

The public officials chosen represent the three levels of government which
coincide in the Metropolitan Area of Mexico City. The environmental problems of Mexico City are dealt with by two administrative bodies. The first is the Secretariat of the Environment of the Government of Mexico City, the second being the Metropolitan Environmental Commission (MEC), which administers the environmental problems for the entire metropolitan region to which Mexico City belongs. Three levels of government coincide in the MEC: the local level, corresponding to Mexico City; the State level, represented by the Government of the State of Mexico, a neighbouring state and the federal level, represented by the Secretariat of the Environment, Natural Resources and Fishing, corresponding to the federal government.

The two levels of government with the highest levels of participation in the air problems of Mexico City are the local and federal level. For this reason, their officials were regarded as being the most important for this research, inasmuch as their opinions and proposals were more likely to be able to influence the decision-making process.

b) The academic sector: One of the sectors or social agents authorised to talk about environmental problems is the academic sector. As shown in chapter II, environmental problems undergo an extensive process of elaboration in order to be perceived as such. Part of this process is related to the way in which scientific knowledge intervenes in the definition of what is regarded as risky or problematic as regards environmental issues. As mentioned earlier, Beck holds that environmental problems are not always directly perceived through the senses, as a result of which they often require the certification of an expert in order to be recognised as such. Science becomes the eyes through which people perceive environmental problems. Yet it is not only analytically relevant for this research to show how various representatives of the academic community conceive the environmental problem but also to explore the variety of perspectives and findings among the scientific community. This aspect is extremely important in research inasmuch as, in many sectors of society, scientific knowledge is regarded as a monolithic body of knowledge whose sole purpose is the search for truth. The ultimate purpose of including this sector is the same as that of including the previously mentioned agent, in other words, to demonstrate the existence of a subjective variety in the
construction of problems which enable the hypothesis of their social construction to be explored.

Within the academic sector, the problem of air pollution has mainly been approached by the medical sector, particularly those concerned with the study of the damage to health caused by pollution. Interviewees from this sector include the most prestigious physicians whose research work has the greatest influence, not only within the academic sector, but also within the social and government sector. Specialists in atmospheric sciences, environmental engineering, and researchers in the social sciences were also interviewed. All these interviewees have produced a number of written works, as a result of which they are regarded as experts in air pollution problems within their respective disciplines.

c) The business sector. This is an extremely important sector for the purposes of this section of research insofar as it includes various agents involved in the problem of the generation of pollution, such as industrialists, traders and members of the transport business. It is assumed in this research and in the context of the literature reviewed on the notion of ideology that these representatives of the business sector participate in the public scene in various ways, by generating images, mobilising perspectives or influencing environmental policy design as a result of the effectiveness of the economic, ideological and political resources they control. For this reason, their perceptions and conceptualisations of air pollution are considered relevant.

The business sector included representatives from the industrial sector, particularly the chemical, cement and metal mechanic industry. Within the service and trade sector, the public transport and car distributors sectors were interviewed.

d) Green activists. This is another agent which the literature regards as crucial to the process of constructing images and raising awareness of environmental problems. According to certain authors, their importance lies in their pedagogical function as regards the dissemination of scientific knowledge among the scientific sector and the general public. Green activists are regarded as a crucial element in the shaping of public opinion. Therein lies their importance as a participatory agent in the social construction of air pollution.

The profile of the green activists interviewed is as follows. Three types of
organisations were selected according to the degree of radicalism of their criticisms and demands vis-à-vis environmental problems and government management. In this respect, the interviewees included, on the one hand, representatives of one of the national and international groups with the most critical and radical positions. Moderate groups were also interviewed, including some whose positions resembled those of the government. Finally, groups between the two extremes, which are widely recognised because of the effectiveness of their demands and their influence at both the government and social level, were also interviewed. The interviewees included a representative from a young environmentalists' organisation.

e) International representatives. These agents are assumed to have a presence within government spheres in which environmental policies and programmes are designed inasmuch as they represent institutions responsible for technical aid or assistance. The views, ideas and interpretations of these actors are assumed to be doubly authoritative; on the one hand, because they provide economic assistance for the implementation of government programmes and on the other, because they provide technical assistance for the Mexican government, for dealing with the air problem or the environment in general. It is therefore assumed that they have the capacity to influence the type of policy designed by the government to cope with air pollution.

Representatives of international organisations were selected on the basis of their degree of presence at the government level, because of the economic and technical assistance they provide. Thus, representatives of American, European and Japanese organisations were interviewed. Representatives of these organisations have varying degrees of knowledge of the air problem in Mexico City. Some know about environmental problems in general, while others have a greater degree of knowledge about the air problem. However, they cannot be said to be experts on the issue. Nevertheless, their views are listened to by the authorities in charge of dealing with the air problem.

f) Political parties. The views of the representatives of political parties are regarded as significant because, to a certain extent, the way they include or exclude the various issues on their agenda gives some idea of the importance of these issues for society in general. It is assumed that parties, as part of their need to expand their
potential electorate, tend to include most of the problems that citizens regard as highly important in their political platforms. It is part of the nature of political parties to detect problems that are significant for the community, interpret them and translate them into proposals for their solution. It is also assumed that the parties are actors which not only have things to say and proposals to make concerning air problems but also influence government programmes, whether they are the ruling party or an opposition party.

The political parties and their representatives were selected on the basis of a simple criterion. First, representatives of the three largest political parties were interviewed, including the ruling party. Next, representatives of the green party were interviewed.

5.3.2. The choice of relevant themes for the interviews and their usefulness in discussing the social construction of air pollution.

There are many ways of exploring the possible social construction of environmental problems, such as air pollution. In this research, one particular method has been chosen, which is explained below. First, inasmuch as the first hypothesis of this research refers to the non-existence of an appropriate inclusion of the social dimension in existing government programmes, the questionnaire was built around a series of questions that would allow the interviewer to detect different forms of perception and conceptualisation of environmental problems that would reveal their social construction. There are also many ways of choosing the themes that must be translated into questions in the questionnaire in order to enable the actors interviewed to express various aspects of the air problem that would permit a comprehensive reconstruction of significant aspects of their social existence. This research has considered four aspects or themes which, for the purposes of this thesis, provide some idea of what the actors think about the air problem, the way they perceive it and the way they assume it. These include: 1) the interviewees' classification of the air problem; 2) the interviewees' classification of the government's environmental management; 3) their classification of existing knowledge of the pollution problem, 4) the actors' proposed solution for these problems.
Each of these themes contains questions, which will be mentioned later on. The aim of the first theme is to document the way in which the actors interviewed reflect on the emergence of environmental problems and the importance they attribute to them. This section also includes questions designed to explore the actors’ evaluation of the severity of the air pollution problem, its scope and the way they rate it in relation to other environmental problems in Mexico City. This will yield general aspects essential for proving the social construction of the air problem and describing its characteristics. The second group of questions is designed to detect the way actors rate the government’s handling of the air problem. The aim is to gauge the actors’ perception of the government’s will and ability to combat air pollution. It also includes a question that records actors’ views on the government’s actual political capacity to solve the problem of air pollution. The third group of questions explores a highly significant aspect for the social construction of air pollution. This is the way the actors rate the role of scientific knowledge in government programmes and the quality of this knowledge, according to the actors involved. Finally, the fourth group of questions is designed to discover the solutions proposed by the interviewees themselves, as well as the obstacles they have encountered. This is an extremely important section of the interview since it explores the actors’ solutions for dealing with the problem, which can then be compared to the proposals contained in official programmes.

The answers to these questions will therefore provide a summary of the way actors perceive and reflect on air pollution in Mexico City. These perceptions and reflections will enable one to speak of a possible social construction of air pollution in Mexico City.

5.3.3. The questions

1) First group of interviews: Rating the air pollution problem.
   Questions:
   a) How do the actors explain the emergence of environmental problems and how important do they consider them to be?
   b) How serious is the problem of air pollution in Mexico City?
c) How do they rate the scope of air pollution in the city and how would they rate this problem in relation to other environmental problems?

2) Second group of questions: Rating government management.
   Questions:
   a) How much credibility do the actors give the government as regards its will and capacity to solve the air pollution problem?
   b) In the actors' view, how much margin for manoeuvre do the authorities have for solving the problem?

3) Third group of questions: Rating existing knowledge of the pollution problem.
   Questions:
   a) How important do the actors think that science is in designing government policies?
   b) How objective is existing knowledge on air pollution in Mexico, according to the actors?

4) Fourth group of questions: The solution to the problems.
   Questions:
   a) Can the problem of air pollution in Mexico City be solved?
   b) What are the obstacles and the solutions envisaged by the actors for solving the pollution problem?

6. General comments on the fieldwork

   The fieldwork experience provides an opportunity for testing the general ideological atmosphere among the interviewees. It was interesting to note both the variability and the uniformity of ideological and political constructions. There is some degree of agreement among the actors on the severity of environmental
problems in Mexico City. Most social actors agreed that more drastic measures are needed to reduce the problem. There is a shared feeling among actors about the importance of fighting for a better environment, which is automatically associated with the term “sustainability”. Yet the actors also disagree over certain critical aspects of the pollution problem. For example, during the interviews, a representative of the business sector acknowledged the severity of the air pollution problem, but refused to admit its health consequences, demanding more convincing proofs. Green activists, on the other hand, seemed convinced that the only people responsible for air pollution were government and the industrial sector. Academics shared some general assumptions and propositions with government officials, but disagreed over their appraisal and hierarchical arrangement of the main environmental problems. On the other hand, when academics evaluated the proposals made by the green activists, some of them did not think that these proposals were serious. However, this opinion did not prevent them from recognising the valuable work carried out by green activists as regards consciousness-raising.

All the actors interviewed expressed great concern over the deterioration of the environment, even though they did not always have the same thing in mind when talking about the environment. Most actors associated the environment with pollution, and pollution with air pollution.

The results of the fieldwork revealed a double attitude among the interviewees toward the environmental issue: on the one hand, there was a tendency towards the homogenisation of the linguistic forms used, standardised by constant reference to two words which would appear to summarise the collective desire for a solution to the acute environmental problems in Mexico City: sustainable development. All the agents interviewed evinced a deep faith in this expression, which does not seem to require any specific content. Everyone, however, referred to the lack of understanding of the other actors regarding the “real meaning” which should be given to these terms. They also revealed a certain passion regarding the meaning that should be given to the idea of sustainability and the (“real”) solutions which should be implemented. On the other hand, a sphere of differentiation occurred at the level of conceptualisation of specific problems, the type of solutions proposed and the assessment of the effectiveness of government action.
Some actors shared views and perceptions and the different perceptions of air pollution problems often concerned the actors’ particular practices and positions in the social structure. There were some cases where it was possible to isolate ways of thinking that are more directly linked to specific interests. A proposal to renovate the city’s vehicle fleet put forward by a car dealer which pointed towards the creation of a subsidised market for old cars, in order to reactivate the car market, is easy to associate with this sector. There were cases of what could be called “uncertainty” or ideological transition, expressed in confused language, which were not necessarily linked to the actor who expressed these views. This comment does not refer to those who adopted radical positions for the purpose of manipulation, but to those who used forms of discourse as a result of something that appeared to be a functional confusion or lack of assimilation, usually temporary, of actors involved in a change of position or role.

In this respect, it is interesting to analyse the construction of the environmental problem in Mexico by a group of officials who hold key positions in government departments associated with the environment. As noted in the interviews, this group used language permeated with ecological terms. For this reason, it was often difficult to determine where the academic or activist ended and where the public official began. There are some reasons that could explain this mimesis and ubiquity of official discourse, as perceived in the context of the fieldwork. On the one hand, many of the officials in the present administration previously had various degrees of commitment to research in several academic spheres; some of them have even published work with a certain degree of influence in the field of environmental studies. One of them exclaimed quite sincerely:

I feel really strange when somebody calls me a public official, because I still regard myself as an academic and researcher.

Others had recently returned to Mexico after pursuing post-graduate studies abroad. The interview period (September-December 1996) occurred shortly after the time many of the interviewees had assumed these administrative positions, meaning that they were only just adapting their former views to those they were obliged to express as a result of their new functions.

Finally, perhaps the most significant cause of this behaviour is the prevalence
of the discourse of sustainability among the interviewees. This has led to a certain
degree of homogenisation of the ecological discourse, particularly because of the
readiness with which the term sustainability has been associated with the idea or
desire for what is “good” or must be included in any project or proposal involving
the relationship between man and nature. In this order of affairs, sustainability
emerged as the group’s wishes, a term which expressed a mood shared by both the
public official, the green activist, the political leader, the university student and the
common citizen. It was felt during fieldwork that sustainability was a magic word
which sanctified or sanctioned the discourse and proposal for action in environmental
issues; it seemed that unless it was accompanied by a notion of sustainability,
nothing would be regarded as a serious proposal, and could be easily ignored in
environmental issues.

Despite this apparent homogeneity of environmental discourse which appeared
to impose the language of sustainability, a heterogeneous discourse emerged from the
answers to the different questions asked. On the basis of the various opinions
expressed, air pollution emerged as a problem that was susceptible to subjective
variability. Ideas on the environment appeared as constructions shaped by different
types of knowledge, perceptions, values and points of views. They seemed to emerge
as the result of debate, negotiation and argument. They did not appear as absolute
truths, but as hybrid constructions comprising various kinds and levels of knowledge
in which ideology, politics and science seemed to be combined in different ways. In
this context, the materials that decision-makers find to construct their diagnosis and
strategies for action are made up of scientific elements, common sense, and
ideological and political components. Decisions in this context appeared as
something that had been decided in a political and ideological arena, rather than in a
purely scientific scenario.

The interviews allow one to infer the relationship between what social actors
perceive and construct as environmental problems and certain economic, political
and ideological perspectives. It is not possible, however, to make these associations
in a direct and mechanical way. On the other hand, it is not the purpose of this
research to establish these associations between actors and perspectives. That is a
task that will have to be undertaken in future research. The fieldwork also allowed
one to perceive the existence of a "guided" political interpretation of problems, proposed by some sectors of government authorities. It is also possible to find in the discourse of actors as a whole, elements of a social perception, a community attitude, that seems to come from society and which constitutes a sort of group interpretation, for which no-one can be held responsible, because it is not the result of an individual entity but rather the result of this reality which emerges from the combination of a number of individual views. In the last case, it seemed as if certain social preferences were imposed. In this respect, people appeared to be talking about a sort of group values and their ideological expressions. On some occasions, they presented their perceptions and constructions as a sort of search for certain environmental conditions. On other occasions they displayed their tolerance or intolerance toward environmental problems. Some of their perceptions revealed something like the notion of well-being they entertained in respect of the quality of environment. It was also possible to perceive a sort of alienating manner of dealing with environmental problems by various social actors, but something like an accepted alienation was also perceived, together with a degree of social tolerance identified by some of the sociologists analysed here as a component of integration or existential safety necessary for social reproduction. A government official said the following:

We are suddenly reaching the stage where society seems to regard having a high level of pollutants as normal. It is symptomatic that on many occasions, Mexico City inhabitants, who have the privilege of breathing in four million tons of substances released into the atmosphere annually, are the least willing to acknowledge the real and potential dangers derived from air pollution. Given the scope of the problem and the inability to solve it, particularly at the individual level, the best solution is to deny its existence.

These aspects of the research concerning the relationship between social actors and discourse and the associations between ideologies, specific values and interests are not the objective of this thesis. It merely seeks to prove the existence of the social construction of air pollution and to characterise it. Nevertheless all these aspects appeared and were perceived as such while the fieldwork was being undertaken. They are mentioned here merely as a means of communicating some idea of the social atmosphere in which the fieldwork was carried out.

Finally, it is important to make some comments on the interviews. An
agreement was made with the interviewees to preserve their anonymity. In this respect, in chapter V the actors are only mentioned in terms of the sector and specific area of either their work or specialisation. There are two exceptions, namely, the Green activists and the international organisations. In these cases, the names of the specific groups and organisations were omitted, to prevent their identification.

Another important aspect of the interviews worth mentioning is the fact that the number of actors per sector is not always the same. This has to do with the fact that not all the actors answered the questions in the way they were asked. Some actors did not have an answer to a specific question. Some of them admitted that they knew nothing about the issue while others said that they would prefer not to answer.

Another feature of the interviews was that the actors did not always give long answers to the questions. It was also found that even though some actors did not answer a specific question, at some point in the interview, they gave answers that were very closely related to that question.

Before the report on the fieldwork to prove the hypothesis of this research is presented in Chapter IV and V, a general background to air pollution in Mexico City will be given in the following chapter. The purpose of this chapter is to give an idea of the scope and characteristics of Mexico City's air pollution.
Chapter III. The Air Pollution Problem and its Health Consequences in Mexico City: General Background

In the previous section, air pollution emerged as a relevant problem in Mexico City. Indeed, the importance of air pollution constitutes the starting point of this research. For the purposes of the latter, however, pollution is also a product of social interaction and a socially constructed problem. Nevertheless, in order to be able to describe the social dimension of a problem such as air pollution, measurable evidence of the other dimension of air pollution, that concerns its physical dimension, is also required.

This chapter presents data that describe the scope of the problem in some detail. The data and characteristics of air pollution presented here are not intended to provide the only version of air pollution, although there is some agreement on this description of air pollution and its health consequences. Nevertheless, this chapter should be regarded as a general background, and a point of reference for relating to it the different existing social constructions among the main actors analysed here.

1. Air Pollution in Mexico City

1.1 Energy Consumption in Mexico City

The vast economic and demographic concentration in the Mexico City Metropolitan Zone (MCMZ) is also reflected in its enormous energy consumption. It is estimated that energy requirements in the Valley of Mexico will rise from the approximately 1,000,000 barrels a day consumed in the late 1980s to 2,700,000 barrels by the end of the century. These volumes of energy consumption account for 25-30% of the national total. Petrol constitutes 41% of all the fuels consumed in the MCMZ, diesel 12%, gas oil 2%, LP gas 20% and natural gas, 25% (DDF et al., 1996). The transport sector uses 56% of the total of all types of fuel consumed in the zone, the thermoelectric sector 9%, industry and services 25% while the remaining 10% is used by other sectors, including the domestic sector.

Petrol is the type of fuel in greatest demand in the region as well as the principal source of pollutant emissions discharged into the atmosphere. In 1989, the MCMZ consumed 16 million litres of petrol a day, a figure which had risen to 20
million litres a day by 1994. These volumes of petrol consumed in the MCMZ are used almost exclusively in the transport sector, which is responsible for 75% of the total amount of emissions in the Mexico City Metropolitan Area. The data available for 1991 show the importance of the transport sector in energy consumption and its effects on pollutant emissions. Thus, as the following chart shows, although private cars effected only 15% of all the journeys/person/day that took place in the Metropolitan Area of Mexico City, they consumed 67% of all the energy used in the zone, emitting 5-6 more grams of pollutants per journey/day than petrol-fuelled public transport and the highest amount of pollutants by far in the transport sector (DDF et al., 1990; Lacy, 1993; DDF et al., 1996).

**TABLE 1. MCMZ: Energy consumption and pollution levels in the transport sector**

<table>
<thead>
<tr>
<th>Types of Journeys</th>
<th>Transport journeys pers/day</th>
<th>% journeys pers/day</th>
<th>Energy consum.</th>
<th>% Energy consum.</th>
<th>Pollutant emissions</th>
<th>Pollutant levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private cars</td>
<td>4 400 000</td>
<td>14.9</td>
<td>8.00</td>
<td>67.0</td>
<td>7430.0</td>
<td>1857.50</td>
</tr>
<tr>
<td>Minibuses and taxis</td>
<td>10 020 000</td>
<td>34.0</td>
<td>2.30</td>
<td>19.3</td>
<td>1840.0</td>
<td>174.90</td>
</tr>
<tr>
<td>R-100</td>
<td>4 200 000</td>
<td>14.3</td>
<td>0.45</td>
<td>3.8</td>
<td>213.0</td>
<td>50.70</td>
</tr>
<tr>
<td>Mexico State Buses</td>
<td>5 500 00</td>
<td>18.7</td>
<td>1.03</td>
<td>8.6</td>
<td>539.2</td>
<td>96.00</td>
</tr>
<tr>
<td>Underground</td>
<td>4 800 00</td>
<td>16.3</td>
<td>0.15</td>
<td>1.3</td>
<td>13.1</td>
<td>2.78</td>
</tr>
<tr>
<td>Tram and light train</td>
<td>535 000</td>
<td>1.8</td>
<td>0.01</td>
<td>0.1</td>
<td>1.0</td>
<td>2.12</td>
</tr>
<tr>
<td>Total</td>
<td>29 455 00</td>
<td>100</td>
<td>11.94</td>
<td>100</td>
<td>10036.3</td>
<td>341.5</td>
</tr>
</tbody>
</table>

1 Kcal x 10 raised to 10/day
2 Grams/journey/persons
3 Ton/day

Several of the measures implemented to attack the problem of pollution have been aimed at improving petrol. Changes in petrol content have sought to reduce or eliminate substances known to damage health. This was the case of the reformulations in the mid-1980s aimed at reducing the sulphur and lead content. The late 1980s saw the introduction of the oxygenation method to reduce carbon monoxide emissions. A new type of petrol (Premium) has been introduced to reduce the emissions of substances which contribute to the formation of ozone.

**1.2 Air quality in Mexico City**

In order to measure air quality in Mexico, the Mexican government has designed an Air Quality Index known as the Metropolitan Air Quality Index (IMECA), which, despite having been designed to measure air quality in the
Metropolitan Area of Mexico City (MAMC) is used to measure air quality in the rest of the country. Through this index, air pollutant concentrations are placed on a scale from 0-500. As one can see from Table 2, when pollutant concentration ranges from 0-100, this means that Air Quality is satisfactory and has no consequences on people’s health. When pollutants range from 101-200, air quality is classified as unsatisfactory, and causes minor health problems. In the 201-300 range, air quality is regarded as poor, and causes major health problems in particularly sensitive people. Finally, in the 301-500 range, air quality is defined as extremely poor, and produces severe symptoms and intolerance among healthy people.

**TABLE 2. Mexico City: Metropolitan Air Quality Index.**

<table>
<thead>
<tr>
<th>Range</th>
<th>Quality</th>
<th>Description/Reactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-50</td>
<td>Good</td>
<td>Very favourable conditions for performing any type of physical activities</td>
</tr>
<tr>
<td>51-100</td>
<td>Satisfactory</td>
<td>Favourable conditions for performing any type of physical activities.</td>
</tr>
<tr>
<td>101-200</td>
<td>Unsatisfactory</td>
<td>Increase in minor disorders in sensitive persons</td>
</tr>
<tr>
<td>201-300</td>
<td>Poor</td>
<td>Increase in disorders and relative inability to tolerate exercise in persons with respiratory and cardio-vascular complaints. Few disorders among general population.</td>
</tr>
<tr>
<td>301-500</td>
<td>Extremely poor</td>
<td>Appearance of different symptoms and inability to tolerate exercise among the healthy population.</td>
</tr>
</tbody>
</table>

Source: INEGI, 1995

Mexico lacks a broad, systematic monitoring scheme at the national level. However, cities with some type of air quality monitoring have significant air pollution problems, particularly those with greater industrial activity and a large number of vehicles.

Air quality is deteriorating in the metropolitan areas of Guadalajara and Monterrey. Guadalajara, where an automatic system for monitoring air quality was installed in 1993, has the following pollutants; particulate matter (PM), ozone (O₃), sulphur dioxide (SO₂), nitrogen oxide (NOₓ), carbon monoxide (CO) and hydrocarbons (HC). The main air pollution problem in this city is particulate matter, followed by ozone. Monterrey has experienced severe air pollution problems for many years but it was not until 1993 that its air quality began to be monitored. However, other than PM-10, which shows a pollutant concentration regarded as unsatisfactory, in some parts of this region and at certain times of the year, this metropolitan area has fewer air pollution problems than Mexico City.

Air quality problems in Mexico City are created by a combination of different social and natural factors, such as the technology used in manufacturing, the technology used to control emission sources in the transport, industrial and service sectors, rapid population growth with inadequate infrastructure and Mexico City’s
geographical setting. The latter results in inefficient fuel combustion due to the high altitude of the Valley of Mexico, and atmospheric inversions caused by air being trapped by the mountains that surround the city.

In 1996, air quality in Mexico City was not as poor in the past, although violations of the norm were still a cause for concern. As one can see from the table, ozone concentration in Mexico City exceeded the norm 327 days in the year, while PM-10 emissions exceeded the norm 192 days in the year, as did NOx (79 days), CO (seven days) and SO2 (two days), (INEGI, 1994; DDF et al., 1996).

**TABLE 3. No. of days with IMECA readings of over 100 points per month and type of pollutant in 1996**

<table>
<thead>
<tr>
<th>MONTH</th>
<th>OZONE (O3)</th>
<th>SULPHUR (SO2)</th>
<th>NITROGEN (NO2)</th>
<th>CARBON (CO)</th>
<th>PARTICLES (PM10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JANUARY</td>
<td>29</td>
<td>0</td>
<td>23</td>
<td>4</td>
<td>29</td>
</tr>
<tr>
<td>FEBRUARY</td>
<td>29</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>MARCH</td>
<td>29</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>26</td>
</tr>
<tr>
<td>APRIL</td>
<td>24</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>MAY</td>
<td>31</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>JUNE</td>
<td>23</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>JULY</td>
<td>28</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>AUGUST</td>
<td>26</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>SEPTEMBER</td>
<td>27</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>OCTOBER</td>
<td>26</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>NOVEMBER</td>
<td>27</td>
<td>2</td>
<td>12</td>
<td>0</td>
<td>21</td>
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<tr>
<td>DECEMBER</td>
<td>28</td>
<td>0</td>
<td>15</td>
<td>1</td>
<td>15</td>
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<tr>
<td>ANNUAL</td>
<td>327</td>
<td>2</td>
<td>79</td>
<td>7</td>
<td>192</td>
</tr>
</tbody>
</table>

Source: Computed from the DDF Automatic Air Monitoring Network.

1.3 Air Pollution in Mexico City: Data and Estimates

The first official attempts to measure pollution in Mexico used the monitoring network established by the authorities in Mexico City in 1967 with the support of the Pan-American Health Organisation. Using this network to monitor air quality enabled the authorities to conclude that there were no significant problems of atmospheric pollution in Mexico City. Indeed, it was not until the mid-1980s, despite the issuing and publication of a set of air quality regulations, and the creation of an institutional structure to deal with environmental problems, that the authorities began to regard the problem of air quality in Mexico City as significant, since none of the monitoring systems implemented, particularly between 1974 and 1985, had been able to measure the scope of the environmental problem with any degree of accuracy (Bravo et al. 1992 and 1996; Fundación Universo Veintiuno, 1990). It was not until 1985 that atmospheric pollution began to be systematically measured in the Valley of Mexico.
The Integral Programme to Combat Air Pollution in Mexico City (PICCA) estimates the annual volume of pollutants in the mid-1970s at 3.5 million tons (DDF et al., 1990). At the same time, Bravo and his team of researchers at the Centre for Atmospheric Science at UNAM maintain that photochemical pollution has existed since the late 1950s. They cite an Emissions Inventory with data for the early 1950s which recorded the existence of pollution, primarily SO2 and PM, the latter with high proportions of organic fragments. According to these authors, by 1968, Mexico City had already exceeded international standards for CO, PM and Pb (Bravo et al. 1992 and 1996). These authors hold that the reformulation of petrol in the 1980s to reduce its lead content created conditions for the loss of control over ozone, which, according to some sources, has exceeded official standards on most days of the year since 1986. Monitoring by Bravo and his collaborators at the Centre for Atmospheric Sciences at UNAM between 1984 and 1990 showed that the authorities began to lose control of ozone in 1986, which coincides with the reformulation of petrol, which, according to these authors, “produced a significant change in the composition of organic reagents emitted through car exhausts and the evaporation of the new type of petrol as well as in the quantity of NOx emitted by combustion, as a result of which different motor designs are required to be able to use the reformulated petrol” (Bravo et al. 1992).

TABLE 4. No. of days with IMECA readings over 100, 200, 250 and 300 points (1988-1996): (OZONE)

<table>
<thead>
<tr>
<th>Year</th>
<th>Over 100</th>
<th>Over 200</th>
<th>Over 250</th>
<th>Over 300</th>
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<tbody>
<tr>
<td>1988</td>
<td>329</td>
<td>67</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>1989</td>
<td>329</td>
<td>15</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>1990</td>
<td>328</td>
<td>84</td>
<td>27</td>
<td>3</td>
</tr>
<tr>
<td>1991</td>
<td>353</td>
<td>173</td>
<td>56</td>
<td>8</td>
</tr>
<tr>
<td>1992</td>
<td>333</td>
<td>123</td>
<td>37</td>
<td>11</td>
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<tr>
<td>1993</td>
<td>324</td>
<td>80</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>1994</td>
<td>344</td>
<td>93</td>
<td>4</td>
<td>0</td>
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<tr>
<td>1995</td>
<td>324</td>
<td>88</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>1996</td>
<td>327</td>
<td>69</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Average</td>
<td>332</td>
<td>88</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>Minimum value</td>
<td>324</td>
<td>15</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Maximum value</td>
<td>353</td>
<td>173</td>
<td>56</td>
<td>11</td>
</tr>
</tbody>
</table>


In 1986, the Secretary of Urban Development and Ecology (SEDUE) published a report on the Status of the Environment in Mexico. According to this report, it was possible to estimate the volume of pollutants being discharged into Mexico City’s atmosphere at just over four million tons, 15% of which, according to the same report, came from fixed sources (industry and services), 80% of which came from
mobile sources (transport) and 5% from natural sources. The analysis carried out for 1974-1984 in this report detected an increase in the concentration of particulate matter (PM) and sulphur dioxide (SO$_2$), with the north-east and south-east zones being the most affected by PM. As for SO$_2$, the most highly affected areas were the central and north-west and north-east zones. The increases detected in this report were extremely significant. The concentration of PM in the Northeast zone rose from 65 ug/m$^3$ in 1974 to 400 ug/m$^3$ in 1984; while SO$_2$ rose from 60ug/m$^3$ in 1974 in the central zone to 120 ug/m$^3$ in 1984.

**TABLE 5. Emissions Inventory for the Valley of Mexico 1985**

<table>
<thead>
<tr>
<th></th>
<th>PM</th>
<th>SO$_2$</th>
<th>Nox</th>
<th>CO</th>
<th>HC</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed sources</td>
<td>2.55%</td>
<td>8.70%</td>
<td>1.95%</td>
<td>1.05%</td>
<td>0.75%</td>
<td>15.00%</td>
</tr>
<tr>
<td>Mobile sources</td>
<td>1.60%</td>
<td>1.04%</td>
<td>71.20%</td>
<td>7.52%</td>
<td>80%</td>
<td></td>
</tr>
<tr>
<td>Natural sources</td>
<td>5.00%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5.00%</td>
</tr>
<tr>
<td>Total</td>
<td>7.55%</td>
<td>10.30%</td>
<td>2.99%</td>
<td>72.25%</td>
<td>8.27%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>


In 1988, SEDUE, quested by Fundación Universo Veintiuno(1990), published data on the volume of pollutants in the Valley of Mexico, recording 4.9 million tons of substances as having been discharged into the atmosphere in 1987, 13% of which were attributed to fixed sources, 82% to mobile sources and 5% to natural sources, with CO comprising 73.7% of these pollutants.

**TABLE 6. Emissions Inventory for the Valley of Mexico 1987**

<table>
<thead>
<tr>
<th></th>
<th>PM</th>
<th>SO$_2$</th>
<th>Nox</th>
<th>CO</th>
<th>HC</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed sources</td>
<td>2.67%</td>
<td>4.93%</td>
<td>1.42%</td>
<td>1.11%</td>
<td>2.87%</td>
<td>13.00%</td>
</tr>
<tr>
<td>Mobile sources</td>
<td>0.84%</td>
<td>0.15%</td>
<td>2.26%</td>
<td>72.47%</td>
<td>6.28%</td>
<td>82.00%</td>
</tr>
<tr>
<td>Natural sources</td>
<td>5.00%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5.00%</td>
</tr>
<tr>
<td>Total</td>
<td>8.51%</td>
<td>5.08%</td>
<td>3.68%</td>
<td>73.58%</td>
<td>9.16%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>


Pollution analysis and the practice of atmospheric planning in the Valley of Mexico became more rigorous with the drawing up of the 1989 Emissions Inventory, which constituted the main tool for the 1990 air pollution programme PICCA, which marked the start of a period of greater professionalisation in the programmes for reducing atmospheric pollution in the Valley of Mexico. The compilation of a second inventory with data for 1994 constituted a significant attempt to study the problem of air pollution and served as an essential tool for the Air Quality Improvement Programme in the Valley of Mexico in 1996 (DDF et al., 1996).
According to the 1989 inventory, the Valley of Mexico received 4,356,391 tons of polluting substances a year, 76.7% of which were due to transport, 8.4% to industry and services (including the energy sector) and 15% to ecological degradation. Data from the 1994 Emissions Inventory record a total annual volume of pollutants discharged into the atmosphere of 4,009,629 tons. According to this last inventory, transport accounted for 75% of the total amount of pollutants released into the atmosphere of the Valley of Mexico, while industry and services were responsible for 13%, with vegetation and soils accounting for 12%.

However, the share of the sectors mentioned varies according to the type of pollutant. Thus, for example, in 1989, the industrial and service sector contributed 78.2% of all sulphur dioxide (SO$_2$) discharged into the atmosphere, with PEMEX and the thermoelectric industry alone accounting for 35.5% while the transport sector contributed 21.7% of this pollutant. In 1994, the inventory attributed 73% of the SO$_2$ released annually into the Valley to the industry sector, the difference being that the share of the PEMEX sector and the generation of electric energy was virtually non-existent, at 0.2%, with the transport sector accounting for 26.8%. It is worth noting that between the 1989 and 1994 inventories, SO$_2$ fell by 78%. As for Nitrogen Oxides (Nx), in the 1989 inventory, the transport sector was primarily responsible for Nx pollutants, producing 75.4% of the total, while the industry and service sectors accounted for 24%. According to the 1994 inventory, the transport sector was responsible for 71.3% while industry and services accounted for 28.6%. However, in 1994, the energy sub-sector registered an 82% increase over its Nx emissions for 1989. As for HC, in 1989, 12.5% of the emissions were produced by the industry and service sector, 52.5% by the transport sector while 35% were the result of natural causes. According to the 1994 inventory, these proportions were as follows: 42% of the HC emissions were the result of industrial and service activities, 54% were produced by the transport sector while 4% were the result of natural causes. By analysing the energy sector separately, one finds a drastic reduction between 1989 and 1994 from 5.5% to 0.2%. However, this pollutant entails severe problems. If the 1989 inventory could be compared with the 1994 inventory, one would find that in the energy sub-sector, HC had been reduced by 99%, while the industry and service sectors (excluding the energy sector) would have shown an increase of 975%. The transport sector would have shown an increase of 88% between the first and second inventories, while natural sources would have fallen by 81%. (see page 127).
Inventories are obviously not entirely comparable. However, these are the only instruments available for measuring the volume of emissions, their components and changes. As far as the level of internal congruence of both inventories is concerned, there are a number of changes worth noting. For example, particularly striking is the virtual disappearance of Petróleos Mexicanos (PEMEX), the state company responsible for producing fuels and the energy generation sub-sector, as contributors to the total pollutants being discharged into the atmosphere. Thus, their contribution fell from 4% in 1989 to a mere 0.5% in 1989. The reduction of the energy sector from 1989 to 1994 occurred in all the substances included in both inventories, except No\textsubscript{x} which, as mentioned earlier, increased by 82%.

Nevertheless, the most important point in the analysis of both inventories is the relative behaviour of the different sectors for the purpose of determining their contribution to the total volume of emissions. In this respect, it is worth noting that the pollutants emitted by the industry and service sector, excluding the energy sub-sector (if the volumes of both inventories were comparable) would be 163% greater than those of 1989. Also noteworthy is the fact that the pollutants attributed to natural factors would be 9% less in the second inventory than in the first. All the pollutants discharged into the atmosphere by natural factors (SO\textsubscript{2}, CO, NO\textsubscript{x}, HC), with the exception of particulate matter (PM) appear in the 1994 inventory with a volume of less than 80% of the amount recorded in 1989.

Two aspects are worth pointing out here. First, if the increase in pollutants emitted by the industry and service industry is not only a problem of lack of comparability between the inventories, then it must reflect a loss of control on the part of the authorities regarding emissions from the industrial and service sectors. Second, the reduction of the contribution of natural features to pollution is unlikely to be the result of air policies, meaning that it can only be the result of improved measurement of the sources of emission, which casts doubts on the sectoral distribution of contaminants; in other words, one cannot be sure whether natural factors are serving as a "non-specified" cause, to which both inventories attribute a proportion which bears no relation to its actual contribution to atmospheric pollution. If the data from both inventories were comparable as regards contributions by the industry, trade and transport sectors, the result would be that the strategy and programmes for reducing air pollution would have proved effective in combating the majority of pollutants in the industrial sector, while the problem of HC would have
emerged on a disproportionate scale (975% increase). At the same time, the transport sector would have increased its share of PM and HC to over 80%, with a significant decrease in SO\textsubscript{2}, CO and NO\textsubscript{x}.

A key factor in the problem of atmospheric pollution is the transport sector. According to the 1989 Emissions Inventory, this sector annually discharged 3.3 tons of substances into the atmosphere, representing 76.7% of the total amount of pollutants released annually into the atmosphere. The 1994 Inventory recorded three million tons of substances discharged annually by the transport sector, accounting for 75.4% of the total. However, the significance of comparing data from both inventories is that it enables one to measure the relative contribution of the different modes of transport to pollution. Thus, for example, the contribution of private cars remained virtually constant at 34%, while in 1989, taxis, minivans and microbuses accounted for 18.4% of all pollutants, a figure which rose to 28.4% in 1994. (see page 129).

These data from the transport sector, if correct, should be understood in the context of the trend in the late 1980s which meant that passenger buses were replaced by minivans and microbuses. In 1988, Ruta 100 buses transported 21% of all passengers from the Valley of Mexico, while the Underground transported 15.6% and minivans and microbuses 27%. By 1991, the situation had changed drastically; Ruta 100 had reduced its share to 8% and the Underground to 10.6% with minivans and microbuses transporting nearly 60% of all passengers in the Valley of Mexico (DDF et al.1991).

Available data on the transport sector, particularly those concerning the emissions of pollutants from private cars and public transport, when weighted for the number of passengers mobilised and the number of units in each of these fleets of vehicles, belie the widespread idea that public transport pollutes less than private transport. In this respect, calculating the total emissions of pollutants from private cars and public transport by the number of journeys/person/day for 1989 shows that private cars emitted 345 grams of pollutants per year per passenger transported while public transport emitted 82 grams. However, if these data are weighted according to the size of each of these fleets of vehicles (private and public) it is obvious that public transport pollutes far more than private transport.
### Emissions Inventory 1989–1994

#### Type of Contaminant

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Energy</td>
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<td>161.54</td>
<td>75.028</td>
<td>104.29</td>
<td>55.205</td>
<td>1.295</td>
<td>9.846</td>
<td>1.7883</td>
<td>31.843</td>
<td>254.88</td>
<td>172.621</td>
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<tr>
<td>Service</td>
<td>2.465</td>
<td>1076.71</td>
<td>22.060</td>
<td>721.68</td>
<td>4.660</td>
<td>964.13</td>
<td>598.00</td>
<td>551.95</td>
<td>21.00</td>
<td>398.178</td>
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<td>Transport</td>
<td>9.549</td>
<td>1884.20</td>
<td>44.774</td>
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<td>2.655</td>
<td>7.578</td>
<td>131.691</td>
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<td>700.180</td>
<td>555.119</td>
<td>5542.272</td>
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<td>Ecological Degradation</td>
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<td>625757.00</td>
<td>331.00</td>
<td>0.00</td>
<td>27.562</td>
<td>0.00</td>
<td>511.00</td>
<td>0.00</td>
<td>199.776</td>
<td>38.996</td>
<td>665.840</td>
<td>664.240</td>
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<td>Total</td>
<td>450.599</td>
<td>4556.13</td>
<td>203.725</td>
<td>4546.08</td>
<td>2.570</td>
<td>2.758</td>
<td>177.338</td>
<td>128.646</td>
<td>572.103</td>
<td>1025.00</td>
<td>4356.381</td>
<td>4325.00</td>
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Sources:
(1) DDFetal. 1996
(2) DDFetal. 1999

### Emissions Inventory 1989–1994

#### Type of Contaminant (percentages in weight per pollutant)

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<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Energy</td>
<td>1%</td>
<td>2%</td>
<td>35.5%</td>
<td>0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>5.6%</td>
<td>13.9%</td>
<td>5.6%</td>
<td>0.0%</td>
<td>3.7%</td>
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<td>Industry</td>
<td>2%</td>
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<td>10.6%</td>
<td>7.0%</td>
<td>3.3%</td>
<td>2.2%</td>
<td>1.7%</td>
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<td>Service</td>
<td>2%</td>
<td>0.24%</td>
<td>10.7%</td>
<td>16%</td>
<td>0.0%</td>
<td>0.4%</td>
<td>4.2%</td>
<td>4.2%</td>
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<td>38.8%</td>
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<td>Transport</td>
<td>2%</td>
<td>4.17%</td>
<td>21.8%</td>
<td>27%</td>
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<td>9.0%</td>
<td>75.6%</td>
<td>71.3%</td>
<td>52.5%</td>
<td>54.1%</td>
<td>76.7%</td>
<td>76.7%</td>
</tr>
<tr>
<td>Ecological Degradation</td>
<td>94%</td>
<td>64.18%</td>
<td>0.7%</td>
<td>0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.5%</td>
<td>0.0%</td>
<td>34.9%</td>
<td>3.7%</td>
<td>33.0%</td>
<td>13.8%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100%</td>
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<td>100.00%</td>
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</table>

Sources:
(1) DDFetal. 1990
(2) DDFetal. 1990.
### Emissions Inventory: Transport Sector 1989 - 1994

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PM</td>
<td>4398.</td>
<td>10321.</td>
<td>3557.</td>
<td>6061.50</td>
<td>1328133.00</td>
<td>1044008.00</td>
<td>41976.00</td>
<td>31913.00</td>
<td>141059.00</td>
<td>253865.70</td>
<td>1519123.00</td>
<td>1346169.2</td>
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<td>4 009 629.0</td>
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* Includes pick-ups, external transport, municipal buses, locomotives and the airport.
### Emissions Inventory: Transport Sector 1989-1994

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<td>11.71%</td>
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<td>54.14%</td>
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<tr>
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<td>95.83%</td>
<td>78.24%</td>
<td>73.17%</td>
<td>3.28%</td>
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<td>47.50%</td>
<td>45.86%</td>
<td>23.28%</td>
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**Total sectors**

| PM 100%                      | 100%    | 100%    | 100%     | 100%     | 100%    | 100%    | 100%     | 100%     | 100%    | 100%    | 100%      | 100%      |


1. Integral Programme against Atmospheric Pollution (PICCA), DDF, 1990.
2. Air Quality Improvement Programme in the Valley of Mexico 1995-2000, DDF, Government of the State of Mexico, SEMARNAP, SS

PM = Particulate Matter
SO₂ = Sulphur Dioxide
CO = Carbon Monoxide
NOₓ = Nitrogen Oxide
2. Health and Pollution in Mexico City

The effects of air pollution on the health of the population living in the Valley of Mexico have been analysed in various studies. The results of these studies tend to confirm the findings of the international scientific community in the sense that they show a positive link between the concentration of polluting substances in the atmosphere and the incidence of morbidity and mortality.

The composition of the substances discharged into the atmosphere in the Valley of Mexico is extremely complex, and indeed, the four million annual tons registered in the Emissions Inventory only describe a group of pollutants called criteria pollutants (CO, NO\textsubscript{x}, SO\textsubscript{2}, PM, O\textsubscript{3}) and hydrocarbons, measured generically. The atmosphere also receives arsenic, a whole range of hydrocarbons not specified in the measurements, metals, fibres and other substances directly discharged or resulting from synergistic effects. Some of these substances have been analysed, in greater or lesser depth, in order to determine their influence in specific cases of illness or death.

Although most of the pollutants which do not comprise the group of criteria pollutants are not measured in Mexico, or at least, not systematically, studies have been carried out (Ponciano, 1996) which detect a significant presence in the atmosphere of formaldehyde, benzene and a broad range of toxic contaminants and other substances with a potential for producing cancer in human beings which have been amply documented, such as fluoranthrene, pyrene, benzoanthracene and metals and fibres such as chrome, nickel and asbestos.

Despite the importance of all these findings, both in relation to the effects of criteria pollutants and to the rest of the substances, it should be noted that the majority of the studies undertaken consist of case analyses and situations of acute exposure. There are still no time series available to determine the effects of pollution in long-term exposure, nor are there any general studies valid for the Valley of Mexico or Mexico City as a whole.

Despite these limitations, the results obtained tend to confirm those hypotheses suggesting the high degree of health risks for the inhabitants of this region as a result
of poor air quality. Specific studies have been available for several decades, but it was not until the 1980s that the intense production of knowledge began, allowing clearer links to be formed between pollution in general and specific morbidity patterns and progress to be made in establishing links between these patterns and specific types of contaminants of particular combinations of the latter. The start of the systematisation of atmospheric monitoring in Mexico City in 1986 permitted further progress in these studies. In this respect, a study undertaken in 1988 (Castillejos, 1992) clearly showed some of the disorders produced by the enormous volume of contaminating substances discharged annually into the atmosphere in the Valley of Mexico. Thus, for example, an analysis of three groups of children from primary schools in various areas of Mexico City showed that children living in the south-west, where there are high levels of ozone pollution, and those living in an area in the north where there are high concentrations of PM and SO$_2$ registered higher levels of morbidity as a result of respiratory illnesses than those living in the least polluted area being studied.

The links between air contamination and mortality were analysed by Molina for the period from 1987-1989, as reported by a public health specialist (Santos and Rojas, 1992), the conclusion being that mortality as a result of respiratory illness in Mexico City rose as a result of the increase in PM and SO$_2$ concentrations. According to one study (Ponciano, 1996) which evaluates the relation between air pollution and health, the lung cancer associated with air pollution in Mexico City represents a loss of 38,932 potential years of life and appears increasingly among those under the age of 40 and in urban areas with over 100,000 inhabitants.

In the case of ozone, the contaminant which most often exceeds norms in the Valley of Mexico (this pollutant violated the norm on 327 days in 1996), numerous studies have been carried out. The importance, in terms of health complaints as a result of this substance, can be gauged by reviewing some of the findings from research undertaken to date. In this respect, a study undertaken by a group of specialists established significant links between the increase in ozone levels and emergency hospital visits due to asthma (Romieu, 1995). According to these studies, emergency visits increased after two consecutive days of exposure to high levels of
ozone. In this respect, it is thought that when ozone levels register an increase of 50 ppb, asthma-related medical consultations show a 44% increase (SS, 1994). Significant reductions have also been observed in the respiratory function of persons exposed to high concentrations of ozone (Castillejos et. al. 1992) together with increases in the respiratory symptoms of asthmatic children (Romieu et al. 1995). Also available are studies showing the link between high ozone levels and school absenteeism as a result of respiratory illness (Romieu et. al. 1992). Similar results can be found in a study (Castillejos, 1992) carried out on schoolchildren aged 3-8. Over a period of three months, 50% of the children were absent, at least once, from school, as a result of respiratory illness under conditions of high ozone content, while 11.7% were absent from school for more than one day during the period studied.

A recent study (Olaiz, 1996) shows that during periods of environmental contingency, when the Metropolitan Air Quality Index (IMECA) exceeds 250 points, there is a fourfold increase in symptoms associated with air pollution, such as hoarseness, breathing difficulties, sore throats, headaches and eye irritation. This same study shows the varying nature of sickness patterns according to the different areas in Mexico City. In this respect, there are areas with more acute sickness patterns, which coincide with the areas with the highest levels of atmospheric pollution. These differences can be better understood if one compares existing differences in the violations of norms concerning contaminants such as ozone. Although all the areas in the city reported violations of the norm (0.11pppm), there are some areas, such as the south-east, which often report twice these levels. This has meant that, in these severely polluted areas, children now aged 10-12 have spent their entire lives being exposed to unhealthy atmospheric conditions, with all the repercussions that this has on their health.

Lead is one of the pollutants in Mexico City’s atmosphere which produces the greatest effect on health and for which there is apparently no safe threshold of exposure. In Mexico, it is estimated that the reduction of the amount of lead in petrol between 1981 and 1986 decreased the amount of emissions discharged into the atmosphere by 300%. However, it is thought that as late as the early 1990s, the sixteen million litres of gasoline consumed in the Mexico City Metropolitan Zone
released nearly two million tons of this metal into the atmosphere (Palazuelos et al, 1992). In this context, it is worth mentioning some of the research findings on the effects of lead on the health of Mexico City's inhabitants. One of the studies on this region (Romieu et al, 1995a) undertaken between 1992 and 1993 in two areas with different characteristics, found that 44% of the children studied (aged between 18 months and 5 years) had a lead content of over 10ug/dl in their blood. The study showed that the lead found in their blood came mainly from glazed pottery used to prepare or store foods or was discharged into the atmosphere by motor vehicles.

In a sample of two hundred women living in two different areas in Mexico City (Romieu, 1993), it was found that 36% of the women (aged 16-48) had lead levels of over 10ug/dl in their blood, with even higher levels being found in older women. It is estimated that at present, the number of women in this age group with a high lead content in their blood may be approximately 250,000 (SS, 1994) Another study published in 1993 (Muñoz et al. 1993), to analyse the lead content in blood and its effects on children's neuropsychological and behavioural development, showed that the high lead content in the blood of 139 children aged 7 and 9 (19.4 ug/dl) was closely linked to poor school performance and a lower IQ, measured using psychometric tests. A study on children aged 6-30 months in Mexico City also showed a link between high lead levels in the children's blood and a lower IQ (Rothenberg, J. et al., 1993). Another analysis, based on the data for 1990 (Romieu et al, 1992) showed that children (aged 1-10) living in private areas with little traffic, had lower levels of lead in their blood than children living in areas with heavier traffic. It is estimated that in Mexico City an average of 11,000 children are born nowadays with lead levels of over 20 ug/100 ml and that over 70% of all school-age children in Mexico City have lead levels of over 10 ug/100 ml in their blood (SS, 1994). At the same time, although it is usually thought that not exceeding the norms as regards the concentration of polluting substances represents a lack of health risks, this has proved to be not entirely true. Thus, for example, according to a study undertaken between 1992 and 1993 (Santos Burgoa, 1992) at a time when it was no longer as common for official SO2 standards to be exceeded, it was found that 18% of the 48,000 emergency medical consultations involving respiratory illness in
various hospitals in Mexico City required hospitalisation. This study points out that there is a 0.04% increase in hospitalisations for every additional unit of SO2, meaning that when the concentrations of this substance rise from 50 to 100 micrograms, there is a 40% increase in hospitalisations, 90% of which are due to respiratory complaints.

In the case of suspended particulates, which is the second main violator of Mexico City standards, although little is known about their characteristics and concrete effects on health for the residents of the Valley of Mexico, the information accumulated and the case studies carried out indicate that their results may prove fatal. A study quoted by Rivero and Ponciano (1996) mentions that suspended particles and those under 10 microns analysed in Mexico City have proved to be mutagenic, particularly those detected in the centre of the city. These same authors mention other recent papers which prove the existence of the following metals in Mexico City's air: vanadium, arsenic, chrome, iron, nickel, cadmium and lead as well as significant amounts of asbestos fibres, all proven carcinogenic agents.

Suspended particulates are regarded by some specialists as the most significant atmospheric public health problem in the Valley of Mexico. In this respect, an expert on the subject (Santos Burgoa, 1996) showed that, for Mexico City, there is a 15% increase in mortality for every 10 micrograms of PM-10. Due to the significant presence of particles in Mexico City's environment, this author points out that those who play high-performance outdoor sports are twice as likely to contract chronic bronchitis as those who do not. A recent study (Avila, L. et al. 1996) on the economic costs of chronic bronchitis caused by PM10 shows that the population being studied had had 3-10 bouts of this illness the previous year. Eighty per cent of the sample population had consulted a doctor 2-9 times during the last bout, over 70% of whom required hospitalisation, and 75% of whom had been absent from their jobs for over two weeks during the year. When this is translated into economic costs, it is necessary to factor in additional expenses, which are generally not recorded, such as the cost of analysis, time spent on the different stages of medical care and time spent on family visits. This provides a more realistic estimate of the true economic costs involved in an illness caused by environmental pollution.
Chapter IV. The limits of governmental construction of air pollution problem

The purpose of this chapter, as mentioned in the introduction and Chapter II, is to test the first hypothesis of this research. According to this hypothesis, government air pollution programmes from 1979 to 1996 lack an appropriate analytical social dimension, in the sense explained in Chapter II. All these programmes are biased toward a more technical approach. However, although social aspects and concepts are included, they are not incorporated for the purpose of explaining facts. This chapter is based on an analysis of the three government programmes already mentioned. The methodology for this analysis was described in Chapter II and will be summarised in section 2 of this chapter. Before the specific analysis is provided, an overview of the general context in which these programmes were designed will be given.


The period from 1979-1996 saw the implementation of three government programmes to combat the air pollution problem in Mexico City. These included: 1) “The Co-ordinated Programme for Air Quality Improvement in Mexico City 1979-1982 (PCMCA) begun in 1979, 2) the “Integral Programme to Combat Air Pollution in the Mexico City Metropolitan Area” (PICCA) started in 1990 and 3) the “1995-2000 Air Quality Improvement Programme for the Valley of Mexico (PROAIRE) begun in 1996. Various measures were implemented in the 1980s, some of which had a powerful impact in terms of improving the air quality of the region. They are not included in this analysis since do not constitute comprehensive government programmes but merely isolated measures.

Between the date of publication of the first and last programmes, fundamental changes took place as regards both the environmental problem in the Valley of Mexico and the economic and socio-political conditions in which it took place. First of all, the composition of substances released into the atmosphere underwent significant modifications as a result of changes in the types of fuel used for different manufacturing activities and changes in the composition of the product itself. The conceptualisation of these changes is crucial to drawing up air policies. However, government diagnoses failed to describe the changing situation, meaning that the
proposals for action lagged behind the development of these phenomena. The entire environmental programming system for 1979-1996 failed to reflect these changing socio-economic circumstances. This meant that although the latter underwent an intense process of change, political policies insisted on repeating an analytical and programmatic project which began with the 1979 programme and was characterised by positing a notion of atmospheric problems and a set of proposals for action outside the economic, social and political context of the problems they sought to influence.

The construction of the environmental programme by the government sector has experienced an analytical deadlock, reflected in the inability of official programmes to transcend the narrow view of the environment and air pollution which was made official in the 1979 programme. It has also limited the sphere of analysis and government intervention to the level of the physical and technical existence of problems, ignoring the economic, social and political aspects of the problems being targeted by government action. The cause of the deadlock is due to a planning system that does not permit the involvement of scientists or the public at either the policy formulation or implementation stage. The scientific community's findings fail to reach government offices and when they do, they are only used to confirm government views. The institutional bodies created to ensure the participation of various sectors of the community are only called on to validate diagnoses that have already been undertaken and decisions that have already been made in government offices. Real civic participation is absent during the various stages of planning, and replaced by a manipulative version of it which attempts to convince citizens of the government's view of the problem and of the official version of solutions. Environmental programmes appear as a unilateral construction, primarily designed to legitimise public action.

The differences between the programmes are more a question of form than content. The general conception formulated by PCMCA in 1979 continues to be maintained even in the most recent programmes. The analytical and programmatic suggestions proposed by PCMCA in 1979 have become a sort of analytical ceiling which subsequent programming systems have failed to break through. One difference between PICCA (1990) and PROAIRE (1996) is that the latter has taken the original programme to its ultimate consequences and provided a more detailed and extensive breakdown of specific goals and actions. Beyond these operational differences, the
most recent programmes revalidate the concept in which priority was given to the physico-chemical and technical aspect, revealing an inability to reach the level of social and political aspects.

The most recent programme (Proaire, 1996) incorporated part of the international discussion on social and cultural aspects of pollution. The aim was to adapt the government’s planning action to the international environmental discourse, with the emerging aspirations of an increasingly informed citizenry which was more aware of the deterioration of its quality of its life as a result of the deterioration of air quality. Changes in the characteristics of pollution and the social context mentioned, which the government agenda has failed to assimilate, are also linked to the improved quality of knowledge generated and the internalisation of the environmental issue in Mexican society’s scheme of preferences. Air policy has become more aggressive while citizens have become more aware of the problem. Certain changes in the ways of perceiving environmental problems, the dissemination of the scientific findings produced by the scientific community, a more participatory society, the severity of environmental damage which increasingly affects the health, economy and everyday life of various sectors of the population and the obviously poor air quality, have led to a public awareness of air pollution, at least among some sectors of the population.

The 1979 PCMCA was created in a somewhat unfavourable social context for achieving the shift from the physical to the social aspects of pollution. The four million tons of pollutants released into the air failed to ensure that environmental issues were regarded as a social problem or the focus of public policies. This presence was not enough because there was no parallel, broad-based environmentalist movement, the scientific community’s findings were still not sufficient to analyse the causes or effects of pollution, the problem of lead in the atmosphere had been insufficiently documented and disseminated, while studies on its effects on health had not yet reached the point of raising the population’s awareness. In short, there was no significant shift from the concept of physical to social risk, which results in its being incorporated into the community’s package of basic needs and demands.

The handling of environmental issues by the Secretariat of State for Health not only revealed the public health approach used in the problem but also decision-makers’ lack of room for manoeuvre in the implementation of these programmes.
The Secretariat was characterised by its low capacity for manoeuvre, scant financial and professional resources and its use of a traditional medical approach. The 1979 programme contained no attempt to construct environmental issues on the basis of their own legality, merely in conjunction with the branch of medicine concerned with public health. There was no link between environmental proposals and those of an economic nature nor was there any attempt to question development models and their link with environmental degradation.

A comparison of the problem of air pollution as it was conceived in PICCA and PCMCA, assuming that both reflect the general conditions of their times, shows that in the eleven years that have elapsed between the two programmes, there have been substantial changes in the air pollution problem in the Valley of Mexico. This has translated into a different interpretation (more scientific, more political and also more ideological) on the part of the different sectors of society involved and reflects the meticulous social construction of the environmental problem. Key factors in this process obviously include the increase in the volume and composition of air pollution and the progress achieved as regards the knowledge and role of the media. In this respect, there has been more accurate measurement and characterisation of some of the pollutants, particularly those classified by the international community as criterion contaminants, together with the accumulation of a significant number of case studies on the relation between pollution and morbidity. At the same time, the environmental problem has become a banner for environmental groups and various sectors of society, while at the same time, this discourse has been integrated into official planning discourse. In 1985, as a result of the devastating effects of the earthquake in Mexico City and government inaction, there was a vast degree of social mobilisation. The environment appeared with a force it had previously lacked at the level of group awareness, one of the most striking aspects being the emergence of various environmental organisations. From the ideological point of view, the issues of sustainability and the environment have gradually penetrated the scheme of social values, and slowly intervened as an aspect of the quality of life. The media and the educational system have placed the topic of the environment in the public scenario, creating a public opinion that is increasingly interested in the environment, either because it is affected by its degradation or because it is moved by the increasing amount of information published on the various dangers faced as a result of irresponsible natural resource management.
In 1979, when PCMCA was drawn up, the volume of pollutants appeared to be similar to that of 1994. Obviously, four million tons of pollutants in 1994 corresponded to a more precise measurement, while in 1979, only estimates were available. It is also true that the contents of the two inventories are extremely different. In 1994, the amount of lead in the atmosphere was significantly less. This does not mean, however, that the rest of the pollutants and the variety of toxic substances, in terms of their effects on health, were more favourable in either of the two periods analysed. However, government and civic awareness of the scope of the problem did not exist in 1979 to the same degree as it did in 1996.

The period between 1979 and 1996 saw significant changes in the country as a whole and in the Valley of Mexico at the different levels of the environmental issue in general and the air problem in particular. The population in the Metropolitan Zone increased significantly, the number of industries and service establishments also rose, the composition of air pollution underwent transformations, inputs were modified, the various types of fuel were subjected to an intense process of reformulation, economic agents were significantly readjusted while political agents faced new, changing situations which led them to seek different forms of social consensus. This period also marked the start of a new form of institutional apparatus in which environmental issues were fully incorporated into official discourse and the practice of environmental planning and management became official. The government of Mexico City, which, in the early 1980s, had no specific organisation for handling environmental issues, created first an environmental office and then a Secretariat of State for the Environment. These institutions arose under the auspices of other national institutions, driven by the same need to deal with the various national environmental problems. However, this was also a period of change at the level of civic awareness of environmental issues, and of an unprecedented creation of knowledge linked to environmental issues, particularly the deterioration of the quality of life of many sectors of society.

However, as a result of all these changes, air pollution programmes have failed to incorporate an appropriate social approach to reflect all these economic, social and political dynamic that have emerged over the last two decades. Social and political forces, as explanatory elements of air pollution issues, are totally absent from government programmes, while the proposals for actions do not include measures to deal with this dimension of the problem. After this general background to the design
and implementation of air pollution programmes, the following section will introduce
the analysis of the three main programmes to test the first hypothesis of this research,
on the lack of an appropriate social dimension in official air pollution programmes.

2. Criticism of the Government’s Construction of Air Pollution

The construction of the air problem and the strategies designed for its
programmatic treatment in the Valley of Mexico, as specified in the three
programmes successively implemented between 1979 and 1996, will now be
analysed. As noted in Chapter II, the methodology for analysing these programmes is
as follows:

First, the list of the factors that each of the programmes regards as most
important in explaining air pollution is presented. These factors are then classified
into two groups, one of which corresponds to what could be regarded as a *first level
of analysis* (level 1), which includes what has been classified here as physical,
chemical and technical factors, and another which has been called a *second level of
analysis* (level 2) which includes those of a socio-political order. It is assumed that
these levels have a specific degree of explanatory effectiveness on their own, but
when placed at the level of public policies, the level corresponding to social aspects
is more effective inasmuch as the most important relations to be explained or
modified in the implementation of policies are those of a social and political nature.
This analytical arrangement does not reduce the importance of the first level. Instead,
it links both levels, removing their self-referential nature by giving them relative
rather than absolute levels of causality. A factor is classified as level 1 when it refers
to the physical and chemical aspects of pollution, or when its explanatory sphere is
limited to technical elements, without seeking relations beyond this level of
existence. A factor is classified as level 2 when its causal elements transcend level 1
and suggest causal links between the conditions of existence at the physical,
chemical and technical level and social determinations or their links with political
forces. To a certain extent, this level includes the embodiment at the social and
political level of factors expressed in level 1. It is essential to point out that at this
level, it does not suffice for a programme to indicate the incorporation of socio-
economic elements for it to be included in level 2; it must establish precise relations
between social forces and specific political forces or describe the embodiment of
level 1 factors at the level of social relations. These agents must be located in the context of what makes them into this type of agents, in other words, as bearers of resources which influence or determine the specific shape taken by a phenomenon linked to air pollution. Programmes often mention socio-economic factors, yet restrict themselves to their physical and technical expressions. For example, industrial or population concentration tends to be regarded as a socio-economic element. In other words, the consequence of a relationship is taken to be the relationship itself, and the virtues of socio-economic aspects are attributed to it. It is worth pointing out that the limits between levels 1 and 2 are arbitrary and should only be regarded as tools of analysis.

The aim is to analyse the analytical procedure by which each programme prioritises the causal factors it uses to explain air pollution. The programmatic strategies and their relation and congruence with the construction of the environmental programme will be analysed below. The next stage involves a comparison with an ideal scheme that includes those elements which, according with the assumptions of this research, should be included in the construction of the problem. The three programmes are classified according to their proximity or distance from this scheme. It is assumed here that a policy that is congruent with a social notion of environmental factors could be classified as more or less appropriate depending on its proximity to or distance from this analytical scheme.

2.1 Co-ordinated Air Quality Improvement Programme for the Valley of Mexico 1979 (PCMCA)

In 1979, the government of Mexico City published the Co-ordinated Air Quality Improvement Programme for the Valley of Mexico in which, in general terms, it incorporated the recommendations of the international group of experts invited by the government of the Mexico City in November 1978 (DDF, 1978) to analyse the problem of air pollution in this region of the country. This programme, which does not contain the diagnosis on which its programmatic strategy is based, includes natural and geographical features to explain the air pollution in the Valley of Mexico, citing the concentration of human activities in the Valley of Mexico as another causal feature. Thus, demographic concentration, industrial concentration, the concentration of polluting industries and cars are listed as the causes of pollution.
The problem of air pollution is constructed, particularly at the first level of analysis, according to the scheme presented here (schemes 1 and 2, see appendix), including considerations corresponding to level 2 but without giving them any explanatory relevance. In this respect, the physical-chemical-technical characteristics of pollution suffice to explain the atmospheric problem in the Valley. Consequently, air problems emerge as the result of a vast concentration of polluting substances discharged into a geographical and climatological sphere together with a type of soil susceptible to degradation and the emission of dust. Under these conditions and given the lack of natural dispersing factors, the substances emitted not only concentrate in the Valley’s atmosphere but also produce chemical processes and reactions which, when combined with other physical and chemical features, create situations of environmental contingency.

On the one hand, there are the technical characteristics of the vehicle fleet and industrial factories and services, while on the other, there are the type and quality of fuel used, which have been here classified as level 1 because, in conjunction with factors of a physical-chemical and natural order in general, they constitute the principal factors behind air pollution in the region, according to this programme. The PCMCA contains certain elements which could be included in level 2, such as the cases of mentioning the concentration of socio-economic activities and consumer elements such as unlimited car use. However, the PCMCA’s inclusion of social and economic factors does not have the same or a greater explanatory capacity than that of level 1. Consumption and the concentration of activities, which, in another interpretative framework, might be regarded as social and qualitative factors, are reduced to being just another aggregate, as part of the logic of adding rather than explaining phenomena.

The problem of the construction of this environmental problem is that it fails to establish any hierarchical analytical order that would allow one to establish causalities and define degrees of explanatory effectiveness between the two levels. A notion of social aspects which excludes agents, the distribution of resources and relations of power, does not meet the analytical criteria required for public policy design. This type of policy reassigns costs and therefore resources, thereby modifying relations of power. The considerations of a socio-economic order included in this programme appear as an addition, a rhetorical device rather than an analytical element.
The 1979 PCMCA presents its objectives and goals pragmatically. The latter are limited by the most direct sensorial manifestation of the atmospheric problem. It consists of a) implementing a short-term emergency plan to attacks periods of atmospheric crisis; b) actions aimed at preventing the conditions leading to “Poor Air Quality” which would reduce “Unsatisfactory conditions” to 10%. As can be seen from the scheme, these strategies have continued to be used in recent programmes. The differences in the most recent programmes consist of their attempts to achieve greater control over compliance with these measures, by emphasising their compulsory and coercive nature. The main difference between the order of priorities in the 1979 PCMCA and subsequent programmes is that they place particular emphasis on immediate actions associated with emergency situations. Their main aim is to attack problems which demand immediate solutions and concern public opinion, since they can be perceived immediately. Except for this difference, the 1979 strategy clearly established the programmatic structure underlying both this and subsequent programmes. It includes: 1) a policy designed to prevent and control pollution by automotive vehicles based on the reformulation of types of fuel, and aimed at exercising total coercion over goods and service consumers (motorists), by positing technical solutions to the problem of transport, and above all, at increasing the number of units and the creation of new routes and preventing excessive costs for the productive sectors, in this case, the automotive industry and the transport sector concessionaires; 2) a policy for controlling industrial pollution also based on a reformulation of fuel, responsibility for which was handed over to the government monopoly represented by PEMEX, and a desire to spare industry excessive costs. Control measures were only to be implemented if they did not affect profitability; 3) measures for controlling natural sources, which do not contain any realistic suggestions for curbing urban growth, which fail to provide alternatives for agricultural development or which do make any distinction between the proposals for reforestation, the recovery of lakes and paving programmes; 3) support measures in which all the proposals concerning research, education or civic participation are bound to an instrumental perception for the purposes of legitimising government action. By way of an example, “civic participation” meant opening up a booth for the reception of complaints.

However, as the scheme shows, the institutional framework in which this programme was proposed could not have been more symptomatic as regards its
voluntaristic nature and the superficial way it handled proposals. On the one hand, Mexico City authorities did not have an office to deal with environmental problems, while most aspects related to air policy were handled by the health authorities with national jurisdiction. At the same time, the PCMCA proposed an institutional arrangement in which air policy was dictated and implemented by an Inter-Secretariat Commission with a broad formal influence on the various sectors of public administration linked to the environment. However, this proposal was not derived from a conceptualisation of pollution and environmental issues which was aware of their complex nature and emphasised the causal interrelations which produced them. The programme was correct in establishing, classifying and distributing specific sectoral actions at specific times. However, it ignored the analytical basis of its institutional proposal. At the operating level, it lacked control over its proposals for action, as much because of its failure to make its measures compulsory as because of the lack of proper mechanisms for surveillance, administration and sanction. The institutional arrangement to which PCMCA resorted has not been taken up by subsequent programmes, even though in the diagnosis of the latter, environmental problems are conceptualised in accordance with their multicausal nature, using action strategies which would require a multisectoral strategy.

PCMCA was voluntaristic, but in this respect, it only differed from recent programmes in the degree to which this was so. First of all, it lacked a diagnosis to explain its construction of the environmental problem. Second, it offered no explanation of the logical and operating mechanisms which permit the transition from the diagnostic level to goals and from the latter to strategies. Third, short-, medium- and long-term goals had no logical or operative link. Fourth, the institutional arrangement proposed, as mentioned earlier, did not correspond to the problem constructed at the diagnostic level. For example, there was no interdisciplinary assessment of environmental issues to justify the multisectoral approach through which it attempted to assign tasks and implement actions at the programmatic level. Fifth, there was no congruence between diagnostic elements as in the case of the evaluation of the role of the transport problem and the type of measures proposed to cope with it. Transport was classified as a fundamental problem in the emission of pollutants but the measures proposed did not translate into a restructuring of transport in accordance with what the diagnosis requires.
These problems in the programme are what gave it its voluntaristic quality mentioned earlier.

If the success or failure of a programme of this nature is judged by the accomplishment of its objectives and goals, then the PCMCA was a complete failure. First, because air pollution increased significantly while the programme was implemented, reaching approximately five million tons of annual emissions in about 1987. Second, because high concentrations of ozone which systematically violated official standards began to be detected and third, because of the high concentrations of lead which only began to be attacked through the reformulation of petrol in 1986.

2.2. 1990 Integral Programme to Combat Air Pollution (PICCA)

PICCA, launched in 1990, constituted the first systematic effort to deal with the problem of air pollution in the Valley of Mexico. The main difference between this programme and the previous one is the greater degree of knowledge it contained on air pollution and the quality of the information on which its proposals were based. PICCA was the result of a different set of circumstances, which partly explains the professional manner in which it approached the problem. It was created against a background of the environmental crisis expressed in the 1980s in the form of atmospheric thermal inversions, the enormous increase in the ozone problem, the public's sudden awareness of the lead being discharged into the atmosphere by petrol which was made public knowledge by research papers on the subject, the systematic start of the measurement and dissemination of criterion pollutants and the perception of the worsening of air pollution. Greater knowledge of the environmental problem in the Valley of Mexico on the part of the scientific community together with the emergence of a civic awareness that was more concerned about environmental degradation explained the zeal with which the government agenda began to deal with the air pollution problem from the mid-1980s onwards.

PICCA reflected all this experience either directly or indirectly, by undertaking a more professional diagnosis using the first complete Emissions Inventory for the so-called criterion emissions, which recorded the volume of substances released into the atmosphere by industrial and service activities, the transport sector and natural sources. This programme also utilised some of the contributions of the scientific community on the causes and consequences of air pollution, which showed the
gravity of the environmental damage, particularly in terms of health, inflicted on the inhabitants of the Valley of Mexico.

The factors explaining air pollution suggested by PICCA showed certain changes in relation to the 1979 program. The most outstanding features included the incorporation of certain elements with greater explanatory scope, such as the cases of the industrial processes and their combustion systems, the importance of anti-polluting technologies in industries, services and transport and the synergistic effects produced by substances in the atmosphere which complicate analysis and shed a new light on the consequences of pollution.

PICCA constructed the problem of air pollution by assigning a specific weight to the elements at both the first and second level of analysis. As regards level 1, as shown in the schemes 1 and 2b, (see appendix) it referred to pollution as a problem caused by emissions from industrial processes, services and the intensive use of a vehicle fleet with highly specific characteristics. Pollution was primarily explained by the intensity of energy consumption in the Valley of Mexico. In this programme, although natural factors were important in explaining part of air pollution, they were not the most characteristic aspect of the region.

However, a characteristic feature of PICCA was its inclusion of explanatory factors which apparently belonged to level 2 of the analytical scheme. At this level, it regarded air pollution as a consequence of economic and social processes, foremost among which was the intensity of energy use in transport, industry and services; and inappropriate land use leading to the greater use of the transport system by modifying the times and lengths of journeys. Pollution was also regarded as a result of the industrialisation and urbanisation which began in the early 1940s. It was also considered an unwanted consequence of the quest for and achievement of higher levels of well-being. However, this notion of socio-economic aspects did not strictly refer to social relations since it highlighted the technical aspects of pollution. For example, the logic of numbers prevailed over social aspects. In this programme, the key factor for explaining pollution was that the MCMZ contained a fifth of the national population, producing 36% of the GDP and consuming 17% of the energy produced. It also mentioned the 29.5 million journeys effected daily, the 2.3 million private cars circulating in the area and the just over forty thousand industrial and service establishments located there. PICCA was primarily concerned about the phenomenon of concentration, of either industry, population or cars. It was also
concerned about the volume of fuel consumed, rather than the quality of the latter and the technological characteristics of the production or consumption processes into which was incorporated. The explanation of land use, the distribution of human activities and the increase in times and distances travelled by the transport system constitute examples of the inability to link strictly technical aspects to those of a social nature.

The physical growth of a city is due to a specific social and economic dynamic which is linked to the development of a specific type of economic activities and a given population dynamic. However, within the sphere of public policies, transport, as an essential component in the circulation of people and products, which permits the operation of social systems of exchange, cannot merely be considered in terms of the number of units it comprises, the volume of fuel consumed, the amount of motor repairs it requires, etc. but above all as an organisation which provides a service for which two types of often opposing efficiency must be appropriately combined: a) the mass transportation of passengers while meeting basic requirements of effectiveness and rationality and b) undertaking this activity while maintaining profit margins that will make the provision of this service attractive to investors. The structure of a means of transport is the main force needing to be changed by the planning system, yet many of its key aspects are beyond the control of planners. For example, the relation between the importance of public and private transport is a decisive factor in any policy wishing to solve problems concerning traffic, pollution and the efficient transport of the city’s inhabitants. However, this is due to the development of economic and social trends linked to the very essence of industrial society which goes beyond planners’ scope of action. Closely linked to these trends is the distribution of the modal structure. For example, electric transport and the Underground are options which seem ideal from the point of view of efficient service, although not from the point of view of financial profit. Yet quite apart from these characteristics and trends, public transport is a sphere of economic activity in which the balance between the quality and efficiency of service and the logic of economic profitability should be subject to strict regulations to ensure that neither of its two components will be affected by the other. In Mexico City, for example, the design of public transport service routes has been primarily governed by the logic of profitability. This is evident when one analyses the authorisation of routes which force users to take more lines of transport to reach their destinations. Any
explanation of the transport system which fails to include this economic dimension and does not link it to the social and political agents through which it is expressed in real terms is simply not valid.

PICCA had the necessary characteristics to be able to transcend the first level of explanation and move onto the second, yet it failed to do so. The PICCA emissions inventory was an instrument that offered the possibility of linking the emissions of substances to economic processes and agents, which would eventually enable social and political agents to be identified. PICCA did not do this in its diagnosis, and therefore could not include it in its policy proposals. This procedure would have made the transition from the first to the second explanatory level possible. It was only apparently of a social order, since if it had truly been of a social order, it would have to have involved the social agents through which it made the analytical transition from the level of technical explanations to those of a socio-economic order, and hence to those of a socio-political nature. This is what lay behind the technical limitations of its proposals for actions which consisted of the introduction of filters, converters, fuel reformulation and monitoring systems while ignoring ideas concerning the processes and conditions of economic viability and political feasibility of the proposals.

The main goal of PICCA was to curb the growth of pollution. Its goals were clearly defined as regards the reduction of lead, SO$_2$, NO$_x$, HC and particulate matter, whereby it would have been feasible to reduce the over four million tons of pollutants discharged annually into the atmosphere, as recorded in the 1989 inventory, to 2.8 million tons over a period of five years. Analysed in the light of the 1994 inventory, this objective was not achieved, even though the volume of certain pollutants fell.

The PICCA strategy for attacking the problem of air pollution was congruent with its analytical construction of the problem. The core of the programme was aimed at reformulating fuel and implementing measures in the transport sector, which it called technological and productive modernisation, which in real terms involved nothing more than the concept of replacing fuels in industry and the services together with a few complementary measures. However, the real influence and room for manoeuvre of the environmental policy operators seemed to occur in the area of fuel. This happened because the fuel monopoly in Mexico is controlled by the State. However, this did not mean the subordination of energy policy to
environmental policy. In fact, the reverse was true; energy policy set the pace and was able to determine the time and degree of its commitment to environmental policy. The two remaining measures, i.e. the rationalisation of transport and the modernisation of productive technology are spheres in which government action has little influence.

This was one of the aspects of environmental policy in which the limitations of the technical diagnosis on which the programme was based were revealed. The restructuring of transport would have involved a restructuring of agents. This is even more important when one realises that new routes and a modal restructuring of transport is equivalent to measures of not only a technical but also of an economic and political nature. These are the components of the programmes for restructuring the transport system which environmental programmes were unable to affect to any great extent. In the case of technological modernisation, these economic and political forces proved how they managed to resist the regulations stipulated in environmental programmes. The proposals for modernisation did not refer to any substantial feature at the level of productive processes, labour organisation or input-product relations which could have led to a productive form of modernisation with repercussions at the level of releasing pollutants into the atmosphere. The strategy in this area focused on emissions control and industrial inspection, the replacement of fuel oil and the issue of regulations preventing the installation of new polluting industries.

The complementary aspects of PICCA, especially those concerning education and civic participation did not have any real effect on the environment, particularly since they were not based on a strategy linked to all aspects of politics and, in the case of civic participation, because they did not encourage participation at the various stages of planning, reducing their role to the acceptance of citizen’s complaints and recommendations.

For its implementation, PICCA had an institutional apparatus which did not exist before. Unlike the 1979 programme, there was already an institutional structure in the government of Mexico City which was directly concerned with environmental problems. There was also a law governing all private and public activity in environmental spheres, namely the 1988 General Law of Environmental Protection and Balance. At the same time, within the Secretariat of State for Urban Development and Ecology, there was a National Institute for Ecology (INE) and the Federal Attorney’s Office of Environmental Protection (PROFEPA); the former
being responsible for environmental regulations and the latter for the ensuring 
compliance with these regulations. In addition, there were ecology commissions in 
the Chamber of Senators, the Chamber of Deputies and the House of Representatives 
in Mexico City. PICCA itself was produced by a Technical Secretariat consisting of 
several Secretariats of State and the governments of Mexico City and the State of 
Mexico.

PICCA showed congruence between the way it defined the problem and the 
strategy it proposed; both were anchored in level 1 of the scheme of analysis 
proposed here. However, it had three crucial flaws; 1) it was unable to break free 
from the technical limitation of its diagnosis to point to a strategy that would have 
involved the idea of processes (both productive and social) and incorporated the 
social agents and real politicians, on whom most proposals depend; 2) inasmuch as 
its diagnosis was limited to a unilateral, technical view, in which measures related to 
the sphere of consumption had greater weight, it failed to take advantage of the broad 
institutional structure available to it. Its sectoral proposals only referred to those 
agents who were directly linked to some of the technical components of the problem: 
Federal Commission for Electricity (CFE), Mexican Petroleum (PEMEX), 
Secretariat of State for Urban Development and Ecology (SEDUE), Department for 
the Federal District (DDF), etc. 3) in addition to the above flaws, given the lack of a 
comprehensive conceptualisation of the problem in which elements from levels 1 and 
2 intervened, functions and actions were assigned to the institutional structure of the 
different levels of government involved, which failed to describe the complexity of 
the environmental problem or take advantage of the multisectoral nature of the 
institutions formally participating in the air policy.

At the same time, no effort was made to analyse or evaluate the viability of the 
institutional structure, the real practices, rather than the formal ones of these 
institutions, the room for manoeuvre of the environmental offices and the economic, 
political and social agents committed to the environmental dynamic and their 
potential response to measures which entailed a general redistribution of the social 
costs of environmental deterioration.

A political proposal should be based on a basic reality principle in order to 
make the leap from voluntarism to the management of concrete factors and actors. 
The PICCA measures, for example, included the suggestion that 1550 industries, 
according to their resources and possibilities but over a period of not more than
thirty-six months after November 15th, 1990 should replace polluting processes or install control units. In the area of transport, it proposed promoting public transport over individual transport, and above all, strengthening the Underground as the core of this proposal. The petroleum industry was required to produce better fuel and control its emissions.

However, it did not provide any elements to assess the viability of its proposals, i.e. the conditions under which these measures should be implemented. What was the real capacity of environmental institutions to impose group environmental interests over those of its various agents? Could the programme’s goals be achieved without closing down industries? This does not mean the potential to enforce closure, but the capacity to keep the manufacturing sector operating, confront and negotiate with agents who in some cases may have great economic and political power and achieve specific environmental goals.

In the case of the petroleum industry, was it possible to control the quality of fuel and impose wide ranging-restrictive measures on this industry? What was the best path to take in the case of industries with a significant economic presence and enormous political influence and how could one balance coercion with negotiation and conciliation? This was the case of industries such as the metallurgy, chemical, automotive and cement industries.

2.3. 1995-2000 Air Quality Improvement Programme for the Valley of Mexico (PROAIRE)

This programme, launched in 1996, provided a more comprehensive overview of the factors leading to air pollution. The problem was no longer merely restricted to the volume of pollutants discharged into the atmosphere, nor to the concentration of economic and human activities in general in the Valley of Mexico, but now mentioned the physical and chemical behaviour of the pollutants, the meteorological dynamics, urban structure and processes, patterns of consumption and social agents. It would be extremely difficult to find anything missing from this list of contributing factors. Classifying the various factors PROAIRE includes according to the analytical scheme used here (scheme 1 and 2c, see appendix), level 1 would include the emissions in the Valley of Mexico being released at present and in the past under the atmospheric conditions prevailing in the region, energy consumption, fuel
quality, existing technology for controlling emissions, existing technology in manufacturing process, services and transport, the modal transport system, times and distances travelled, traffic, etc. A significant number of factors were located at level 2, as is the case of the reference to economic, social and cultural processes. The processes that took place in the city were regarded as essential for describing environmental problems, particularly the air pollution problem.

However, the inclusion of a social dimension in the construction of the environmental problem on the part of PROAIRE did not help to explain the processes since these processes are only mentioned for discursive purposes, with the aim of adding factors rather than explaining factors. For example, the reference to a systemic approach would appear to imply the will to link level 1 factors to those at level 2; however, these factors appear to be merely superimposed. At the same time, the programme referred to social agents, yet the latter seem to have been analysed from the point of view of consumption and are therefore presented in relation to what they have in common, as goods and service users, meaning that they are just as guilty or responsible for environmental degradation; their differences, as the possessors of different resources, are located within a structure of hierarchical relations and the context of relations of power. The city mentioned in PROAIRE is a depersonified city, with socially indistinct and politically neutral agents. The idea of socio-economic issues included functions according to the logic of major aggregates, which do not count as real agents but as the cause and consequences derived from large aggregates such as production, consumption, transport and culture.

As for the programmatic aspect, it is striking that although the diagnosis included a considerable number of factors, the strategy was very similar to that used in the 1979 and 1990 programmes. PROAIRE can only be distinguished from these by the consideration, at the strategic level, of the idea of integrating policies involving urban development, transport and the environment and greater specification as regards the strategy of economic incentives. The remaining measures, such as those involving the use of the best technologies and fuel in industry, services and automobiles, modifying the transport supply, stricter and broader surveillance and inspection of vehicles, industry and services, civic information, education and participation, were merely an extension of the proposals already included in the 1979 programme.
The institutional framework of PROAIRE was characterised by the fact that in addition to having PICCA’s institutional structure, it was protected by the vast umbrella comprising the Secretariat of State for the Environment, Natural Resources and Fisheries, (SEMARNAP), and the Secretariat of State for the Environment of the government of Mexico City, both created in late 1994, at the start of the 1994-2000 government. It also had environmental offices in the State of Mexico. This programme emerged at the behest of social agents who attempted to foster commitment between various governmental and non-governmental agents, a novel public policy sphere in the Mexican context.

These are some of the characteristics of the diagnosis and programmatic proposals of PROAIRE. However, at the level of congruence between diagnoses and strategies, there are a few inconsistencies worth pointing out. There was no correspondence between the systemic means of classifying the factors which caused environmental problems and the strategy for action. For example, there was no proposal for policy packages that systematically included the various sectors in the administration and the various intervening agents. There was no integral proposal for the air pollution problem to be placed in the context of other environmental problems. The factors were merely added up, with no effort being made to discover analytical sequences between emissions, economic processes and urban processes. The measures implemented to deal with the predominance of the private car and its effects on the environment lagged far behind the diagnosis which regarded it as the principal urban predator.

There was no correspondence between the interrelations established in the diagnosis and the level of proposals. These were confined to the more technical aspects of level 1 and not regarded as strategies for level 2.

Taken as a whole, the document failed to construct a unified conceptual framework; instead it presented a superposition of various environmentalist and ecological discourses designed for rhetorical rather than analytical purposes. There was no analytical link between the chemical, physical, ecological, economic, sociological and political components of the conceptual framework. The interdisciplinary, systemic nature referred to in the programme to reflect on environmental issues was merely a rhetorical device, rather than an element of reflection. Each of these analytical sections appeared as both self-contained and self-explanatory.
This is the case of the conceptual framework, included in Chapter VI, in which the discursive form appears as a list of desirable things:

First of all, it is impossible to ignore the function of a multiplicity of concepts which are currently disseminated, mainly in the spheres of sciences and the economy. This requires starting out with an attitude of openness to change, ignoring currently widespread prejudices regarding the type and scope of measures that can be applied. Only if these conditions obtain will we be able to achieve the successful introduction and acceptance of the basic concept of this new approach: sustainable urban development (DDF et. al. 1996:117).

Sustainable urban development posited in this fashion is an empty phrase, since it does not refer to any specific content and instead resorts to the social acceptance achieved by two words: development and sustainability. Second, it is not the function of a policy to promote the acceptance of terms or concepts but rather to mobilise social and political forces to obtain viable results in those systems of practices which people wish to affect; third, overcoming prejudices and openness to change do not constitute the real conditions required for the viability of a policy; they merely describe a wish or at most, a will.

In Proaire, urban processes and policy were essential to the successful implementation of an environmental policy. However, the idea of city in Proaire was not only partial and irrelevant for describing the processes that take place within it, but also regressed at least seventy years in the interpretation of urban dynamics. The classic Chicago environmentalists’ school, which in the 1920’s analysed urban problems by using a biological ecological model, actually had a more realistic notion of the situation than the one mentioned in the document being described. For this school of thought, the urban order was a consequence of the competitive struggle between different agents fighting over the city’s resources. The occupation of space and the urban order produced in this way came to express the balance of these opposing forces which gave rise to an unequal order derived from the confrontation of opposing forces.

The city described in Proaire is free from antagonism and contains no hint of conflict:

The city today is the most complex and developed form of human organisation. In it, millions of living beings can co-exist (including urban fauna and flora), simultaneously carry out innumerable daily activities, interact, communicate, produce and consume goods and services, all without the city’s collapsing: the urban phenomenon, although complex
and multidimensional, it something which works (DDF et al. 1996:120).

Seen from this point of view, the city appears as an aggregate of actions and reactions in which men, territories, living beings and events are indiscriminately blended in a neutral social context.

It is important to emphasise the consequences in terms of policy suggestions of this neutral tone, this lack of social agents and real politicians, this lack of conflict and the absence of any mention of the unequal nature of the appropriation of urban and consumer resources, constituted by the notion of city in Proaire. This is why many of its proposals assume a voluntaristic aspect, in which the main factor is the manipulation of technological resources and the constant allusion to scientific aspects, all decontextualise from a real social organisation. The schemes 1 and 2c, summarising the conception of the air pollution problem and giving a brief summary of goals and strategies, fails to place the environmental problem in its true context. From this point of view, all the proposals belong to level 1. Analysed according to the scheme proposed in this research, none of the social explanations in Proaire are fully social because the bearers of social and political relations are absent. From this perspective, it does not belong to level 2, even when at the discursive level, it seems to go beyond level 1.

The pollution factors and strategies in this programme indicated a tendency to favour technological solutions, and to emphasise consumption over the production of goods and services. The aim was to reduce emissions through the use of catalytic converters, and the introduction of filters rather than through an analysis of the technical, organisational and logistic production processes and those of consumption itself. There was no questioning of the productive logic and rationality, or consumption patterns. In this respect, it was similar to the PCMCA and PICCA.

Just as the diagnosis failed to mention the agents, institutions and processes in which environmental problems are embodied or take shape, so the strategies and proposals for action removed social agents from those at whom the measures are directed, either ignoring or failing to take their actions or reactions in the economic, social and political spheres into account. This was a voluntaristic policy because it did not refer to the real terrain in which its actors lived, acted, negotiated, and agreed or disagreed with the laws, norms and mandates through which costs are assigned and attempts are made to incorporate them into a new arrangement concerning the
social distribution of these costs.

The lack of key socio-political variables in the entire process of drawing up and implementing public policies led to the omission or non-recognition of the fact that the implementation of any regulation implies; 1) sectoral negotiation prior to its issue, 2) the constitution of a real scenario for its fulfilment 3) the existence, on the part of the sender and receiver of the regulation, of the will to comply, 4) a capacity and will to sanction on the part of the authorities, 5) a real capacity on the part of all parties involved (sender-receiver of the norm) to negotiate the implementation of the norm.

All these elements describe the many mediations which exist between the issuing of a regulation and its real, concrete impact on the reduction of air pollution. The consideration or otherwise of these elements determines the voluntaristic or realistic nature of environmental policy proposals and programmes.

The Proaire programme depicts technological solutions as an essential component of the air policy, basing any proposal for urban sustainability on overcoming poverty by increasing productivity:

Little or nothing can be done in extreme poverty, or in economic straits, and in a situation of poverty, priorities and social expectation are overturned in the short term, while there are fairly high discount rates in the structure of preferences, which invalidates and rules out projects such as environmental sustainability, (DDF et.al. 1996:123).

The underlying assumption in this statement is that it is possible to overcome poverty by increasing productivity. From the point of view of environmental issues, this idea is subtly presented in interpretations and proposals which suggest that human needs are left unsatisfied because of the existence of a natural shortage of resources which prevents their equitable social distribution. Moreover, in this case, the problem of unequal distribution of resources is essential to understanding the true essence of their scarcity; in this case, one could speak of a social scarcity rather than a natural scarcity, derived from the unequal distribution of resources.

The means of constructing the environmental problem is crucial to proposing policy proposals and the strategies for action for coping with pollution. If the problem of the air, the water and the overall quality of the environment is regarded as a problem of scarcity determined by natural forces, then policy proposals focus on technological solutions, utilising a form of social analysis in which society appears as
the result of the free association of actions and individual wills which, with a similar participation, creates common results or gives rise to results that are not always desirable.

Conversely, if environmental problems are not merely regarded in their natural aspects, then proposals and strategies should incorporate the social and political dimension. In this case, it is essential to explain the social conditions behind the creation of shortage or the social conditions which produce environmental degradation. This leads to the analysis of social life as a result of confrontation or conflict, the search for consensus among agents who are not only functionally unequal but occupy different positions in a hierarchical social structure. Policy proposals and strategies should consider solutions in the environmental, economic, technological and socio-political spheres. In the latter, the problem of distributing the costs of repairing environmental damage should be regarded as a decisive factor in an objective and realistic proposal. With this kind of analysis, Proaire could reach level 2.

A public policy proposal, as in the case of the one for air, should foresee the conditions of implementing its proposals and clarify the limits of its regulating action. These limits are determined by the development model and its capacity for assimilation and change, the social will to advance in environmental issues to the point where the value of the environment and its nature as an integral part of the package of well-being will not be opposed or made less important as a result of the values or needs held to be more essential by the group. The other decisive limit is the one established by the actors themselves according to their ability to manage economic, ideological and political resources, and the agreements and results derived from the confrontation between these positions at a set point in time.

A propos of these actors, analysis should include the powerful negotiating skills of some of them and their inclusion as an element of visibility in the proposals. Environmental policy, like any public policy, has a coercive component and one which involves the search for consensus. The incorporation of an appropriate physical-technical and social dimension into the official programmes involves the appropriate, timely and effective handling of both components in a context in which all the physical-chemical-meteorological components comprising the physical aspect of the environmental problem (level 1), its economic and technological components and its socio-political aspects (level 2) are given their true value and weight. Thus a
voluntaristic or rhetorical public policy is one in which these elements are not included in its conceptual frameworks or proposals for action.

3. Elements for a more appropriate social dimension of air pollution programmes

Finally, summarising the criticism of the government’s construction of air pollution, this research would like to compare this construction with an ideal one, in which air pollution, in terms of its characteristics and composition, would be thought of as a consequence of natural, social and political phenomena of greater explanatory scope and with a different sort of prioritisation than that expressed by government programmes. The implications for the planning of a conception of this nature would be to suggest programmatic proposals aimed at the different levels of existence of environmental problems and a prioritisation of actions which would enable conjunctural and structural problems to be simultaneously attacked, by establishing priorities within this dynamic which arise from the treatment of emerging problems, on the one hand, and underlying problems on the other.

The three programmes explore this physical-chemical-technical level (level 1) of pollution fairly successfully. All three include the presence of social components among the causes of problems (level 2). However, in the first and second programme, social aspects are overshadowed by the phenomenon of the *concentration* of economic activities (industry, services, number of cars) and the population. The third programme includes, as a diagnostic feature, a list of other more qualitative components, which intervene as an explanatory element; this is true of cultural factors and the idea of urban processes. However, these elements are included in the conceptual framework as decorative rather than explanatory components, since they are not interrelated or incorporated into proposals for action. Proaire incorporates more variables and some of them have a great explanatory power. However, at the diagnostic level, they are not arranged hierarchically and do not form part of a unitary interpretative framework. At the level of proposals for action, there is a lack of congruence between the conceptual framework and strategies.

Air policy, as understood here and presented in the scheme 3, should be constructed on the basis of two components: 1) a conceptualisation which situates the
atmospheric problem in its different levels of existence; a) as part of an environmental problem with which it interacts b) as a result of natural geographical characteristics c) as a result of technology and organisational forms at the level of economic activities d) as a phenomenon influenced, at the macro level, by an urban and social order in which the value system coincides with an economic and political order which lends society as a whole its true content. 2) The second component on which air policy should be based concerns the specific strategy of action which includes the objectives, goals, strategies and institutional framework in which the proposal will be developed. The core of this aspect is the need to establish congruency between the construction of the problem at the diagnostic level and the type of concrete proposals contained in the programmes.

The basic aspects of this criticism should be taken into account. One of them concerns the construction of the air pollution problem in government programmes, particularly as regards its conceptualisation. In this case, the observations are aimed at the ability or lack of ability of the diagnoses and conceptual frameworks to conceive of a multicausal problem in its different levels of existence, arranging them hierarchically in accordance with the goals of these diagnoses. When the goal is to design a public policy, the conceptual framework should include the agents who embody the physical, technical, technological and economic aspects of environmental problems, the relations between producers and consumers in a set social order, the value system according to which the agents regulate their lives and the political exchange in which they participate.

The other basic aspect of this criticism concerns the necessary congruence which should exist between the construction of the problem at government level and the strategy for action proposed to deal with the problems. In this respect, it is less inappropriate to have a programme which defines the pollution problem simplistically while proposing complex solutions, than one which defines the problem in a complex way and proposes simplistic solutions. The first case applies to PCMCA and the second to Proaire. The scheme 3 (see appendix) aims to intervene both analytically and programmatically in the problem of air pollution. In the scheme, the air problem is seen from the point of view of two types of interventions. Thus, from an analytical point of view, pollution appears as a combined result of physical, technical, economic, social and cultural factors. Between the physical-technical and socio-cultural aspects, the latter has a greater explanatory ability
inasmuch as man's social organisation and action are essential elements in modifying the natural environment. At this same analytical level, the model presented here includes the economic and political actors derived from or involved in environmental problems such as pollution. These agents are the receivers and real forces which take part in policies and it is ultimately they who determine, as a result of the control they exert over resources and their actions and reactions in a scenario marked by dispute and negotiation, the type of policy implemented by government authorities.

From the point of view of the second intervention in the problem of pollution, i.e. programmatic intervention, air policy appears in the diagram presented here to require strategies at the different levels of existence of the environmental problem. The diagram then refers to the need to design a planning system for the purposes of air policy in which this policy is hierarchically arranged, according to its degree of efficiency and its room for manoeuvre, in the context of other sectoral policies with which it competes for resources and costs. According to the diagram shown here, economic policy has more room for manoeuvre and exercises a more significant control over resources, thereby involving both environmental and air pollution. Failure to consider the hierarchy existing between the different public policies leads the environmental authorities to under- or over-value the specific sphere and scope of environmental policy. The proposal for action that would be derived from a multicausal conception of the environmental problem is one which assigns different responsibilities to the various sectors involved. This is what is meant by the last section in the diagram which points out the need for 1) congruence between diagnosis and strategy, 2) the inclusion of the different agents according to their importance in the origin and solution of the problems 3) the prioritisation of actions according to their degree of effectiveness in attacking the problems and the dynamic between conjunctural and underlying problems 4) the identification and, where appropriate, creation of room for manoeuvre for sectoral action and that of the agents involved.
Chapter V. Air pollution as socially constructed

This research is situated in the field of social sciences, particularly in the perspective that holds that environmental problems, apart from their physical dimension expressed in terms of magnitude and damage, are subject to a process of social appraisal that adds another socially constructed dimension. This research seeks to contribute to this field by analysing this area of problems in Mexico by means of two hypotheses. The first states that official programmes to solve air pollution in Mexico City fail to incorporate an appropriate social dimension in dealing with the problems and that their analytical and programmatic components emphasise the physical and technical aspects of the problem. The second hypothesis holds that there is a social construction around Mexico City's air pollution problem that is not incorporated into the official programmes and that would give them another relevant perspective, and if incorporated, would help to make the air pollution planning process more effective.

The purpose of this chapter is to provide elements for testing the second hypothesis of this research. According to this hypothesis, the existing social dimension of air pollution can be reconstructed from the way certain key social actors perceive and construct the problem. It is assumed here that environmental problems, such as air pollution, undergo a process of social construction in which social, ideological and political aspects are present.

In order to test this social existence of air pollution in Mexico City, the research project designed a set of interviews for a group of representatives of the various sectors involved in air pollution. These persons are called social actors in this research since it is assumed here that they do not only behave as individuals but also as socially determined beings. The answers given by these actors to the question on relevant aspects of the air pollution issue are called Environmental Ideological and Political constructions (EIPCs) to reflect their social nature and their constituent ideological and political elements. All the aspects related to EIPCs and the design of this part of the research are explained in Chapter II.

The purpose of the research is to describe the social dimension of air pollution, but it is particularly interested in demonstrating that such a construction exists among certain social actors who play an important role in various aspects of the policies implemented. In this respect, its universe of social actors is highly select, since it
includes those actors who are important in the process because of their involvement in some of its dimensions. The analytical justification for the selection of actors is presented in Chapter II. There are many other actors involved, but for the analytical restriction of this research, it was necessary to include only the most important ones. To find out how these actors perceived and constructed air pollution, the research project selected a group of actors with different kinds of involvement in the problem. In this context, it was considered relevant to include representatives of those working in government offices on issues that were more directly linked to air pollution policies, such as government officials from the local and federal environmental authorities. It was also considered necessary to interview some of the best-known researchers in different areas related to air pollution, such as natural science specialists, social science specialists, environmental scientists and engineers. Because of its recognised involvement in air pollution, the entrepreneurial sector was included, particularly industrial, transport and car dealer representatives. Green activists are considered a key agent in the dissemination of knowledge, as well as consciousness-raisers and claim makers for environmental demands, which is why they were included. Another important actor as regards the consciousness raising process and in their capacity as mediators between social demands and government, are the political parties. These actors were included because they are more sensitive to the demands recognised by the majority of the population. Finally, representatives of international organisation were included, because they are considered an important interlocutor by government, since they provide two crucial aspects for official programmes: technical and financial assistance. The information was drawn from thirty interviewees conducted between September and December 1996.

A similar process of selection took place with the topics to be included in the questionnaire. The aim was to incorporate the aspects that could allow various facets of the problem to be reconstructed. These were restricted to those that allowed the way governmental and non governmental actors construct the problem and exchange perceptions, meanings, concepts and interests around air pollution to be reproduced. The selected topics included the explanation actors gave of both the importance and emergence of air pollution as a matter of public concern, the severity of the problem, the magnitude of air pollution and the place it has in relation to other environmental problems in the city, the will and capacity of government to deal with air pollution, the authorities’ room for manoeuvre to solve the problem, the importance of science
and the objectivity of knowledge in the planning process and the obstacles and solutions to the problems in the view of the social actors. These questions were arranged by subject. The complete contents of the questionnaire can be seen in Chapter II.

The results of the interviews are presented in such a way as to show how air pollution is constructed by the actors. First the answers are presented according to the subject of the questions by the selected members of each sector. Following the presentation of each set of answers by subject and actors, a brief summary is given of the subject and answers provided. At the end of the chapter a general overview and reflection on the characteristics of the social construction of air pollution is given.

The following section presents the results of the field work arranged in the aforementioned order.

1. First set of interviews: rating of air pollution problem by actors

   a) How do the actors explain the emergence of environmental problems and how much importance do they give them?

   **Government officials:**

   **Actor 1** (Federal Environmental Official).
   I think that there are at least three reasons behind the emergence of environmental problems. First, people have rediscovered or perceived environment as a problem. This situation has been accompanied by the maturity achieved by various social groups such as NGOs, entrepreneurs' associations, community groups, etc., who have been able to link environmental problems to their habitat, and to their problems of housing, poverty, democracy, etc. Second, some environmental problems have worsened and gone beyond a certain threshold that people did not previously perceive. Third, the emergence of an environmental awareness at the global level has influenced diplomacy and international trade.

   **Actor 2** (Federal environmental official).
   The main factors behind the emergence of environment as a matter of concern include the insistence on the importance of environment by organisations such as the United Nations, and at the national level by certain governmental sectors and academics and researchers who have emphasised the severity of air pollution problems, the level of deterioration of the ecosystems and the exhaustion of our natural resources.

   **Actor 3** (Local environmental official).
   Americans and Europeans in particular have been very active as regards these topics. They are very concerned about the environment because they
have solved their most important basic needs. In Mexico, people have been influenced by these ideas from abroad. It is a sort of fashion because if you analyse the general problems affecting most people in Mexico, there are other more urgent needs for people to be worried about.

**Actor 4 (Local environmental official).**

During the 1970s and the 1980s people and government did not pay much attention to pollution because it was not obvious. But as soon as we exceeded the limits of ten million people and the numbers of automobiles increased because of our economic boom, ordinary people started to realise that pollution was a problem that affected everybody. As a result of air pollution individuals are affected in their everyday life. For instance, motorists cannot use their car one day a week, because of the official programme “One day without a car”. People experience irritability and various physical disorders because of pollution, which is why this awareness emerged.

The various actors interviewed in the government sector shared some views on the factors behind the emergence of environmental problem as a matter of public concern. Most of them agreed that air pollution had reached a level that made it impossible for ordinary people not to be aware of it. According to some of these actors, when people were not too affected by air pollution, they did not perceive it as a problem. But as soon as they began to feel affected, awareness emerged. However, according to most of them, it was not only the spontaneous appearance of a symptomatology of illness that made the problem emerge, but also the influence of institutions, ideas and images from abroad.

They conceived the problems as being subject to a certain mobilisation of meanings produced in the industrialised world and transmitted by international organisations. However, there was no consensus among government officials on the relative importance that should be given to both factors, namely international awareness and increasing air quality deterioration. For a local environmental official, the emergence of air pollution as a matter of concern in Mexico bore no relationship to poor air quality but merely to international influence. He viewed concern over air pollution as a sort of collective fashion.

There is tacit recognition among the new generation of government officials that certain social and cultural global values emerging at the international level have caused problems such as air pollution to come to the fore. They tend to associate problems with a sort of emerging concept of quality of life linked to environmental issues.
Only one of them refused to believe that the magnitude of the problem had triggered people's awareness, attributing it instead to the unilateral influence of international influence. Most of the interviewees cited a combination of these two factors, although there was a tendency to cite the increasing deterioration of the environment in Mexico City and the damage and inconvenience it caused as the factor behind public awareness of air pollution.

Actors in this sector tended to share the constructionist and post-materialist perspective. This is borne out by in the importance they placed on ideological and cultural aspects in the public emergence of air pollution as a matter of concern. From this perspective, it was not only the magnitude of a problem that explained its public emergence but values, perceptions and the will to regard something as negative.

The academic sector

Actor 1 (Environmental sciences).
I think that it is a problem that goes beyond air pollution in Mexico City, it is more a question of anxiety in a wider context. Environmental issues comprise two aspects: use of natural resources and waste management. They are two related yet independent issues. And why should we worry about the environment? Because it is a false dilemma. We do not have to choose between the two issues. Both of them are crucial and we have to take environment and development together. Poor management of our natural resources can increase poverty, backwardness and underdevelopment while ineffective waste management can paralyse production and endanger the life of future generations. I think that environment is not just a luxury for the industrialised and developed world. Developing countries cannot afford to ignore their environmental problems.

Actor 2 (Atmospheric sciences).
Environment has been recognised as a very important issue since people in Mexico started to understand that all living beings are interconnected. We have understood that, for example, when we avoid polluting water, we are protecting aquatic life and in doing so, we are creating the opportunity to have fishes to meet our nutritional needs and for trade. We in the academic sector, have also understood that if we destroy our forests we will cause desertification and climate change. In doing so, we will produce starvation and hunger. This is why people talk about the environment. Air pollution in Mexico City is not only a matter of fashion but of health damage. In my surveys among citizens in Mexico City, people report headaches, watery eyes, pain, coughing and nausea.

Actor 3 (Social scientist).
The ideas I have about the environment and its current importance cannot be explained in an interview. I have written my main ideas in books and journals. Basically, the emergence of environmental problems means that people have become aware of a crisis of social, economic and productive rationality which we are currently experiencing. This means that we are undergoing a broad ranging, multifacetted crisis that involves values, principles, economics and rationality.
Actor 4 (Public Health).
We should recognise that it was the medical sector researching the health consequences of air pollution who first publicly denounced the increasing damage caused by air pollution. For example, it was important to eliminate lead from gasoline to improve air quality, but it was crucial to publicly disclose academic findings on the health consequences of lead, for the general public to become aware of and involved in the problem. Ordinary people became aware of the dangers caused by the high concentration of lead in Mexico City’s atmosphere. When it was revealed that these sensitive sectors of the population had high lead levels in their blood, there was a public scandal. In this situation we are talking about the emergence of public awareness as a result of the magnitude of air pollution problem.

Actor 5 (Environmental sciences).
I think that an important change took place in the world, a change in philosophical and political terms that influenced the way people thought about nature all over the world. This movement started in the industrialised world whence these kinds of ideas were disseminated to the rest of the world. These changes involved not only a new attitude to our environment but a new way of conceiving the human condition and overcoming the selfish and individualistic ideology and behaviour that predominated previously in both the industrialised and the non-industrial world. It was at the beginning of the 1970s that this movement started and it is associated with the Stockholm Summit. Then, during the 1980s the environment emerged very strongly, particularly after the publication of the Brundtland Report. Finally, the Rio Summit in 1992 gave the environment a prominent role in the international agenda.

There are many related issues in the explanation this sector gives of the public emergence of air pollution. One general explanation mentioned involves a general crisis of rationality that would have revealed environment as a matter of concern. According to this idea, modern society is in the midst of a crisis. As a result of this crisis, modern values, the economy and social institutions, etc. have been called into question. Environment and the way people relate and deal with it are changing. Within this same context, but using other words and issues, academics alluded to a new academic and public understanding of human life and natural processes. One of the academics interviewed held that people in Mexico now understood the interconnections existing between man and nature. On the other hand, another academic believed that it was particularly in the academic sector that specialists viewed the environment as something very closely linked to human life. In this respect, he affirmed that the negative consequences for humans of the irresponsible use of nature were now clear.

Apart from this emerging new awareness, a public health specialist held that consciousness started because of a double coincidence: First, the academic community was successful in analysing the relationship between air pollution and
damage to health. Second, these academic findings were publicly disclosed by the media. This actor believed that the dissemination of the scientific findings concerning the damage to children, women and the elderly caused by pollution had been a decisive factor in the emergence of public consciousness.

The academics interviewed showed a tendency to view environmental problems as a social and cultural aspect of human life. Most of them emphasised air pollution as a problem of consciousness that was particularly dependent on an understanding of the way the world operates. From this perspective, people started to worry about the environment once they became aware of the numerous links between man and nature. This sector felt that there was a continuity between environmental destruction and well-being and between pollution and exhaustion and poverty, starvation and hunger. However, public dissemination of scientific knowledge of the damage caused by pollution, rather than environmental damage itself, emerged as the main factor behind public concern over environmental damage.

From the academic discourse presented here, awareness of air pollution, as the constructionist perspective affirms, is primarily a social construction. An understanding of the interconnectedness of living beings reveals the importance of the environment for human reproduction. At the same time, pollution is seen as the result of social anxiety, an attitude that has to do with the constitution of society or even the emerging values that constitute and reconstitute society. From this point of view, environmental concern is linked to the notion of ideology that emphasises the existence of certain shared values that make it possible for a society to exist. At a more general level, however, environmental problems were viewed by one of the interviewees as a result of the changes that are taking place in contemporary society.

**The business sector**

*Actor 1 (Industrial sector).*

I sincerely think that it has to do with politics. Everyone is now aware of environment because, for some political groups in both government and society, talking about the environment, making environmental claims and taking care of animals and trees is a way of earning support from the general public. Government does this because that is the way it legitimises their actions. Political parties do so because the environment gives them the votes and constituencies they need to be in power. For environmental activists, it is important to defend the environment because it is a means of obtaining international funds and earning the support of the general public.
Actor 2 (transport sector).
I feel that it was because many environmentalist groups started to talk about environmental problems. These people were influenced by international organisations. Suddenly in Mexico everybody seemed very worried about environmental problems, it was like a fashion that charmed some of the Mexican middle class. Air pollution is an important problem but according to environmentalist groups it is extremely dramatic.

Actor 3 (Car dealer).
I think that a fundamental aspect in the emergence of the environment as a matter of public concern is the fact that environmental damage is currently one of the most important threats to human survival. Environment is now a serious problem for the entire world population. Sometime I feel it is better to ignore these sorts of problems. Nevertheless, those of us who are aware of the problem know that people are very distressed about the way the environment is being affected. In this respect, we feel that it is a very difficult problem to be solved and that it can affect various aspects of our life, our future and our children.

As regards air pollution, ozone is a significant matter of concern because we do not know the extent of its influence on our health. We are now more aware of environmental problems because they have increased; unfortunately, no solutions have been put forward, which is terrible because we suspect the great magnitude of the problem and feel powerless in the face of this lack of solutions.

Actor 4 (Chemical industry).
The emergence of environmental issues at the public opinion level has to do with the increase in the number of people affected by pollution. I observed lots of people affected by bronchopneumonia, different types of viral diseases for which there is no explanation and all we do is to attribute them to pollution. The link we make between pollution and disease is what makes us worry about the environment.

For some members of this sector, air pollution problems emerged as a result of social factors. However, they did not associate these social factors with constitutive social elements or with any post-materialist assumptions, but with the simple political interests of individuals, groups and organisations. Problem were not as real as they appeared in the political discourse of these groups and organisations. One of the members of this sector was of the opinion that although air pollution was an important problem, it was magnified in the Green activists' discourse. There are two ways for environmental damage to publicly emerge according to these actors. First, as a result of the direct interests of Green activists and political groups in promoting the environmental cause as means of legitimisation. Second, some groups and organisation serve as mediating agent for international groups to penetrate Mexican public opinion in such a way as to generate a sort of artificial concern for the environment.

Both these ways of understanding awareness of air pollution are constructionist. Yet while the first regards it as a result of attempts to achieve
legitimation and political support, the second views it as a consequence of a mere whim acted on by certain social groups as a result of external influences. Both of them can be considered within the framework of ideology as a means of expressing and organising relations of power. Both can also be thought of as a way of organising bias to achieve power.

Nevertheless, other interviewees from the business sector thought that environmental awareness had emerged as a result of the severity of air pollution. They associated awareness with damage. For one of the representatives of this sector, environmental damage appeared as a matter of survival. But unlike those who associate damage with publicly disclosed knowledge, this actor thought that the most worrisome aspect of air pollution problems was that people were not aware of the magnitude of the health risks of certain pollutants. For this actor, what was at stake was human life and its present and future viability. Another actor from the industrial sector clearly associated health risks with awareness. In his view, the emergence of a well-defined symptomatology, particularly associated with respiratory diseases, had triggered environmental awareness.

Awareness of air pollution is viewed as something that is both related to and distinct from its physical dimension. However, some of the interviewees expressed a more ideological position when they said that air pollution was merely an invention. In their view, it was not a problem of awareness but of political manipulation. Environmental problems had appeared as the result of legitimisation and political struggle. However, another ideological aspect emerges from some of these actors’ constructions of air pollution. The perception of environmental problems has to do with ideological constitutive elements because it reflects a shared fear of environmental damage. Pollution appears as a common way of expressing a group or social anxiety that helps unify the way a problem is perceived. In this respect, concern for the environment can be understood as a way of belonging to a group or a community.

Green activists

**Actor 1.**
I think that an important moment in the emergence of environmental awareness in Mexico was the Mexico City earthquake in 1985. We started to exist as an organisation in 1985. All the NGOs that were set up because of the earthquake were involved in consciousness raising. In Mexico, we
had no information on environmental issues and our legislation was obsolete. Many people confused air pollution with fog and did not associate it with health problems. The earthquake was very important because it had many social consequences as regards raising people's awareness of social issues such as environmental problems. In addition, the 1985 and 1986 winters were particularly severe in terms of air pollution and thermal inversions and people started to worry about the quality of their environment. People panicked because Mexico City's atmosphere was full of the particulate matter released by the earthquake and when combined with the usual substances and with thermal inversions, the scenario looked dramatic. We launched a powerful campaign to raise people's awareness of environmental problems and as a result, the Secretariat for Urban Development and the Environment was abolished.

**Actor 2.**
I think that environmental awareness has emerged because air quality has deteriorated. We are moving towards an extreme situation and everything would seem to indicate that the programmes and strategies implemented by government have failed to solve the problem. Although degradation may have decreased a little, the general trend has continued at both the local and national level. We feel we have reached a deadlock.

**Actor 3.**
The depletion of natural resources and the extinction of many species started to raise people's awareness of environmental damage. Suddenly all of us seem to be in danger. In addition, nuclear and chemical disasters have affected lots of people and all these circumstances have helped to create an image of industrial progress as something that is rather dubious.

**Actor 4.**
I have no doubts that at present in Mexico we are more aware of air pollution problems, because people really feel that they are in danger. How could you avoid being aware if pollution is so evident? Even if you wanted to ignore the problem, you would feel its consequences because your health was being affected. The air is obviously dirty which makes it different from other forms of pollution, because you do not need anyone else to confirm the presence of air pollution; you can see and feel it. Awareness is merely a consequence of this.

Most of the Green activists interviewed shared the perception of associating awareness of pollution with its physical presence and its health effects. In their view, air quality had gradually deteriorated, but at some point, it had become so obvious that people started to realise that something was happening to their health that was linked to the poor air quality they were observing in the city. However, in order for this awareness to emerge, air pollution had to be depicted as a serious problem.

Green activists perceived air pollution as a severe problem that was beyond control, implying that government was overwhelmed by the problem. Its severity was linked to the government's inability to curb it. This sector depicted air pollution as an acute threat to society and green activists seemed be trying to convince people that air pollution was more serious than it appeared in both the government's and
society’s perception.

One of the actors in this sector attributed the emergence of environmental awareness to both the physical and the social dimension of air pollution. On the one hand, awareness emerged as part of the general social disruption caused by the 1985 earthquake in Mexico City. According to this point of view, the involvement of civil society in rescuing earthquake victims had made ordinary citizens aware of both their ability to solve the problems they were facing at the time, and their ability to collectively deal with the different social and community problems they were experiencing. Environmental issues were one of the problems that civil society chose as a potential area of intervention.

Moreover, the earthquake itself, together with several periods of extremely severe air pollution that drastically affected Mexico City inhabitants’ health, made people realise the seriousness of the air pollution problem. However, in the discourse of this actor, the physical aspects of air pollution and the social conditions that led to an awareness of the latter, appeared to be very closely linked. This is borne about by the link he establishes between the thermal inversions and the enormous concentration of particulate matter released by the earthquake and Mexico City citizens’ resolve to become more involved in the solutions to their problems. This resolve was due to their successful participation in solving the problems of earthquake victims.

**Political parties**

**Actor 1 (Green Party).**
In our opinion, the city’s environmental crisis is a really big problem. All the recent administrations have failed to curb air pollution which is why Mexico’s City environment has deteriorated. Air pollution is the city’s main problem, you can see how many people’s health has been affected. I know lots of people that have left the city because of the poor quality of the air. You have to take this situation into account to explain the emergence of environmental problems.

**Actor 2 (Revolutionary Institutional Party).**
I think that the emergence of the environment as a matter of concern has to do with the severity of environmental deterioration in Mexico. It is the deterioration of our natural resources and ecosystems produced by human activities that has caused the emergence of environmental issues as a problem of survival.

The quality of both air, water and soil leave a lot to be desired in different parts of the world. It is the awareness of this situation that explains the birth of a new consciousness and responsibility for environment throughout the world. I must stress that this is a problem of survival and unless we act together the human race will be in danger of extinction.
Actor 3 (Action National Party). The environment has emerged as matter of public concern because what is at stake is our natural resources, particularly the non-renewable ones. This is true of water. I am not just talking in terms of the water cycle but of pollution and over-exploitation.

Actor 4 (Democratic Revolutionary party). We are in the midst of a crisis affecting our relationship to the environment. We as a society have caused severe damage to our environment which has led to the emergence of a citizens’ movement that perceives environmental deterioration as something one should protest about. We are now suffering deforestation, soil erosion, loss of biodiversity, the depletion of natural resources, over-consumption of energy, pollution, etc. These are enough reasons to be worried about the environment.

All the political party representatives interviewed were of the opinion that public environmental concern was a direct consequence of the serious environmental deterioration that had taken place in Mexico. For these actors, evidence of air pollution abounded. Damage to the ecosystems, the depletion of natural resources, water, soil and air pollution and damage to human health, are the main factors, according to these actors, behind the emergence of environmental awareness in Mexico City.

Like the Green activists, political party representatives expressed a dramatic perception of the problem. They shared the feeling that people were in danger because of the destruction and pollution of nature. Environmental problems were depicted as being crucial to human survival. This emerged as a shared perception linked to both the attempts of political parties to achieve legitimisation among the electorate and the need to dramatise environmental problems to create a concerned constituency that they could eventually represent. However, this perception of environmental problems includes a need on the part of political parties to participate in a social shared feeling of living in a dangerous situation that threatens everyone and allows individual members of a social group to feel integrated with their community.

According to the political parties’ perspective, air pollution does not need any cultural mediation to be assumed as such. Awareness is a natural consequence of environmental deterioration. The language used to describe air pollution and environmental problems in general resembles that of the authors who emphasise the crucial role played by the claim-making process in social and governmental acknowledgement of environmental problems. In the political parties’ statements, air
pollution appears as something dramatic and a real threat to human survival.

International organisations

Actor 1.
Mexico was probably influenced by environmental protests coming from the industrialised world. But I think that another factor has been the deterioration of the environment in Mexico. Air pollution is a serious problem here, it is a question of risk and people who feel threatened are going to be more aware. I think that this is the way people react to this kind of situation. Air pollution causes immediate damage to everyone, because air is part of the environment and all of us have to breathe it. It is a public health matter.

Actor 2.
I think that air pollution has emerged as a problem because it has become a matter of survival. It is clear that air is very bad; people can see the problem and many of them are highly sensitive to the effects of certain pollutants. You do not need to be a specialist to notice, before landing in Mexico City, how dirty the air is. Unless you are blind you will soon notice air pollution.

Actor 3.
It was during the 1940s and 1950s that people started to become aware of air pollution because of several dramatic cases of pollution in both Europe and America. It became clear that air pollution could kill people. In London, Belgium, New York and other US cities, many people's health was affected because of the high concentrations of air pollutants.

The environmental discourse of this group of interviewees regards air pollution problems as extremely severe. Most of them emphasised the physical presence of pollution and associated it with public concern for the environment. The dirtiness of the air, which was evident for these actors, was the factor that had triggered awareness of the problem. This was not only true of Mexico but of all cities that had experienced a significant deterioration of their environment. One of the interviewees felt that the air pollution problem was so severe, that one did not need to be a specialist in air pollution problems to realise its magnitude. From the perspective of this sector, the severity of the problem means that international influence is not required to make people aware of the problem. It seems, according to the logic of this discourse, that social and cultural mediations are not needed when people face a problem of the magnitude of Mexico City's air pollution.
b) How serious is the air pollution problem in Mexico City?

Government officials

**Actor 1 (Local environmental official).**
Air pollution is a real problem, not something we have invented. If it were not serious, we would not be working on it in the government sector. But it is necessary to differentiate air pollution as a real problem from air pollution as a problem for some environmentalist groups. They do not always try to understand the problem as such, preferring to create a dramatic image that makes people really concerned. In short they exaggerate the magnitude of the problem for political reasons. Nowadays, in Mexico, the environment serves as a political forum for negotiating problems that are not environmental in nature.

**Actor 2 (Federal environmental official).**
Air pollution used to be a big problem, but not any more. One should recognise that some of the measures implemented by government have been successful in reducing the amount of substances in Mexico City's atmosphere. I can mention just three cases to illustrate this reduction. First the amount of carbon monoxide, second the amount of sulphur dioxide and third the amount of lead have been substantially reduced. Please do not think that I am saying that we have solved the entire problem; what I am saying is that we have made significant progress in solving the problem. I think that if you analyse the problem in some detail, you will find political motives behind the criticism from political parties and Green organisations that want to gain supporters by criticising government policies.

**Actor 3 (Federal health official).**
It is serious. We are breathing in millions of tons of pollutants and people not only perceive air pollution physically but also when their health is affected. But accepting that is a serious problem does not mean agreeing that it is as severe as it appears in the activists' discourse. Nor does it mean that air pollution is the only environmental problem in Mexico City. I think that many environmental organisations distort the facts and confuse ordinary people. In many aspects they perform an important function in raising awareness about environmental issues, but sometimes they just try to scare people. You can tell that environmental causes are often just a means for groups or individuals to gain political advantage and to get political concessions in problems that have nothing to do with the environment.

**Actor 4 (Local environmental official).**
It is not as serious as it appears in the media. There are many people who make it their business to exaggerate both the magnitude of the problem and the role of government in its control. I know many people working in Green organisations who intentionally exaggerate to get financial support from abroad. No donor agency would be interested in funding them if Mexico City air pollution were not dramatised in such a way that everybody appeared to be in a dangerous situation because of pollution.

There was a shared opinion among the interviewees in this sector that despite its importance, air pollution was neither as dramatic as it appeared in environmental discourse or as severe as it had been in the past. According to some government
officials, air pollution is misrepresented in environmentalist groups' discourse. These groups distort the facts to attract the public's attention. Air pollution and the environmental forum is seen as an arena for dealing with other, non-environmental problems. According to this version, the environmental arena is not environmental as such, but a general political forum where social groups deal with different kinds of problem under the pretext of defending the environment. According to government officials, the distortion of facts by these Green organisations is not only intended to secure public involvement in environmental problems but also to make it easier for them to obtain funds from international donors. If the latter are convinced of the severity of air pollution, they will provide funding.

On the other hand, government officials state that air pollution is decreasing because of the effectiveness of official programmes. In this context, those who affirm that the problem is severe and out of control fail to take the achievements of government in controlling air pollution into account. Within the general atmosphere of these actors' discourse, there is a perception that air problems are not that severe, largely as a result of government intervention.

According to government discourse, air pollution problems exist on two levels in Mexico City. In one of them, air pollution appears as an important but decreasing problem. As a result of government intervention, the problem has decreased and certain pollutants are no longer present in the same amounts as in the past; a point of view adopted by government officials. On the other hand, they claim that environmentalist groups offer a different version of air pollution in which it appears as dramatic and out of control. Government would be responsible for this worsening situation because of the failure of its programmes.

The academic sector

Actor 1 (Social sciences).
Air pollution is really a big problem in Mexico City. This is true not only because of what government authorities say but also because of the health damage reported by different studies carried out in recent years in Mexico. The problem in Mexico City is that many people are unaware of the severity of the problem and its consequences on human health. I remember that during the 1970s, when you talked about air pollution and health damage, nobody believed in it. It was only after a number of cases of people being affected by pollution were reported by the mass media that people started to associate damage with pollution and began to demand better air quality. It was during the 1970s when newspapers reported cases of pollution from chromatic acid that both government and society became aware of pollution.
Actor 2 (Environmental sciences).
Air pollution is not the leading environmental problem but at least the second biggest one. When I rate it as the second most important problem, I do not mean that the air problem is unimportant. It is important and government has been unable to solve it. But the full scope of air pollution has not been allowed to emerge because some authorities have denied the problem. I remember some years ago that the Secretariat of Health issued an official version stating that ozone pollution was not really important. According to that institution, Mexicans were very adaptable people and they would finally end up adapting to ozone or to any other pollutant. I feel that government is ambiguous in its efforts to minimise the problem. It is ambiguous because on the one hand it minimises the problem and, on the other hand it takes some heroic measures, such as the programme “One day without a car”, which is completely arbitrary. One day during the week you are not allowed to use your own car; a car that you paid for with your own money and that you have to pay tax on.

Actor 3 (Public health specialist).
In terms of health damage it is important. But we are now more aware of it because we know more about its causes and consequences. I am sure that once we know more on it, air pollution will show why we are worried about its consequences. What we know now enables us to take some measures that government has not taken. Over the last five years the academic sector has generated a great deal of knowledge, particularly on acute exposure to certain pollutants. However we know nothing about most aspects related to chronic exposure.

Actor 4 (Atmospheric sciences).
We are aware of the real scope of the problem. It is more serious than government admits. They just worry about their public image and they give you unrealistic data. According to government, air pollution has ceased to be a worrisome problem. The opposite is true. Every year new pollutants are discharged into Mexico City’s atmosphere. As a result of the new petrol a new cocktail of hydrocarbons and oxides of nitrogen has been released into the atmosphere. Do you know why government does not admit the severity of the problem? Because that would be tantamount to a public admission of failure. If you ask other members of the scientific community you will find that they have many doubts about the way government is addressing the problem. There are many areas of environmental risk that have not been analysed which could be more dangerous in terms of their consequences on human health and ecosystems. Air pollution in Mexico is not only a serious problem because it affects Mexico City inhabitants’ health but also because of its global consequences in terms of global warming.

For the academic sector, air pollution is more serious than it appears in government discourse. For these actors government is consciously seeking to conceal the real magnitude of air pollution. On the one hand, this ignorance is produced by government attempts to deny the severity of the problem to avoid being criticised for its failure to solve the problem. On the other hand, people ignore the problem and are unwilling to believe its magnitude or consequences.

In this context, although air pollution was perceived by these actors as a severe problem, they thought people had no possibility of fighting for a better environment.
since air was not recognised as a matter of concern. According to the logic of academic discourse, people failed to perceive the real magnitude of air pollution for ideological and political reasons. One expression of these ideological factors is linked to people's refusal to believe in the problem. This aspect of ideological intervention can be understood as a constitutive group mechanism that not only makes group identity possible, but also serves as a group strategy for dealing with apparently insoluble problems. The political factors would be linked to the government's wish to deny or minimise the problem. Problems that both specialists and activists described as real and serious, are shaped by government in such a way as to be socially perceived as harmless or, at least, less important than they really are.

According to the logic of academic discourse, in order for the claims process to begin, the academic findings on the magnitude, causes and health consequences of air pollution would have to be brought to the public fore by the media in such a dramatic way that people would begin to view air pollution as a significant problem. Knowledge and its dissemination by the media emerged as crucial aspects of awareness. On the basis of their assumption that knowledge is currently extremely limited, these actors believed that once more details of the characteristic of Mexico City's air pollution became known by the public opinion, this would be followed by a new awareness and involvement.

All the aspects involved in the way the academic sector perceived the severity of air pollution reflected a social construction of air pollution. The physical dimension of air pollution and the evidence of its health consequences appeared as an important factor that intervened in the acknowledgement of a problem such as air pollution. However the mediation of the images transmitted by the media and government attempts to deny or minimise the problem were, according to the logic of this sector, decisive factors in the perception of air pollution as harmful.

The entrepreneurial sector

Actor 1 (Industrial sector).
I do not think that air pollution is a really big problem. Everybody contributes to magnifying the problem. If you read the newspapers, if you watch TV programmes, if you listen to what environmentalist groups say, all of them show Mexico City on the verge of an apocalypses. What happens is that we perceive the problem in that way. Its the same as looking an ill person and trying to cure him just by analysing his face. To really cure him we have to probe his internal problems, his real problems, otherwise we will misrepresent his symptoms. Air pollution is an
important problem, and a problem that has to be addressed using more effective measures, but I think that exaggerating the problem does not help.

To really know how important the air pollution problem is in terms of health, it would be necessary to carry out many studies that allow us to evaluate the real health damage caused by air pollution for people living in this city.

Actor 2 (Cardealer)
Air pollution is a serious problem, but it is not so serious that it cannot be solved. Cars may be the main source of air pollution in Mexico City. But you have to distinguish between private cars and public transport buses. We who work in the car business area know that the main problem is not cars in themselves but car maintenance. You will find that pollution comes from public transport buses that are in poor condition which is why they pollute more than private cars. The car industry has been accused of causing pollution. I think that despite the pollution caused by cars, part of the problem is artificially created by political groups who do not like car industry and may even be against any form of progress at all.

Actor 3 (Transport sector).
I think that the problem is not as serious as it seems. I have some people working for my business and their health has only rarely been affected. They spend all day driving around the city. I have heard that some people and authorities think that the public transport system is the main polluter. I sincerely do not think so. I know some reports and some people in the university who say that most pollutants come from factories and soil erosion. Some of them think that the industrial sector is the main polluter, and for others, we are the ones who contribute most to air pollution in this city. There are lots of problems that some people think we are responsible for, but I think that we perform a very important and necessary function for the people living in this city.

For the actors interviewed in this sector, air pollution was not a major problem or at least is not so serious that it could not be solved. There are two aspects to be emphasised in the perception of the severity of Mexico City’s air pollution problem by this sector. One has to do with the common point of view that denies the severity of air pollution. Another is related to the shared wish of members of this sector to exonerate themselves from any responsibility for the generation of air pollution.

Air pollution mostly appears in entrepreneurial discourse as a subjective phenomenon rather than a real threat to ecosystems and human health. Air pollution as a severe problem and the damage associated with it, is seen as the product of the ideological and political activity of various social groups, institutions and practices. In this respect, the magnified vision of the environmentalist groups and the media have created a social image of Mexico City’s air pollution as something dramatic and apocalyptic. For the entrepreneurial sector, air pollution is less a real and harmful physical phenomenon than a problem originated at the discursive level.

An interviewee involved in the public transport business cited the fact that the
health of his minivan drivers was not affected as proof as the harmless nature of air pollution especially since they were exposed to pollution. In his view, estimates and studies that confirmed transport as a leading polluter were wrong. Industry and soil erosion rather than transport were responsible for air pollution. He questioned the role in air pollution attributed to transport, since even researchers disagree over defining the main sources. He felt there was a false image that attributed many of the city’s problems to transport, although he denied this. A car dealer thought the opposite. In his view, the public transport system rather than the transport sector as a whole was responsible for pollution. He said that private car owners maintained their cars in better mechanical condition, which is why they polluted less than the public transport fleet.

What emerges from the discourse of members of this sector is the idea of a subjective, artificial existence of air pollution. This is close to a definition of air pollution as a socially constructed problem. In fact, this perception is nearly the same as what some other actors regard as the concealment of the problem by government. In the view of the business sector, the media and activists exaggerate the problem.

The Green activists

**Actor 1**
In this country no-one pays any attention to environmental problems. Air pollution is one of the biggest problems in Mexico City but people are not aware of the problem. I think that government and certain members of the industrial sector realise the true magnitude of the problem, but they prefer not to talk about it publicly. Government probably does this because it does not want to scare public opinion with this issue, and industrialists do so because they tend to work to conceal the problem. We as an organisation receive many complaints from people who are directly affected or know that someone’s health has been damaged. Those who have been affected and the knowledge produced in research centres in Mexico and abroad have placed us in a position to demonstrate how important this problem is.

We often hear that environmental problems are not as important as other social and economic problems. We who work on environmental issues know that people in Mexico City are exposed to a huge amount of pollutants and we know that potential and real damage are more dramatic than authorities admit. I do not know how people will live in this city in the long term.

**Actor 2**
It is a serious problem. We may not know how severe the problem is. We were given funds to carry out a study on these issues, whose findings will be released shortly. That study shows how many people are affected because of air pollution. Governmental authorities are pressing us not to release our findings because they would be catastrophic for them. They always try to tell the public that the problem of air pollution in Mexico
City has been solved or nearly so.

Actor 3
All I can tell you is that the problem of air pollution problem in Mexico City as described in international studies is more severe than government authorities admit. I was at a meeting with experts from Japan who presented some dramatic data on the volumes of substances discharged into Mexico City’s atmosphere and its health consequences. As soon as government found out about this study, the document was withdrawn from the public. We were sent a copy of the document and as far as we can see, the air pollution problem in the city is really serious. Many people are severely affected by pollution. Even those who are unaware of the problem are likely to become ill unless pollution is reduced. We think that the real scope of air pollution is not publicly disclosed because some of the major polluters have the political power to prevent the problem from emerging at the public opinion level. It is precisely because of the activism of various social groups that the problem is now appearing in all its magnitude.

The view of air pollution presented by the Green activist interviewed was dramatic. In his opinion, both government and the business sector had conspired to conceal the real magnitude and health consequences of air pollution. The result of this means of dealing with the problem is public ignorance. One of the interviewees thought that both government and the business sector were aware of the real magnitude of the problem, but preferred not to disclose what they knew either to avoid alarming the public or to avoid being held responsible for pollution. This sort of conspiracy theory is supported by another idea expressed by two of the interviewees. They mentioned the dramatic presence of air pollution described in some studies that had either been published in confidential reports or were shortly to be released. For one of these actors, the image of Mexico City’s air pollution was even more dramatic in certain studies undertaken by the international scientific community. According to this version, government did not want the Green activists to disclose their findings, because that would mean the political ruin of government, since it always has insisted that air pollution is under control. The same is true of some of the major polluters, who have used their political power to prevent the public emergence of this problem.

However, this sector viewed air pollution as a genuinely severe problem that was beginning to emerge on the public scene because of the activism of environmentalist groups. Air pollution and its health consequences were now more present at the public opinion level. However, even those who were unaware of the problem would be or had already been affected because of the magnitude of the problem.
Again, Green activists presented one of the most dramatic images of air pollution. In the context of their perception, both government and the business sector's air pollution perspectives can be regarded as socially produced since the emergence or concealment of air pollution, as a matter of public concern, is determined by ideological and political factors as well as the physical presence of air pollution. The work of the Green activists to raise the public's consciousness of air pollution can be regarded as ideological and political.

Green activists not only described air pollution as something harmful and threatening for human survival, but also referred to ideological and political factors in shaping what people perceived and in the emergence or concealment of the magnitude of air pollution.

The political parties

Actor 1 (Green Party).
I have no doubt that air pollution in Mexico City is really a serious problem. A number of studies have shown how people's health is affected by the high concentrations of chemical substances in the atmosphere. In fact one of the main demands that we first had was for better air quality in the cities, particularly in Mexico City. When we started to have public presence, air pollution problems were just starting to be analysed by specialists but public opinion was not aware of its importance and magnitude. At that time, many people accused us of paying attention to irrelevant problems.

Actor 2 (Institutional Revolutionary Party).
I think that it is a real problem but I do not think that air pollution is as bad as it is said to be by some groups and even by some government officials. I think that we could control it if we had the political will to do so. Some people say that we do not have money enough to implement some of the necessary measures, but I think that government could allocate the funds it receives from international donors more efficiently. I feel there is a lack of a clear understanding of the problem which is why air pollution has deteriorated.

Actor 3 (National Action Party).
I think that the atmosphere has deteriorated considerably. I think air pollution is a serious problem but what worries me most is government's indifference to the problem. It is a well-known fact that many people get sick because of air pollution. I heard of a researcher at the university who has shown how children's health is affected by ozone and other contaminants. People are now perceiving the magnitude of the damage caused by air pollution, particularly because their children are highly sensitive to certain substances. I know many people who have left the city because of pollution.

Actor 4 (Democratic Revolutionary Party).
Air pollution is indeed a very serious problem. But we can say the same about several environmental problems in the city. Air pollution is perceived by some sectors of the population as a real problem, but there
are other environmental problems that people do not perceive as important, such as waste and water. It is necessary to think about environmental problems in an integrated way, so that we can propose integrated policies to solve them. Air pollution is a serious problem, but there are other problems that are just as serious as air pollution which we are doing nothing about.

For the political party representatives interviewed, air pollution was regarded as a serious problem except by the representative of the ruling party. The latter thought that air pollution was merely seen as a very severe problem by environmentalist groups and certain government officials.

Two of the interviewees stressed the existence of certain studies that demonstrate the severity of the problem. In their view, the health of many people, particularly children, was affected by air pollution. One of the interviewees said that he had information on many people who had left the city because of air pollution.

According to some of these actors, the seriousness of the air pollution problem was due to the lack of will, indifference and the lack of an integrated approach and of a clear understanding of the causes and consequences of pollution by government. In this context, government emerged as a key actor in solving the problem.

Air pollution also appeared as a problem of perception for one of the actors interviewed. Following the logic of that perception, there is a group attitude that regards air pollution as a serious problem. However, this perception tends to be unilateral and is unable to understand the different environmental problems existing in Mexico City, apart from air pollution. This is viewed as a biased perception that prevents government from taking action in areas of environmental problems that are not perceived as problematic, despite their severity.

But perception is also regarded as an important aspect in enabling consciousness to emerge. In this context, one of the interviewees said that people started to perceive the magnitude of the Mexico City’s air pollution, when it was publicly disclosed that children’s health was being threatened. Another form of air pollution perception mentioned by one of the actors involves the images of air pollution disseminated by activists and other environmentalists.

Most of these actors agreed on the severity of air pollution and most of them cited the government strategy for addressing air pollution as the main cause of the deterioration of air quality.

The political party perspective could be considered constructionist. First,
because it attributes the existence of air pollution problems to their recognition by transmitted knowledge. Second, because air pollution needs to be perceived as such in order for it to be addressed by various social actors, including the government. Third, because, according to these actors, effectively addressing the problem is not only a matter of knowledge but also of the quality of knowledge available. In this respect, one of the interviewees demanded an integrated perspective from government in dealing with air pollution problems.

Finally, one characteristic of the political party perception of air pollution problems is to cite government as being primarily responsible for pollution. Government is seen as a key factor in either the solution to or exacerbation of problems because of its indifference, lack of will, faulty understanding and mistaken approach to addressing the problem. There is no clear distinction, in political party discourse, between the polluters and those who work to control it within the government sphere. It is almost as if political parties needed somebody to blame for the problem, and chose government for this purpose.

**International Organisations**

**Actor 1**
I think air pollution is more serious than it appears in many academic and public forums. For international organisations and enterprises, air pollution is an important factor that has to be taken into account when they offer someone a job in Mexico. Many international institutions pay you an extra salary and offer to pay you to spend weekends outside the city. I have heard that some people coming from abroad have the opinion that air quality is not as bad as they were informed before coming, but I also know a lot of people who find this city very polluted.

**Actor 2**
Air pollution is so serious that people are starting to become aware of it. It is necessary for people working in government to take drastic measures now, rather than when the situation gets worse. In my country, air quality deteriorated from the 1950s to the 1970s, and it was not until the 1970s that government and society started to take radical measures. In Mexico the severity of the problem demands more commitment from both government and society.

**Actor 3**
I do not know the magnitude of the rest of environmental problems in Mexico City but what I know about air pollution is that it is a major problem. But I think it is so big because there is no possibility of complying with the regulatory system because of corruption. It is frustrating to see how people prefer to pay bribes instead of complying with the law.

According to the interviewees in this sector, air pollution was a serious
problem. In their view, it was a major problem because government had failed to take the drastic measures required by the situation. However, they felt that society as well as government had failed. This could also be observed, according to this sector, in a sort of culture of corruption that makes people pay bribes instead of complying with environmental law.

International organisations have acknowledged the magnitude of air pollution in Mexico City in a variety of ways. One of them is to pay their employees extra salaries when hiring them to work in Mexico City. For one of the interviewees, the problem was so great that the public had started to become aware of its magnitude.

The perception of air pollution by this sector establishes a direct link between damage and consciousness. In this context, there is no need for cultural mediation, since it is the magnitude of the problem itself that causes public concern.

c) How do the actors rate the magnitude of air pollution and how much importance do they give it in relation to other environmental problems?

Government officials

Actor 1 (Federal environmental official).
My point of view is that it is not possible to establish priorities in a mechanical way. In this respect, from the point of view of public health, I think that the perception of atmospheric pollution as the first priority is correct. It is correct in the sense that it causes the most health problems in both the short and the long run. From the point of view of health consequences, air pollution is undoubtedly the leading environmental problem.

From another perspective, and thinking in the long term about the difficulties of dealing with problems, I think that water is the central problem. The reason is that it is more difficult to reverse the exhaustion and pollution of the water table than to curb air pollution. But when we talk at a national level we have to prioritise issues very differently. At this level I would rate environmental problems as follow: first deforestation; second erosion; third loss of bio-diversity; fourth water and fifth air pollution. But what is important is to analyse the changing regional pattern of priorities. For Mexico City I would put air first, water second, and solid waste third.

Actor 2 (Federal environmental official).
Well, I believe that the air pollution problem in Mexico City is really serious, in other words, it cannot be minimised. Although we do not have scientific information on its health consequences, its severity cannot be denied. However, there is of course a social construction that makes so-called public opinion overstate air pollution in Mexico City in relation to the rest of environmental problems in the country as a whole.

Finally there is a question of values in the judgement of what one regards as being most important. I will present two extreme cases: First the health damage caused by water contamination and second, the loss of
biodiversity. What is more worrisome, a current problem of public health or a problem of the permanent loss of genetic resources for the future? Since losing a tenth of all species from time to time does not mean immediate environmental damage, we do not know the magnitude of the harm we are causing through deforestation. To calculate the national patrimony including genetic capital is to recognise that we have immeasurable wealth. No-one really knows the size of this wealth.

Actor 3 (Federal health official).
To me the most important environmental problem generated by this city is sewage. Sewage is a major problem for the city. Around 45 cubic meters per second of sewage is generated in the city. We have not solved this problem but simply disperse it to different parts of the country. For example, the pollution of the Valle del Mezquital in the state of Hidalgo is caused by the sewage produced by Mexico City's inhabitants.

Actor 4 (Local environmental official. Federal District Department).
In environmental terms, the greatest problem in the Valley of Mexico is water, in every aspect. We have not just desiccated water bodies in the course of the history of our city but we have also exhausted water courses, we have contaminated all sources of fresh water and we have to bring water to the city from far away. Social perception of the water problem fails to include the magnitude of its scarcity. Like a miracle, people turn on the tap and suddenly clean water appears and when we operate the flush toilet, the dirty water disappears. From my point of view, the main environmental problem in Mexico City is water; the second is air, the third problem is the lack of green areas, the fourth is solid waste and the fifth is noise.

Actor 5 (Local environmental official. Federal District Department).
In Mexico City, the main pollution problem concerns air because this is an available resource for all the population; everyone uses it on a daily basis, but it is contaminated. If we do not take care of our cars, if we pass the emissions test in fraudulent ways pollution will increase.

Actor 6 (Local environmental official).
I think that the most serious problem in terms of pollution is water. In addition you have to bring in water from remote regions and pump it up nearly six thousand feet which is very expensive. People do not value water in all its dimensions. What we have done in Mexico City is to exhaust our water resources. We have not taken advantage of the region's rainfall meaning that all the rain water is wasted. It is really a shame that all the rain water we receive ends up in the drains. Water is a real problem because it is related to the quality of life and it is a public health problem. If we have good water quality, we have less illness among the population. Air pollution is a serious problem but I think that we can solve it easily. It is as easy as constructing two million latrines to prevent people from defecating in the open air. And it is as easy as installing catalytic converters in the entire car fleet or in an extreme case, as stopping the city's entire car fleet. Air pollution is certainly serious in Mexico City because of the amount of lead in people's blood. But I insist that we can deal with it with political and civic will.

When the magnitude and importance given to air pollution in relation to other environmental problems by government officials is compared, significant disagreements emerge. Water and air appear as competing environmental problems. Yet there are other actors who cast doubts on those problems. For one of them,
sewage was the main environmental problem. For another, air was important but environmental problems should be analysed in both the short and the long run.

It is important to emphasise the perception of air pollution by certain members of this sector. One of the actors thought that air pollution was the most worrying problem as regards both long and short-term health damage. Water was viewed as the main long-term challenge. However, in his view, this was only valid for Mexico City. When analysing environmental problems at the national level, he changed the order, placing deforestation first, erosion second, loss of bio-diversity third, water fourth and air pollution fifth. For a local environmental official, Mexico City’s environmental problems should be prioritised as follows: first water, second air pollution, third lack of green areas, fourth solid waste and fifth noise.

Those who perceived air pollution as the city’s most worrying environmental problem gave the following reasons: its short- and long-term health consequences, its permanent consumption by the entire population and its severity. On the other hand, those who viewed water as the city’s main problem believed that the main reason for this was the exhaustion of water courses, the desiccation of water bodies, water pollution, the costs of bringing in water from remote regions and the wasteful use of rain water.

Nevertheless, apart from these physical aspects of air pollution, government officials mentioned a social dimension of environmental problems that determined their perception or otherwise by the population. In their view, these social aspects have to do with values and the formation of a social perception embodied by the general public opinion which prioritises the problems dealt with. In this respect, air pollution is regarded by one of the interviewees as an over-stated problem. For another actor, water is minimised because people do not perceive how difficult and costly is to bring it to and from the city. Finally, in another actor’s view, people are unable to perceive a problem whose effects will only be observed in the future.

From the official government perspective, air pollution is a hotly contested problem; there is no agreement over its evaluation as the city’s main environmental problem. There is some agreement over the importance of air pollution but no agreement over the order of priorities. In this context, there is a social construction of air pollution by these actors that concerns both the fact of a divergent perception of the problem and the social values that intervene in establishing an order of priorities.
The academic sector

Actor 1 (Public health).
Air pollution in the Mexico City basin is a severe problem. It must be considered a public priority. Nevertheless, I would be cautious because we are just starting to analyse water. When we have enough information on water pollution I do not know what my answer would be. We have already started to investigate water and the evidence makes me prioritise air. If I had to make a decision now I would attack the problem of air. I think that disagreements are not related to air but to the importance we must give soil and water because these problems have not been analysed with the same emphasis as air. In general terms, the Metropolitan Commission for the Environment is biased toward air pollution. Very few studies are undertaken on solid waste, soil and water. I think that this is where we disagree. The economic resources, public attention and reports on the levels of air pollution in the city that we receive on the radio every hour all focus on air pollution. This is why people worry about air rather than about any other kind of pollution.

Actor 2 (Environmental sciences).
Air pollution is the second most important problem in Mexico City. In my view, the main problem in Mexico City is not air but water. The lack of cheap water can stop the city’s economic development. Air pollution is the second most important problem even though public opinion says that is main one. Public opinion does not know very much about water, all the information it receives is about air. They only know that when they turn on the tap they get clean water, with no concern for the sustainability and cost involved in providing water for Mexico City. Water is not yet perceived as a social problem. Air is a problem that people feel in their eyes and nose and when they breathe.

The Secretariat of State for Health has maintained an ambivalent position on pollution. Some people there state that we do not have to worry about such pollutants as ozone because it has not been proved that it really affects health and because at the end of the day, Mexicans become accustomed to everything. The message is contradictory because on the one hand they threaten you with drastic measures, with the closure of industries, and costly technological processes and on the other hand they tell you that pollution is not a problem. There is a major contradiction there.

Actor 3 (Public Health Specialist).
I think that air is one of the most important environmental problems in Mexico City. It would be very difficult to know if it is more important than water and food contamination because we do not have studies on these to compare them with air pollution. We know that water is a really big problem; for instance we do not know what will happen with its transport to the Mexico City Valley. We are talking about a problem of scarcity. We do not have a complete picture of water problems and the same is true for food contamination. We know that people get sick frequently because of food contamination in Mexico but we do not have the data or analyses of the problem.

Conversely, air pollution has been analysed more comprehensively. We have a very sophisticated monitoring system for air pollution that tells us on a daily basis what the exposure for people is and we know the expected health consequences. I could say that this is really a very important problem, but this would be unfair because we do not have any information on the other two problems mentioned earlier.
Actor 4 (Public Health).
I think that it is very real. There is a clear problem of air pollution and its magnitude is often not shown on the Metropolitan Index for Air Quality (IMECA). But what the IMECA does provide is an objective evaluation. On this basis we have several diagnoses and we know which toxic substances affect human health and have a differential impact according to the subjective perception of every person. Nevertheless, the real impact on human health has not been fully analysed; we only know the health effects of acute rather than chronic exposure. Nevertheless what we know at present would be enough to require a more active presence in the public’s demand for better air quality and a better environment generally.

Actor 5 (Environmental Engineer)
We place too much importance on atmospheric pollution in Mexico City. This importance is a little false because it is linked to different levels of socio-economic groups. If you analyse the situation in greater detail you will find that not everyone places the same importance on air pollution. For example richer people are more concerned than poorer people. That means that people react toward pollution in a very different way. Government is currently placing great importance on air pollution because the public is placing great importance on it.

We can clearly define the date when people started to worry about pollution in Mexico City. It was in 1986 when government began to systematically measure air pollution. Before that no-one talked about thermal inversions, IMECAS, etc. In those days people began to talk and to raise others’ awareness of air pollution. For several years you could go to any public gathering and be sure that pollution would be one of the main topics of conversation. This is not true nowadays, not because air pollution issues are less important but because there are a lot of other problems to worry about.

Politicians started to defend environment as a way of legitimising themselves. In this context, people began to worry and become aware of the importance of air pollution, a situation that was encouraged by the implementation of the programme “One Day Without a Car” and by the fact that the emissions test become compulsory.

Actor 6 (Social Environmentalist).
Air pollution is a problem that affects you whether you are rich or poor. Wherever you live you will be affected and be part of the problem. It is not the same with water. You simply send it through the sewage system and somebody else is going to receive it, but not you. I would say that air is the second most important problem; I think that solid waste is the first. To me the environmental problems of the city would be in this order: First, hazardous waste, second, air and third, water.

There were important disagreements in the academic community over the order of priorities for Mexico City’s environmental problems. Most of the interviewees recognised the magnitude of air pollution and thought it constituted a serious health problem. However, most academics focused less on whether or not air was most important than water, than on the social circumstances that made air appear to be the most worrying environmental problem in the city, while the rest of them were ignored.

There were also academics who had no doubts about the importance that
should be placed on specific problems, whether air, water or hazardous waste. However, the perspectives of the academic sector were expressed as a cautious attitude to knowledge, and not just as a way of dealing with problems. For example, many of the interviewees regarded the priority given to air pollution as a matter of available knowledge. Air pollution is the most frequently analysed environmental problem of Mexico City. Many people are studying different aspects of air pollution. That is not the case of other problems such as water, soil, waste, etc. A crucial aspect of consciousness-raising involves the availability of knowledge on the remaining environmental problems. According to the logic of the academic sector, the more a problem is analysed, the more likely it is to be considered a matter of public concern. For some of the interviewees, the fact that air quality is constantly monitored, that it has been analysed in a more comprehensive way and that most of its pollutants have been analysed, has given air pollution its social relevance. As a proof of the importance of knowledge and information for the social recognition of a problem, one actor said that it was since 1986, when air quality begun to be monitored, that people had begun to discuss air pollution socially. In his view, this fact could be observed in everyday life, when people often talked about air pollution at public and family gatherings. But it is not only knowledge that makes consciousness emerge, but also the communication of this knowledge by different means. For these actors, the fact that air quality was reported by the media every hour, created a social atmosphere that encouraged air to be regarded as a very relevant problem.

For some of these actors, it was not only the general public but also the authorities that were biased toward air as the main problem of the city. This is the case of the Metropolitan Commission for Environment, which, despite being the authority responsible for addressing the different environmental problems for the metropolitan area where Mexico City is located, focuses all its efforts on air pollution.

Although the academic sector did not present opposing views of environmental problems, they can be grouped, to a certain extent, into air and water defenders. Water defenders argued that both the lack of knowledge and the sensorial difficulty of appreciating all the pollution and social costs involved in bringing water to the city, were responsible for the social minimisation of the water problem. Water was considered as doubly problematic, partly because of its degree of pollution and partly because of its scarcity.
Air defenders argued that despite the potential importance of the water problem, air pollution was a real problem that affects everybody. According to one actor, air pollution affected both rich and poor. For another interviewee, air pollution was more severe than it appeared in official data, because government information was manipulated to minimise the magnitude of the problem. This actor thought that the fact that air pollution had not been fully analysed meant that people did not know how dangerous it could be. For another academic, even the Secretariat of State for Health had officially denied the magnitude and health effects of ozone, thereby contradicting its declared aim of implementing drastic measures against certain polluters.

Most of the interviewees provided elements for discussing air pollution as both a physical and a social problem. Knowledge and the dissemination of knowledge appeared as crucial factors that determine the social recognition of environmental problems. The social dimension of air pollution is not only manifested in the socially disseminated knowledge required for its recognition but also in the diverse way that social groups perceive environmental problems, including the academic sector. One of the interviewees felt that air pollution was regarded as a problem by the middle class and the rich, but not by the poor.

The business sector

**Actor 1** (industrial sector).
Air pollution is a severe problem in Mexico City but most of it is caused by cars. In view of the fact that 60% of atmospheric emission is produced by vehicles, we have to concentrate on minimising their impact. But despite the importance of air pollution, I think that the most important environmental problem in the city is water pollution.
In air pollution our contribution is not as important as many people think; it is around 4% and our is not a direct form of pollution. In addition, we as a sector have invested nearly four billion dollars in reducing air pollution.
We have to think of the problem as a whole. Our contribution is very small and I must stress the fact that the main contributors are vehicles. If we are self-critical, we have to recognise that our major incidence in terms of pollution is at the municipal level, because municipalities lack the infrastructure to solve such a complex problem as pollution.

**Actor 2** (Transport sector).
We cannot deny the magnitude of the problem. But this is not only a problem in Mexico City. There are many cities in the world with the same problem. In Mexico City I think that we probably have many other more important problems. I have heard that people in the National University say that other environmental problems, such as water and soil erosion and deforestation are more significant than air pollution.
Actor 3 (Chemical sector).
I think we have to divide the answer into two levels. First of all, as a citizen, I would like to have elements, data and facts that would allow me to gauge the cause-effect relationship in terms of the health consequences on the population exposed. Personally, I think that there are some symptoms but I do not have any scientific proof of the damage caused by pollution.
In this context, when you ask me about the importance of environmental problems in Mexico I think that a great deal of it has to do with perception. This circumstance is crucial to the importance people place on air pollution. Since air pollution is a more visible problem than water, ordinary people think it is more important. Perception is a fundamental factor in defining air pollution as the most important environmental problem in the city.

Actor 4 (Car dealer).
For me, water is the main problem in Mexico City and that is a really big problem. The cost of bringing water to the city is very high. Water problems are not only a matter of quality but of availability and economic costs. On the other hand, because we bring in water from other regions, we are using a resource that is vital for the survival of people in those regions. That is unfair because they also have the right to live and we are promoting a non sustainable use of water.

Most of the actors interviewed in this sector thought that air pollution was not the main environmental problem in the city. Some of the interviewees viewed water as the main environmental problem of Mexico City. The rest, despite recognising the importance of air pollution, attribute its wider recognition to a problem of perception rather than to its real magnitude. Air, according to them, was a more visible problem than water which is why people worried about it.

But there were some actors in this sector who minimised air pollution on the basis of a variety of arguments. For one of them, air pollution was a common problem in many cities of the world; from this perspective, it was not only a privilege of Mexico City. The message was that people should not be too concerned about it. Another interviewee felt that many people talked about the severity of air pollution and its health consequences yet lacked sufficient proof.

For the entrepreneurial representatives interviewed, air pollution was an important problem, but not necessarily the main one. This sector shows a special interest in not only minimising the air pollution problem, but also defending itself from those who accused it of being the main polluter.

This attempt to minimise air pollution and to deny the sector's participation in the generation of pollution appears to be an ideological resource to publicly minimise their real contribution, documented in existing data.
The Green activists

Actor 1
From my point of view, the air pollution problem is really serious, even more so than water, especially if we analyse the problem here in Mexico City. It is very different if we are studying the impact on the areas that supply water to the city.

Water pollution is probably a major problem but information is restricted, we lack concrete, credible information on this issue. We have known for some time that in the poorest parts of the city, water pollution is severe but all these things are kept secret. We went to Mexico City’s environmental authorities to analyse water quality but they denied us access to all the information.

We could get the information we wanted. But we know that even now there are many problems with cholera, but we do not have the data. We need to do research on water pollution issues and sometimes we need to do detective work to get reliable data.

I once visited the Secretary of State for Urban Development and Environment and he admitted that he had a case study for some areas of the city. According to this study, particulate matter emissions were severe and pollution was killing people here in Mexico City with such illnesses as leukaemia. He insisted that he could not release the information for political reasons. The previous administration had tried to regulate smelter companies but industrial sector representatives complained to the president and as a result, all the regulating policies for these companies were cancelled.

All I am saying is that pollution in Mexico City is a major problem, largely because of government failure to curb it.

Actor 2
To us, the most serious environmental problem in Mexico City is water. Water is not just a problem of pollution but of scarcity; in the near future we could all die of thirst. But air pollution is a serious problem too, followed by soil and food. When talking about air pollution, all we can say is that it is a serious problem because we live in a valley where all the pollutants are concentrated and trapped. It is very difficult for the toxic substances to be dispersed because of the mountains surrounding the city.

Because of industry and a poorly organised transport system, air pollution is a very serious problem. Frequently I hear from my friends about more cases of chronic allergic diseases, dermatitis, etc., that have nothing to do with water. On the other hand it is important to realise that water pollution, pesticides, toxic waste, etc., also affect air quality.

Actor 3
We obviously have an acute problem of pollution here in Mexico City. We can prove it with the frequent violations of international standards for some contaminants: we are constantly threatened by health risks. From an environmental point of view, air pollution is less serious than soil and water pollution.

If we are thinking about the medium and long term, then water pollution and availability and soil pollution are the most important problems.

Actor 4
Air pollution is the most serious environmental problem in Mexico City. Specifically, we have two significant problems: one of them is the presence of high concentrations of volatile organic compounds that contribute to ozone formation and affect health. The other one is the high presence of particulate matter from both anthropogenic and natural
sources. Both kind of pollutants are causing serious health problems. In an analysis carried out by the National Public Health Institute it is estimated that approximately 4500 people die annually as a result of air pollution in Mexico City. This study will shortly be released.

Green activists’ perceptions coincided in regarding air pollution as a major problem in Mexico City. At first sight, air and water would appear to be given equal priority. However, when analysed in detail, the arguments expressed by the interviewees place more importance on water problems. For example, one of the interviewees who said that air pollution was more serious than water problems, noted that all the most relevant information on water is kept secret by the authorities. Nevertheless, he had information that confirmed that cholera was a severe problem in many parts of the city.

This actor said the same about key information in the hands of the top federal environmental authorities which proved that suspended particles were killing people. According to him, this top official admitted that he could not release this information for political reasons.

For some actors in this sector, air pollution was a major problem, although less severe than soil and water pollution. Water tends to be viewed as a medium- and long-term problem, while air is seen as a current problem. Only one of the interviewees was firmly convinced that air pollution was the main environmental problem in Mexico City.

Members of this sector perceive water rather than air as the main problem although they do not minimise air pollution. They accused government of concealing certain key information on the real magnitude of both water and air problems. But they gave this accusation an emotional tinge, describing it as a government conspiracy. Government once again appeared as the main culprit in failing to preserve the environment.

Green activists would appear to be searching for a culprit to blame for pollution and other environmental problems as a means of promoting the environmental cause, for which government is an ideal candidate. In this discourse, the need to bring the environmental cause to the public fore makes Green activists portray an extremely delicate environmental situation that only appears less serious than it really is because of a sort of government conspiracy to conceal the facts.
The political parties

Actor 1 (Green Party).
Air pollution is the main environmental problem in the city. The main factor behind it is the lack of an integrated transport system. What we have is a very uncoordinated one. It is demographic and industrial concentrations that have caused the great magnitude of air pollution in the city. Air pollution is of course the most important environmental problem in the city.

Actor 2 (Institutional Revolutionary Party).
Air is the biggest problem in the city and is due to the implementation of a development model that failed to pay attention to its consequences on environment. Most of the economic activities are concentrated in Mexico City, and apart from producing a huge concentration of people this has implied an enormous consumption of fuel. As you know, we currently consume forty-four million litres of fuel and the transport system is the main contributor to air pollution.

Actor 3 (National Action Party).
Air pollution is most serious problem in Mexico City. The magnitude and importance of the problem have to do with its health consequences. I can see the quality of people's lives being affected. But you also have to take into account the bad quality of the environment we are leaving to future generations. Today the carrying capacity of the Mexico City has been overtaken. But do you know why? Because of government apathy. Government must design a more aggressive policy to reduce fuel consumption and implement an effective public transport policy. Unless you modify this, whatever you do in terms of re-formulation of fuels, catalytic converters and programmes such as “One day without a car” is pointless. Nevertheless it is important to say that despite the priority that we have given to air pollution issues, air pollution and environmental problems are not as important as the economic, social, cultural and political problems faced by the city and the country as a whole.

Actor 4 (Democratic Revolutionary Party).
For me, air pollution is the most worrying environmental problem in Mexico City. It is really a very big problem. The severity of the problem is exacerbated by the irrational pattern of urbanisation, the aggressive patterns of production, privatisation, economic and demographic concentration and, above all, the inefficient transport system.

The political party representatives interviewed had no doubt that air pollution was the main environmental problem in Mexico City. They never mentioned any other problem except the severity of air pollution and identified different factors to explain the magnitude of air pollution such as the lack of an integrated transport system, demographic and industrial concentration and the enormous amount of fuel consumed. One of the interviewees said that air pollution was so acute because of government's apathy in solving it. However, in his view, despite the severity of air pollution in Mexico City, there were other more important problems than air, such as the economic, social, cultural and political problems that people regard as more
relevant.

They mentioned factors that caused pollution at different levels. For example, the most general factors have to do with the model of development implemented in the city and in the country as a whole. At another level, they concerned the patterns of urbanisation, industrial production and demographic trends. Finally, at a more concrete level, they referred to the need for a new transport system and for new patterns of fuel consumption in the metropolitan area of Mexico City.

It seems that political parties were very interested in following what public opinion defined as its object of concern. They never attempted to criticise or modify the general perception that cited air pollution as the city’s main environmental problem. These perceptions can be understood as a need to defend political causes through the way people perceive them, and are not intended to change what people agree on as regards their choices and preferences.

International Organisations

**Actor 1**
Mexico City obviously has a very serious air pollution problem. If you want proof of the severity of the problem, all you have to do is look at the monitoring system’s report. Ozone standards are violated most days of the year. I am not sure how important air pollution is in relation to other environmental problems, but it certainly is a big problem.

**Actor 2**
I feel that air quality here in Mexico City is very poor. I know the official information on the magnitude of air pollution and all I can say is that no country would be happy with being exposed to the amount of pollutants Mexico City inhabitants are exposed to. I think that air pollution is the most important environmental problem in Mexico City.

**Actor 3**
I think that air pollution is not as severe as it appears in the media. There are many other more important problems in Mexico City in terms of risk and sustainability, such as hazardous waste and water. As far as I know Mexico does not have a policy to deal with hazardous waste and water is not considered a very important matter of concern by either government or the general public.

Most of the interviewees agreed that air pollution was the city’s major problem. One of them was dubious about the importance of air pollution and said that water and hazardous waste might be more significant problems. Two factors were mentioned by some of these actors to explain why air pollution was regarded as so important. The first was empirical data from the official monitoring system.
which documented violations of official air quality standards. This information indicates that ozone standards are violated most days of the year. The second referred to the vast amount of pollutants concentrated in Mexico City’s atmosphere.

For them, the problem was not the position air pollution or other problems occupied among Mexico City’s environmental problems, but the fact that air pollution was a serious problem that affected people health. According to some members of this sector, government’s and the public’s ignorance of problems other than air pollution was a far more serious matter. One of the actors was very concerned about this lack of awareness about most of Mexico City’s environmental problems.

Most of the interviewees in this sector associated the physical presence of air pollution with awareness. However, one of them provided elements for associating awareness with the social construction of environmental problems. For him, the media misrepresented reality and emphasised certain problems while ignoring others.

Second set of interviews: rating of government environmental management.

2. Second set of interviews: rating of government environmental management

\textit{a) How much credibility do the actors give the government’s will and technical capacity to solve the air pollution problem?}

\textbf{Government officials}

\textbf{Actor 1 (Federal environmental official).}\n
I can not speak for past administrations, but I am absolutely sure the current administration, at least at the federal level has not only the technical capacity to understand the problem but also the will to deal with it. If you look at the new environmental officials you will see that we now have a new generation of government officials that are more professional, better trained and more committed to environmental issues. What happens, though, is that solving air pollution problems is more complex than it seems. We know what the technological challenge involves. But, what do you have to do to make people exchange their gas boilers and stoves for less polluting electrical appliances? The same is true of automobiles. The new generation of automobiles is able to eliminate 95\% to 97\% of total emissions. All that is required is an electronic starter, a three-way catalytic converter and reformulated petrol. The problem is how poor people, the owners of older cars, are going to pay for this. Even California, one of the richest states in the world with the strictest environmental standards, has not been able to completely renew its car fleet. Another important factor in solving the problem is that neither the
public nor government place air pollution problems over insecurity, unemployment, investment and transport. You soon realise that solving air pollution problems is not only a matter of will but also of understanding the various factors that prevent knowledge from being translated into concrete actions.

**Actor 2** (Federal environmental official).
There are cases where government does not have political will to act because the authorities do not want to pay the political price of attacking the specific causes of pollution. Because it is not due to a single cause but to several different ones, and because all of us participate in the problem, dealing with it means dealing with many interests in various social spheres: producers, consumers, road constructors, urban developers, etc. But when I talk about political will, I would like to talk about it in a broader sense. In this context we have to include societal will as well as government will. For example, there is no political will in the private transport sector because car owners do not have a radical will to change their car use habits.

**Actor 3** (Local environmental official).
We have will to deal with the real causes of air pollution but we do not yet have the full technical capacity we would need to overcome air pollution problems. We have some information on certain problems but nothing definite. We are gradually creating new information and we can see that people are trying to improve their health. People are forcing us to act more effectively. Despite this progress, there are many health consequences of pollution that have not yet been analysed. We are just beginning to study chronic exposure to ozone and at present our knowledge on this topic is virtually nil. What I mean is that the technical capacity and the understanding of the problem do not appear suddenly but as a result of a lengthy process of researching and planning.

**Actor 4** (Local environmental official).
We have both the will and the capacity. But when we talk about capacity, we are not only talking about our own technical capacity as government but our social capacity. In this respect, we take advantage of the scientific findings generated by the academic community. The knowledge we have on the causes and consequences of air pollution comes from researchers at various academic institutions in Mexico and abroad.

Government officials gave different answers to the question of the government’s will and technical capacity to solve the air pollution problem. Some of them thought they had the necessary will and capacity. Others thought they lacked the will, while still others thought they lacked the technical capacity. One of the interviewees, for example, admitted that they do not always have the will to address the problems because of the political cost involved in taking certain decisions against sectors of the population that they would prefer not to affect. Another actor said that they did not have the technical capacity required to deal with the problem.

On the other hand, those who said that they had both the will and capacity, did not give a precise answer regarding these issues. For example, one federal environmental official was very confident about the new generation of government
officials that had recently been appointed, but did not have the same opinion about his colleagues working in local environmental offices. One local environmental official, despite stating that government had both the will and the capacity to solve environmental problems, said that government capacity was actually social capacity, since all government decisions were supported by researchers’ findings on various aspects of air pollution.

However, the most important fact in terms of government will and capacity to solve air pollution, is that most of the interviewees showed some perception of the social implications related to the government’s will to solve air pollution. For example, one federal official argued that it was not only a matter of having the will to solve the problems, but of taking into account the social and economic conditions required to take action. In this respect, he noted that there were a group of measures that had to be taken to curb air pollution but that these were not socially or economically viable. This was the case of introducing costly technology for reducing emissions.

The same effect is produced, according to one actor, when people do not regard environmental problems as important. For some of them, unemployment, insecurity, investment are the real problems, rather than pollution.

For some of the other interviewees, having the will to solve problems was not enough, since pollution is the result of various factors and agents. Coping with it involves dealing with various social dynamics and interests. For another actor it is not just a matter of government will but also of societal will. People should have the will to behave differently to cause less damage to the environment.

Government officials reflected a certain sensitivity to the social aspects involved in the air pollution issue. They also mentioned some of the limits of technological measures and provided elements for reconstructing an important social dimension that affected not only the perception of environmental problems but also their generation.

The academic sector

Actor 1 (Social sciences).
In the Semarnap (The Federal Office for the Environment) I feel that there is a certain degree of will to solve environmental problems but we cannot interpret that as a sign of general government will to solve the problems. Moreover, the will of certain government officials to confront polluters
does not mean that problems can be magically solved, particularly because in the field of environmental problems, various interests and policies overlap. On the other hand, I think that they have a certain technical capacity for solving the problem, but I also think that they lack a clear understanding of the causes and consequences of air pollution. Without this understanding, whether or not you have the will or technical capacity to face air pollution is unimportant.

**Actor 2 (Atmospheric sciences).**
Neither the will nor the capacity exists. There are many economic and political interests in the air pollution issue and government is unwilling to deal with them. The scientific community has produced enough knowledge to be able to make decisions but they are just worried about keeping their jobs. But even at the level of understanding the problem, some government officials are very confused about the factors involved in air pollution. At present all politicians talk about sustainable development and environmental destruction, but these words are just used in their political discourse to gain more supporters for their political purposes. I remember hearing a politician talking about the sustainability of Mexico City. That is a contradiction because Mexico City is a clear example of what is not sustainable. Politicians just use attractive words with no meaning.

**Actor 3 (Environmental sciences).**
There is a certain amount of technical capacity for dealing with air pollution now that a new generation of government environmental officials have been given various positions. Some times ago I was very sceptical about the capacity of this young generation, but I have to admit that they have demonstrated their efficiency and capacity. However, these officials are sometimes exceeded by political forces and administrative and bureaucratic factors. On the other hand, I do not expect any will from government in dealing with the economic and political forces involved in air pollution. Every six years we have a new administration and all of them participate in the same simulation. They are the product of authoritarianism and corruption. The will that I believe in is societal will. Society is the only force that can change the way this country manipulates problems such as air pollution.

**Actor 4 (Public health specialist).**
I think that we do not have the elements we need to judge their performance as environmental officials because they have just occupied their new positions. However if I judged them on their current acts, I would say that they have failed because government, particularly at the federal level, has been unable to provide the basis for solving the problem. The public sector has been reactive rather than proactive in its measures to combat air pollution. I have talked to them on many occasions and seen that they are overwhelmed by the problems. They are under enormous social pressure, yet have no financial resources for dealing with the problem. People working at the Semarnap now have had no previous experience in bureaucratic positions and do not know how to deal with the various aspects, agents and institutions involved in the air pollution issue.

**Actor 5 (Environmental engineer).**
Government lacks the will to deal with the real problem by government, despite having the technical capacity to cope with the problem more effectively. I think that one important factor behind this lack of will is the politicisation of air pollution. There are many different political interests involved which government does not want to confront. For example, there is a need for stricter environmental norms, but government fears the
political consequences of irritating potential supporters among the electorate. Car users, the industrial sector, etc. could all be affected by stricter regulations, and the ruling party is unwilling to pay the political costs of introducing new standards for dealing with pollution.

The members of the academic sector interviewed held diverging views regarding the will and technical capacity to solve air pollution problems. Some of them thought that there was a certain amount of government will at some but not at all levels. Others believed it had the technical capacity but not the will. One of the interviewees thought that government had neither the will nor the capacity to deal with air pollution problems.

However, the most important aspect here is the actors' arguments regarding this question. For some of the interviewees, solving air pollution was not just a matter of will but of many interests. Air pollution issues are an area in which various policies overlap; it is subject to not one but many forces and actors. On the other hand, for some actors in this sector, a more important aspect than even having the will and technical capacity is having a clear understanding of the causes and consequences of pollution. For some academics, many government officials are extremely confused about the factors involved in air pollution. Others academics noted that the new generation of government officials has the technical capacity to solve air pollution, but that they are overwhelmed by political forces and administrative and bureaucratic factors. In their view, the people currently working in environmental issues had had no previous experience of dealing with the combination of agents and political forces involved in the air pollution issue. For one of them, government lacked the will to deal with the economic and political forces involved in air pollution. He saw government as an extremely corrupt, manipulative body. In this context, he said that the real will to solve the problem must come from society rather than government. Another actor from this sector felt that government only talked about air pollution and sustainable development at the discursive level, purely for the political purpose of legitimisation. Two of the interviewees who said that there was a lack of government will thought it was because government did not want to alienate its political supporters with stricter norms and regulations. Addressing problems more effectively might involve political costs that the ruling party could ill afford.

The academic perception of air pollution problems in Mexico City was very
close to a socially constructed perspective of the problem. For them, the will and technical capacity to deal with air pollution issues was not enough. Environmental problems of knowledge, interests and ideological and political forces combine to produce a highly complex physical and social problem.

The business sector

Actor 1 (Industrial sector).
I think that government probably does not have the technical capacity required for air pollution issues. Government positions in the environmental sector are not always occupied by well-trained people. Moreover, political interests sometimes interfere. For example, the Mexico City mayor was severely criticised when he said that he was not going to commit himself to a radical environmental agenda since this would imply an enormous political cost. Political cost is an important variable for a politician to consider. A characteristic of all politicians is that once they realise they could be politically affected by taking drastic political measures they prefer to abandon the arena. What politicians fail to understand is that if they really solved air pollution and other environmental problems, this would probably earn them more votes and make them more popular.

Actor 2 (Chemical industry).
It probably has the will but lacks the capacity. Government air pollution policies have been only partially successful because they have failed to establish better communication with various sectors of society, such as the business sector, the academic sector and with the general public. Policies are not designed for the long term but only as a means of dealing with current situations. All these aspects are examples of a lack of ability to understand and deal with the problem. That is not a matter of will but of understanding the problem and of strategies.

Actor 3 (Car dealer).
I am not sure whether government has the will to deal with air pollution problems, but I am certain that it lacks the capacity to understand and manage them. On the one hand, people occupying government positions are not necessarily well trained. On the other hand, the way government officials are appointed in Mexico, does not allow them to complete the learning process in a particular area of specialisation. Most government officials change frequently from one area to another within the public administration sector. For that reason these officials do not have the capacity to understand air pollution. They frequently interrupt their learning process.

Actor 4 (Transport sector).
Government has both the capacity and the will to solve the problem. Most measures have contributed to reducing the problem. I cannot understand why people are always complaining of government. For example, if you observe the quality of the petrol sold in Mexico City, it does not have lead. I do not feel that air pollution is worse now than it was twenty years ago. I do not know any people who have been severely affected by air pollution. That means that government policies are working well. It is true that they need to be improved but you cannot say that they have failed completely.
Most of the actors interviewed in this sector cast doubts on the technical capacity of government to solve the Mexico's City air pollution problem. The reasons they give are that people working in government offices are poorly trained. They think that government has failed to curb air pollution for the following reasons: it has failed to establish adequate communication with different sectors of society, government officials are constantly changing from one to area of speciality to another and, finally, government has failed to design a medium- and long-term strategy for dealing with air pollution.

The interviewees were not sure whether or not government had the will to solve the problems. But some of them agreed that will alone was not enough and that a more important aspect concerned the faulty understanding of the air pollution problem in government spheres. One of the actors interviewed in this sector added that the will to solve problems depended on political interests. He mentioned that the former mayor of the city had told him that he was unwilling to take any radical measure because of the political cost involved.

However, one of the actors in this sector was of the opinion that government had both the will and technical capacity to solve the problem. To support his assertion, he mentioned the decrease in lead added to petrol and his perception that no-one's health had been affected because of air pollution. He argued that proof of the government's will and capacity was that official programmes to reduce air pollution had been very successful.

The entrepreneurs' perception of government's will and capacity to solve the problem tended to focus on its lack of capacity. They were less sensitive to the political and ideological factors intervening in the air pollution issue. Political implications were only mentioned by one of the actors. This actor focused on the political costs of taking drastic measures that most politicians were unwilling to pay.

The fact that this sector focused on the lack of technical capacity to solve the problem reflects their understanding of the air pollution problem. This is also true when some of them declared that the problem was not lack of will but rather the lack of a clear understanding of pollution. They equated knowing about the problem with solving it.
Green activists

Actor 1
Government lacks both the will and the capacity to solve environmental problems. On the one hand, government officials lack the expertise to solve the problems. But it is not only in the technical aspect of air pollution but also in the integral conception of the environment that we need to have a more realistic and effective approach to the environment. We have specialists in air pollution who are completely ignorant of transportation issues. And we have specialists in transport with no clear understanding of air pollution problems. These people are heavily influenced by many interests and what they do is determined by those interests. Government lack of will has to do with the influence and power of road constructors, developers, etc.

Actor 2
I think that government has the capacity but lacks the will. I have been at different meetings and I have listened to and had discussions with Fernando Menéndez (the former head of the local environmental office). All what they do is wave a sheaf of data at you, to convince you that they know everything about environmental problems but when they have to make decisions, they just do nothing. For example they have made no decisions regarding the crucial problem of transport. When government wants to, it is able to deal with the problems, but government has no will to act.

Actor 3
The government lacks any political will to solve the problem, but even for government it is not an easy task to break the economic and political interests of the owners of the minivans (the most important mode of public transport). In short, they do not want to confront these interests. Moreover, the government hampers the work of the scientific community and scientists seem to accept these obstructions because they also have their own interests. At the end of the day all of us keep quiet and nothing happens.

All the interviewees in this sector agreed on the lack of government will to solve air pollution, which they explained in terms of the economic and political interests involved in environmental issues. In their view, because of the government’s involvement with road constructors, urban developers, etc., it does not take drastic measures against them. On the other hand these actors remarked that although some polluters have already been identified, such as the public and private transport system, government was unwilling to take more radical measure in these areas. There is a lack of will by government to confront the powerful interests involved in air pollution. But this lack of will is a result of both government involvement in private polluters’ businesses and the difficulties of dealing with powerful economic and political interests.

For at least one of the interviewees, there was a lack of technical capacity in government offices, and above all, an erroneous conception of environmental
problems. According to this opinion, government officials lacked an integral understanding of the problem. Most of them do not think of air pollution in connection with other environmental problems.

The Political parties

**Actor 1** (The Green party)
If we take the results of government performance in air pollution issues into account, I would say it has neither the will nor the capacity to solve the problem. Air pollution standards are violated on most days of the year and we are constantly living under the threat of environmental emergencies. We have had various official programmes, lots of economic resources have been used to solve the problem, yet the air has not improved. What has happened? I think that they are unaware of the real causes of the problem which means they do not have the capacity to solve it. Even if they had the will, the problems would remain the same.

**Actor 2** (Institutional Revolutionary Party)
My opinion is that government, rather than having the will to solve air pollution problem in Mexico City, has a need to do so and I believe that it really wants to solve it. But that wish does not always translate into political will, because government has to give other problems priority. To go deeper into the solution of air pollution we had to emphasise catalytic converters and improve fuels, but these measures are expensive. Government does only have to solve air pollution issues but many other problems existing in different areas of social life.

**Actor 3** (National Action Party)
The government may have the capacity, particularly because it justifies its actions on the basis of knowledge produced by scientists. Actually the government does not have to carry out scientific research but to fund research institutions to do this. I think that the existing centres for research have produced a significant amount of studies on air pollution. Many solutions are feasible but the problem is economic feasibility. There is another set of problems where government does not have the political will to act.

**Actor 4** (Democratic Revolutionary Party)
I do not believe in the government’s will to solve air pollution. I also have some doubts about its capacity. I think that many top public officials have made agreements with the main polluters, particularly those who are the most economically and politically powerful. On many occasions, environmental offices just work to do business with the different agents involved in air pollution. There are many studies carried out by the scientific community both in Mexico and abroad yet the government does not make decisions.

Most political representatives thought that government did not have the will to solve air pollution. Both the Green party and the left wing PRD were the most radical in their criticism of the government’s environmental performance. For the former, proof of the lack of will and capacity was the fact that air quality standards were violated on most the days of the year. Moreover, they thought that Mexico City
inhabitants lived permanently under the threat of environmental emergency. For this party, many programmes had been implemented and many economic resources had been used to deal with air pollution, but all of them had failed, because government was unaware of the real causes of the problem. For the latter, the problem of the government's failure to solve air pollution had to do with government officials' involvement in private businesses with some of the main polluters. Officials were depicted as a corrupt group of people who were not committed to cleaning up and taking care of the environment but were only concerned with protecting powerful interests.

Two of the interviewees argued that existing knowledge of the causes and consequences of air pollution would be enough for government officials to implement measures they failed to take because of lack of will. But a representative from the ruling party (PRI), was of the opinion that it was not easy for government to make decisions since it had to deal with many other problems apart from the environment. According to this actor, priorities in Mexico City were not only environmental but also social and economic.

On the other hand, according to these actors, closer examination of the environmental sectors revealed the economic and political factors that prevented the cleaning up of the air. Examples of the former were the economic difficulties involved in improving fuel and introducing devices such as catalytic converters in cars, because of their cost. By way of an example, they noted that certain scientific findings were not used to make decisions because of political obstruction from economic groups.

In short, all these factors, combined with an incomplete or inadequate knowledge of the causes and consequences of air pollution, were thought to be responsible for government failure to curb air pollution.

**International organisations**

*Actor 1*
I think that Mexican authorities have the will to deal with the air pollution problem. In terms of capacity, what I have observed is that government officials, apart from their own experience have taken advantage of international experiences. In our case we have shared our long experience of dealing with air pollution with our Mexican colleagues. Many people working for the environment in Mexico have been trained in my country, so that at least they have the same level of knowledge we have. To solve air pollution problems is really a major task. I feel that Mexico is in the
vanguard among Third World countries because of its laws and norms. Where I think they have failed is in developing a adequate institutional arrangement to deal with air pollution and also in the enforcement of law. Mexico has too few inspector to supervise a huge industrial plant.

**Actor 2**
I think that Mexican authorities have the will to solve the problem and they are now better equipped to deal with the problem. I feel that without the intervention of the authorities the problem would be worse. I do not feel that the Mexican response to air pollution has been bad. On the contrary the Mexican government started its planning activity early on. In my country it was not until 1975 that universities created environmental degrees. Mexico has done the same since 1976.

**Actor 3**
There is no capacity. The Mexican government may have the will to solve air pollution, but it has been very difficult for the authorities to get good results. On many occasions, official programmes do not solve the problems but merely transfer them to other regions. It is exasperating that on many occasions it is really difficult for those responsible for environmental programmes to think of air pollution as an integrated problem. When I think about air pollution I cannot think about in an isolated way but in its connections with water, soil and ecosystem problems. That is the only way to have a complete picture of the problem.

Most of the interviewees from the international organisations thought that government not only had the capacity to solve the problem but also the will. Two of the representatives said that Mexican government officials were well trained in managing environmental problems since they had been trained by international institutions. But even for some of these actors, Mexican experience in dealing with air pollution was good because it had begun in the mid-1970s when their own countries had also begun to implement political measures to deal with the same problems. One of these international representatives rated Mexico City’s air pollution policies as the best in the Third World. For another, Mexico City’s government intervention to control air pollution had proved decisive in preventing air quality from deteriorating even further. He also said that, in comparison with his country, the Mexico City government had begun to take care of the environment early on.

However, one of the interviewees thought that government did not have capacity and he was not sure whether or not it had will to solve the problem. He said that rather than solving problems, government transferred them to other regions of the country. According to him, government officials had a problem of knowledge that prevented them from having an adequate understanding of air pollution. Government did not analyse air pollution as an integral problem, which in turn prevented it from cleaning the air.
b) According to the actors, how much room for manoeuvre does the government have to solve the air pollution problem?

**Government officials**

**Actor 1 (Local environmental official)**

We have very little room for manoeuvre. I wanted to exempt school transport, but the Ministry of Finance opposed the measure. When their priorities are drainage, water and housing, resources for the environment take second place. Unless there is a lot of pressure on environmental issues from public opinion, they are ignored.

**Actor 2 (Local environmental official)**

It is really very frustrating how little room for manoeuvre we, as local authorities, have when we try to implement air pollution programmes. Let me give you an example. We are an authority with no possibility of regulating the sectoral action that has an environmental impact and that affects air quality in the city. In fact, we cannot intervene in industrial, educational, economic or health policies. All of them have dramatic impacts on environment, but the current normative framework only allows us to verify car emissions and to manage the air quality monitoring system. How can we improve air quality in the city if we are an authority with no power in the most decisive aspects of air pollution? In addition I feel that we do not have adequate communication with the other sectors involved in the air pollution problem which affect the entire planning system.

**Actor 3 (Federal environmental official)**

No, we do not have the room for manoeuvre we need to be more effective in solving air pollution problems. The current institutional structure does not allow us to work systematically. There is sectoral resistance to working together to solve the air pollution issue. When you talk about environmental problems and when you are trying to design a policy, you soon notice that in order to solve these problems you have to go further from your own sector. It is necessary to interact horizontally with the rest of the public administration. I think that a major theoretical and operative change is needed to be more effective in solving these kind of problems. You can achieve some success while working in your own environmental sector, but real success is only possible if you can penetrate the sectoral structure and modify its rigid planning system. Environmental problems have to be analysed and addressed in an integral fashion.

**Actor 4 (Government health official)**

I honestly do not have any obstacles to carrying out my regulatory work. It is probably because of the area where I work. We are just concerned with establishing health standards. In this context I feel that I have a great deal of room for manoeuvre. There are no forces that prevent my work but only forces that help it. For me the problem is not whether I have enough room for manoeuvre, but how to educate people to make them aware and demand more drastic measures from government.

Government officials regarded their planning activity as ineffective because they did not have an institutional structure that allowed them to force the various
sectors of public administration to base their policy-making process on environmental criteria. A local environmental official commented dramatically, that they were powerless to regulate the planning activities of sectors with more environmental impact. In his view, it was impossible to improve air quality when working within an institutional framework with no possibility of penalising the polluters.

Most actors thought that the institutional structure did not allow them to work in co-ordination with other departments at the same level, as required by the integral nature of environmental problems. For one of the interviewees, it was necessary to regulate the activities of the environmental sector, but, in order to be more effective, it was essential to influence the rest of the public administration sector, since they were also responsible for environmental deterioration. He called for profound modifications of both the planning system and the analytical approach.

Some of these actors voiced the need to make environmental decisions in a horizontal and integrated way. One actor expressed this need to act integrally when dealing with air pollution. Some of them mentioned the presence of a sectoral structure that hampered and opposed the environmental planning process, thereby preventing air quality from being improved.

However, there was one government official from the Secretariat of State for Health who did not perceive any obstacles in his regulatory work. On the contrary, in his view there were many forces that helped him perform his work. Rather than more room for manoeuvre, he thought that what was required to clean the air was an educational process that would change people’s behaviour towards the environment.

Most actors in this sector criticised the government’s institutional structure for dealing with air pollution and called for radical changes. They stressed the need to implement a new approach, whereby air pollution could be analysed in an integral way. Some of these actors working in the environmental offices, shared this perspective on the means of dealing with air pollution. But they not only demanded an integral perspective at the analytical level, but also at the programmatic level, where actions have to be taken in a horizontal, integral way.

**The academic sector**

**Actor 1** (Environmental science specialist)
Decisions are often not made by those in charge of environmental
offices. The proliferation of taxis, minivans and microbuses is a case in point. In fact the owners of those modes of public transportation are the ones who decide the urban order and their public behaviour is what has the greatest effect on air quality in the city. But government refuses to pay attention to this real power that different economic and political groups have in the decisions that are made as regards the city.

**Actor 2 (Public health researcher)**

To answer that question I would ask about the logic of the decisions made concerning private and public transport, because transport is the main source of air pollution in the city. If you analyse these decisions you will see that what authorities do is to provide incentives for private cars and disincentives for public transport. It is the environmental authorities who, on many occasions, create or eliminate their own room for manoeuvre. If you only consider the perspectives and interests of the polluters you are not going to be successful in solving the air pollution problem. But that means that it is up to government officials to choose whether or not they are doing their job as regards air quality and pollution.

**Actor 3 (Social sciences)**

The room for manoeuvre that the authorities have does not depend on them but on their political capacity to mobilise the social factors needed to have a better environment. They could do more but I think they do not want to do more. This attitude may be the result of the presence of political interests in the government sphere, or alternatively, the authorities may not know what to do to create the political space they need to be more effective and implement more radical measures. I think that it is a combination of the two.

**Actor 4 (Environmental engineer)**

They do not have any room for manoeuvre. I used to work in the government sector and I know that those who make the decisions on environmental issues are the major corporations. Government often has no power to oppose them. On other occasions these corporations bribe government officials. But it is also true that, on many occasions, government does not want to confront any sector that could affect its need for legitimacy and popularity. This is why air quality is so bad in Mexico City.

The majority of the academics interviewed thought that government had no room for manoeuvre to take the necessary measures to solve air pollution. The real forces that decided environmental issues came from outside government environmental offices. For some of the actors, the economic and political interests of powerful groups had the most decisive influence on the planning process. For other actors, society could give the government sector the power it needed to deal with major polluters.

Some of the interviewees thought that polluters such as the owners of public transport companies and factories were the real forces that determined air quality. For one of these actors, the beneficiaries of government actions determined environmental issues. For example, if public transport were penalised and private
cars encouraged by government, that would mean that government had decided not to solve the problem but to increase it. For this actor, government itself was responsible for limiting its room for manoeuvre.

On the other hand, according to one actor from this sector, if government had the will to solve air pollution, it could mobilise the social forces required to improve air quality, but it was unwilling to do so.

It was widely felt by this sector that government did not have enough room for manoeuvre to solve air pollution. According to these actors, society and its different economic, social and political forces determined government planning activity.

**The entrepreneur sector**

**Actor 1 (Industrial sector)**
I think that government is under great pressure from political groups, which reduces its room for manoeuvre. Environment has become a very political issue and that is bad for the environmentalist cause because you cannot have an objective view of the problem. Environmental groups and political parties, for example, are demanding more actions on problems that may not actually exist as such. But they just want to please their constituencies or their supporters. For example, although many specialists agree that air pollution is mainly caused by transport and by natural sources, they insist that industry is the main polluter. In these circumstances, you notice that government has no room for manoeuvre to make its own decisions because it is at the mercy of these political forces.

**Actor 2 (Transport sector)**
I think government has enough room for manoeuvre to deal with air pollution. For example, it is always introducing new standards, new taxes, new petrol and regulations. We have to fulfil all those requirements in order to offer our services. I think they actually have too much opportunity to intervene in environmental issues. On many occasions they do not care whether or not offering public transport services is profitable or not. They would like us to provide the service and pay all the costs involved in environmental regulations and not to charge any fares. I think that government has too much power.

**Actor 3 (Car dealer)**
I tend to think that government does not want to take radical measures because of the political costs involved. It is not a matter of having room for manoeuvre but of being willing to exert its authority. Government would like to please everybody. On some occasions government does not issue very strict norms for industry and car owners because that could affect the ruling party’s popularity. I think that government environmental officials should be politically neutral and enforce the law under any circumstances. The deterioration of the environment and its health consequences requires greater government commitment to air quality.

Some actors in this sector thought that government had no room for manoeuvre to make decisions either because it was unwilling or because it was unable to
confront the various economic, social and political interests involved in the air pollution problem. For one of the interviewees, political groups prevented government from taking drastic measures. In his view, some political parties and Green organisations pressured government to attack non-existent problems and enemies. He thought that the industrial sector was attacked by government because of the activism of political and Green groups. But for another actor of this sector, government did not have the will to solve air pollution because it did not want to confront the different groups involved and instead tried to please them to maintain the political support it needed. This actors thought that stricter norms would make the ruling party lose popularity.

For one of the interviewees from the transport sector, however, government had enough room for manoeuvre to make decisions on environmental issues. He perceived this in the many regulations, norms and taxes implemented by government to address the air pollution problem. He felt, in fact, that government actually over-intervened in environmental issues.

For these sectors, the government’s lack of room for manoeuvre to implement the environmental measures required to clean up Mexico City’s atmosphere was the result of two kinds of political factors. One had to do with the pressure exerted by political parties and activists to design an air pollution policy. Another had to do with its intentional non-intervention in problems caused by the major polluters in order to preserve its political popularity. Government was seen as the victim of these political influences, which in turn reduced the effectiveness of the policy-making process.

**Green activists**

**Actor 1**
Government has no room for manoeuvre. It does not have any power to regulate the public transport system, the urban planning system or the various areas of decisions that affect the quality of the environment. The city is actually controlled by the different economic and political interests involved in air pollution. To have the room for manoeuvre they need, the authorities should sever their ties with these interests. For example, government could start by regulating the minivan public transport business, because that agent is not only responsible for a significant part of pollution, but also for the urban chaos in Mexico City. I think that the problem is that private interests and government officials get together to do business without any real concern for environment.

**Actor 2**
Government could have more room for manoeuvre, but what it lacks is environmental awareness, knowledge and training. Moreover,
government officials have interests. The power of the entrepreneurial sector is always present in the decisions made by government. For example, the current mayor of the city repealed the environmental laws that forced all the industries that wanted to set up business in Mexico City to carry out an environmental impact assessment to find out about their potential effect on Mexico City’s environment.

I think that people now working in the environmental offices have more consciousness and are better informed, but they are often under great pressure, not only from economic interests but also from different sectors of society.

Actor 3
Government has no room for manoeuvre because it has the same political interests as the polluters. I have reached the conclusion that politicians obey the political interests of groups, and that the decisions they make depend on the economic and political power of certain groups. For example now government could force smelter plants or asbestos factories to comply, but it does not want to do it because they are very powerful companies. Some of them are French companies that create jobs and government does not want to affect these companies to avoid increasing unemployment. The largest industrial plants are the oldest and the ones that create the most pollution but they generate the most jobs.

Actor 4
On the one hand, government does not have any room for manoeuvre and on the other hand it does not have the will to take drastic measures. Government, for example, does not have the will to face the powerful economic interests behind air pollution. Things are changing a little bit now because we have specialists working in the environmental offices. However, this new generation of people now working on environmental issues, does not have the experience needed to deal with different agents. So what could be an opportunity to solve the problem becomes just an illusion because current government officials despite their technical capacity, have not been trained to work in a political scenario.

For the Green activists, it was clear that government lacked the room for manoeuvre to make the decisions needed to solve air pollution in Mexico City. Most of the representatives of these organisations interviewed admitted that powerful economic and political interests determined environmental policies in Mexico City. The various expressions of these interests affected the effectiveness of air pollution policies. One concerned government’s inability to regulate the activity of major polluters because they were so powerful. Another expression of these interests was related to the fact that government sometimes engaged in business with certain major polluters, whom it protected from regulations and taxes. Still another expression concerned the redefinition of an adequate juridical framework to help polluters. One actor commented that a city mayor had decided to eliminate environmental impact assessment as a pre-requisite for allowing factories to be set up in the Mexico City Metropolitan area.

Some actors said that although current environmental officials were more
aware of environmental issues, they were relatively inexperienced as regards working in a highly political scenario.

**Political parties**

**Actor 1 (Green Party)**
Government officials do not make decisions, they do not act on their own. On the one hand they do what their institutional and political bosses decide. On the other hand, if you examine the measures they take you will see that they always try to protect those powerful economic interests. For example why couldn’t they stop some of the most heavily polluting factories in Mexico City such as the cement industry or the chemical companies operating in the suburban areas without regulations? Government prefers to have polluting companies if they create jobs. Sometimes these companies bribe government officials to avoid complying with regulations and inspections.

**Actor 2 (Institutional Revolutionary Party)**
At present environmental offices have the power to take action against polluters. I think they are doing their job well. It is true that we need to do more and on some occasions to take more drastic action against certain industries or public transport businesses. I have seen the work of those in certain federal offices and I know that they are doing what should have been done twenty years ago. The juridical frame existing in Mexico gives them a great deal of room for manoeuvre. I think that they could do more, for example, to legislate on different problems that are emerging now but that have not been regulated. For example, hazardous waste management, dump sites, etc. Environmental problems are enormous and will always look as if nothing was being done about them.

**Actor 3 (National Action Party)**
No, they do not have any room for manoeuvre but because of corruption. If they were committed to the environment neither factories nor car owners would pollute in the way they do today. In Mexico, we do not have the figure of a government official who is really committed to the environment, a person who is able to punish those who pollute despite their economic and political power. I feel that they do not want to have any more room for manoeuvre because if they did, public opinion would realise that they simply did not want to act against those who pollute Mexico City’s atmosphere.

**Actor 4 (Democratic Revolutionary Party)**
I think that it is not a problem of having room for manoeuvre but of being committed to the environmentalist cause. Let me explain. One can say that an institution or a person either has room for manoeuvre or doesn’t but on condition that the will to make decisions exists. If it does not exist, it is irrelevant whether or not there is any room for manoeuvre. In Mexico all you see are political influences being used to break the rules. Everyone wants to avoid complying with environmental regulations and just get the official emissions certification by paying a bribe.

The political party representatives interviewed in this research, except those from the ruling party, thought that government had no room for manoeuvre for making decisions. More importantly, they thought that decisions were not really
made by those occupying the main positions in the government structure but by those with the greatest economic and political power. Different reasons were given for this situation. For example, they mentioned that on many occasions government preferred to have heavily polluting factories if they generated employment; in other cases corruption was mentioned as the reason why factories that polluted were not penalised. These actors also said that government was not committed to environmental causes and that Mexico lacked the figure of a public official who was determined to protect the environment, despite the many interests surrounding the issue. Two other actors thought that government officials would prefer not to have any room for manoeuvre for decision making since they did not actually want to make decisions. If they had room for manoeuvre, the results would be the same and no decisions would be taken yet public opinion would notice.

However, for the ruling party representative, the government had sufficient room for manoeuvre. In his view, government officials were doing their job well and were catching up on what should have been done many years earlier. He thought that although more drastic measures were needed and more problems had to be controlled, the overall balance was positive.

Except for the ruling party representative, the remaining interviewees felt that government lacked control of the situation and that private sectors determined air quality in Mexico City. Lack of will or commitment to the environment, corruption and the lack of determination to enforce the law, were the main expressions of government performance in air pollution issues. They were also the reasons given for government failure to solve the problem.

**International organisations**

**Actor 1**
I see a government trying to do its best. I can also see that they are trying to create the institutional framework needed to regulate all the polluting activities in the city. From this point of view, government is creating the room for manoeuvre you mentioned. We have worked together with some local and federal offices and the impression I have is that there are many areas of public administration where environmental problems are not taken into account. But environmental officials are trying to convince other sectors to work together for a better environment.

**Actor 2**
I think government has enough room for manoeuvre, but there are no projects without a political component. In these cases decisions are not made on a scientific basis but as a result of political negotiation. When
you substitute what should be a scientific decision for a political one, the possibilities of cleaning up the environment are obviously rather remote. In recent years Mexico has been given financial support and in this context the authorities' room for manoeuvre has increased because they can now undertake those initiatives that were not possible before because of the lack of funds. For example, there is now a project of reforestation in the north of the city financed by the World Bank. To have more green areas in the city, it is crucial to avoid particulate matter from soil erosion.

Actor 3
My opinion is that government does not have enough room for manoeuvre because it has been unable to capitalise on the enormous power of citizens' organisations and form environmental groups. In my country it is precisely this power that has made environmental protection possible. If you have powerful corporations with an enormous influence on governmental spheres you will be very dependent on them unless, if you have the will, you encourage public participation at the different stages of the planning process. People are your best allies when you are dealing with economic and political interests.

Most actors agreed that Mexico City's government had the room for manoeuvre required to make the decisions to solve air pollution. However, they thought that part of that decision-making capacity was due to the technical and financial support received from international institutions. For some of the interviewees, the government created its own room for manoeuvre when it established an adequate institutional arrangement to deal with air pollution or when it channelled resources from donor institutions. For these actors, government officials also created more room for manoeuvre by convincing the non-environmental sectors of public administration to take environmental variables into account.

In this context of the government's building its own decision-making capacity, one actor from this sector perceived a lack of the necessary room for manoeuvre in this respect. However, he argued that this was due to government's failure to perceive the benefits of incorporating citizens into the planning process. In his view, public participation in the decision-making process had been a key aspect in successfully combating air pollution in his country.

The perception of these actors regarding government's decision-making capacity was generally favourable. They regarded government officials as committed, courageous persons doing their best to solve air pollution despite the many obstacles around them.
3. Third set of questions: rating existing knowledge on air pollution.

a) How much importance do actors give science in environmental policy design?

Government officials

Actor 1 (Local environmental official)
You have to base your decisions on the best knowledge available. That is what we do. We have a very close relationship with the scientific community. Scientists are a very important component of the Metropolitan Commission and we listen carefully to what they say. What we do has the consensus of what scientists think on air pollution problems.

Actor 2 (Federal environmental official)
Our contact with the scientific community is positive and we try to take advantage of it because that provides us with strong support for our policies and programmes. We have worked together particularly in the area of natural resources. For example in the case of dolphin and whale deaths, we appointed a scientific committee who helped us determine the causes of such deaths and make the best decisions.
All the contacts we have had with scientists so far have been favourable. But we are very careful with them, with their ways, methods and practices of knowledge. We do not exert any pressure on them because we know that they need more time to reach certain truths. Time for science is very different in relation to political time. We are working under pressure, we often do not have their time and we have to make decisions in different situations based on common sense. When there is no scientific knowledge available, what can you do? We do not always have all the knowledge needed to make ideal decisions, and this is neither good nor bad, but real and it happens everywhere in the world.

Actor 3 (Federal public health specialist)
Science is crucial to decision-making. We are here, in these government positions because of our past experience in research on the health consequences of air pollution. In my former work in the scientific field I was part of a team that investigated the health damage to population caused by air pollution. Now we are committed to applying all our knowledge to protect people's health. There is now effective communication between government and our colleagues in the academic sector. For example, we now have a small health programme that was designed with the help of air pollution and disease specialists.
We are also working together on a health programme for environmental emergencies. All the aspects included there have a scientific basis drawn from the findings of the academic community. This situation is new; in the past both communities, i.e. the government and academic sectors, worked separately, with no communication between them.

Actor 4 (Local environmental official)
I think that science would be a good basis for designing air pollution policies and helping to prioritise problems. The problem is that the scientific community is not researching the field of air pollution. I could count those who are doing research in air pollution on the fingers of one
hand. On the other hand the scientific community has scarce resources to carry out its work. We have the resources they need such as an accurate air quality monitoring system, historic files on air pollution, etc. For example, I do not know of anyone who is researching the relationship between transport and pollution, which is dramatic because transport is the main source of air pollution in Mexico City.

The scientific community has a generic interest in air pollution. There are a few researchers working on it, specially on concrete and urgent problems; some people are working on water, and other general issues. Studying air pollution requires costly instruments which very few institutions have. Mexico City has the second largest air quality monitoring system in the world, and we lend some of our equipment to some universities, because without those instruments, they would be unable to do their work. Science is very important, but what we need now is to stimulate research to work on very urgent problems.

Government officials seemed convinced of the important role played by scientific knowledge in the decision-making process. Most of them said that they based their decisions on science and that they asked the scientific community to advise them on the best decisions. The image transmitted by most of the government officials is one of a harmonious relationship between government and the scientific community.

They insisted that working together and being respectful of the time and needs of scientific work had been the key to government success in dealing with air pollution. For one of the interviewees, the positive relationship with the scientific community had to do with the government's understanding of the knowledge process in terms of costs and time. As proof of the good relationship with government, one actor cited the fact that some government officials had previously worked in the academic sector, making it easier for both government and the academic community to continue working as a team. In his view, these communities had failed to communicate with each other in past administrations.

However, a local environmental official was of the opinion that it would be useful for government officials to base their decisions on the findings of the scientific community although he did not know of that many researchers working on the different aspects of the air pollution problem. Even in decisive areas of environmental impact such as transport, there were no people doing research. In his view, what made it difficult for the scientific community to help decision makers in their job was the generic interests the former had in air pollution, whereas the latter needed to know about specific areas of problems closely linked to the planning process.
The government officials' perspective on the role of science in the planning process, except for that of one local official, was optimistic and they seemed anxious to promote an image of both communities working together for the benefit of the environment. They insisted that it was only when no knowledge was available that they made decisions based on common sense. Otherwise, science always helped them in their jobs.

The academic sector

**Actor 1 (Atmospheric sciences)**
I have no doubt that all the decisions made by government are supported by scientific facts. However I feel that government officials do not have the same opinion, at least not in real facts. For example it is true that some members of the scientific community are invited to participate in the Metropolitan Commission for Environment, but I know that all they want when they invite us to participate in their sessions is our seal of approval. They never send us the programmes to be discussed in advance and they just want our approval to legitimise their decisions.

**Actor 2 (Environmental engineer)**
Science is not only a necessary part of the planning system but a fundamental one. But government is not interested in science as such. I do not believe in the Metropolitan Commission for Environment. I am very disappointed with the way they manipulate decisions in environmental policies. What goes on there is a farce. In the past I was part of that farce, I was a top environmental government official, and I know that that everything there is a sham. Now I completely disagree with those practices.

**Actor 3 (Social sciences)**
We have to make some distinctions when talking about the importance of science in public policies. On the one hand, science is a key aspect that has to be included as a criterion for decision-making; we have to know some facts as objectively as possible. At present, I think that we know many aspects of the causes and consequences of air pollution. We have some disagreements among the scientific community but we also have consensus on many topics. I can say that with this available knowledge it is possible to make some decisions. On the other hand, we have to recognise that decision-making is not only a matter of knowing the problems but also of the political possibility of making some decisions. From this perspective, government has to identify those forces and deal with them. But this depends on its will and capacity to do so.

**Actor 4 (Public health specialist)**
Science should be the basis of air pollution policies but that is not the case in Mexico City. Let me explain why. Government has funded research on many air pollution topics. But if you asked me whether or not they have used them to make their decisions I would say no. Have the authorities promoted the participation of the scientific community in the design of official environmental norms? I do not think so. I think that there is no government will to establish contact with the scientific community. There is no financial support from government to do research. Academic participation, when it exists, is unpaid. I think that to do the work professionally, all academic participation in the designing of norms and
programmes should be remunerated. In developed countries, government has scientific councils who advise them on scientific facts related to the decision-making process. But in Mexico this practice does not exist.

The opinion of the academic community on the role of science in the planning process was unanimous: science should be the basis of policies and programmes. But all the actors interviewed agreed that scientific findings did not play an important role in the planning process, since government was not interested in science. According to some of these actors, all government wanted from the scientific community was to use it to legitimise its decisions by pretending to involve academics in the policy-making process. Some of these actors said that all that happened in the Metropolitan Commission for Environment was that the top environmental authority at the metropolitan level was a farce. They did not want genuine academic involvement in the planning process, nor did they wish to base their decisions on scientific findings by the academic community. An academic from the atmospheric sciences area complained that they were never sent the programmes in advance to evaluate them or make suggestions. An environmental engineer who used to be a top federal environmental official said that the Metropolitan Commission for Environment was a sham and that decisions were made by those in charge of the environmental offices, outside the formal structure of the metropolitan Commission. He said that when he was a top government official decisions were made in the same manipulative way as nowadays. He acknowledged his role in that farce in the past, but not any longer.

Some actors agreed on the need to support the planning process in science, but they do not believe that science was the only and most decisive factor in decision-making. For him, sound knowledge was available on key aspects of air pollution, but decisions had not been taken, because they did not only depend on scientific findings but also on current political conditions.

For some actors, although government said that science played an important role in the policy making process, it did not even use the scientific findings from the research it funded in its decision-making. Nor did government seek the advice of the scientific community in designing official environmental standards.

The general perception of the academic community was that government only talked about science to legitimise non-scientific decisions. In their view, however, science should play an important role in the policy-making process. This did not
mean that other actors felt that all that was required was science; on the contrary they believed that political factors should be included when dealing with air pollution.

The entrepreneurial sector

**Actor 1 (Industrial sector)**
I think that science must participate more in the design of air pollution policies. The scientific community has the methods to investigate this issue, because scientists base their findings on facts, evidence and experiments. In this respect I place great importance on their studies. For example, a Mexican-American research team has recently conducted a very important study, called the Simulation Model for the Mexico City Atmospheric Basin. This is the kind of work that should be done more frequently because it allows decisions to be made on a sounder basis. I think that government has not taken advantage of this kind of studies. In fact I feel that most of the research that has been done has not been used by government.

**Actor 2 (Transport sector)**
Of course science should be the basis of government policies, but I am not sure whether they take that kind of knowledge into account. On the other hand I have the impression that many scientists in the national university are investigating various things that are not important. For example, I heard that they were doing research on the possibility of making a huge hole in the mountains to disperse pollutants with the help of enormous ventilators. I regard that kind of solution as mere fantasies. Other researchers do not do scientific research but just want to find people to blame for the problem and of course most of them find that we, the transport sector, are the only ones responsible for pollution. I do not believe in that kind of science. I feel they are pretending to be police.

**Actor 3 (Car dealer)**
Science is by definition the only source of truth. From this point of view it should be one of the central criteria in the government strategy to reduce air pollution. I am not a specialist on the subject, but I feel that government should base its decisions on the results of scientific research. Some government achievements in reducing pollution may have to do with decision based on science.

All the interviewees in this sector agreed on the need for government to base its decisions on science, but they were not sure whether government was actually doing so. Most of these actors placed great importance on science in the planning process, since they felt that scientists were the only people qualified to research the causes and consequences of air pollution. For one of the interviewees, only science could produce scientific truths which is why it should be a key factor in designing air pollution policies.

In the context of these actors' comments, an environmental policy should be supported by sound scientific findings, and some examples of this kind of research were quoted. One of them, however, felt that researchers were wasting their time.
investigating unimportant topics. Even more reprehensible in his view were scientists who, instead of undertaking research, tried to find people to blame for air pollution and invariably singled out the transport sector as the main culprit.

These actors regarded science as crucial to the policy making process but cast doubts on government's willingness to base its decisions on scientific findings.

Green activists

**Actor 1**
I think that science should be an important aspect in the kind of policies implemented in the city. However, I think that scientific findings are not always used properly. The shadow of corruption is always present in all government decisions. For example, it has been scientifically demonstrated that catalytic converters in cars are a highly effective means of reducing pollution. But it was public knowledge that the former head of the local office for environment was a business partner of one of the main producers and distributors of these anti-pollution devices. In that context we really did not know whether he was promoting the use of catalytic converters because of their effectiveness in reducing pollution or because of his interest in selling them.

**Actor 2**
I think that science should serve as a point of reference in decision making, but unfortunately government just uses it for political purposes. I think that government has created a distorted image of scientists' participation in government policy design. The authorities have appointed academic councils, committees, etc. in different universities and research centres. However, the scientific community finds out about the decisions government makes through the newspapers; they never participate directly in the design of official programmes. Decisions are political rather than scientific.

**Actor 3**
My personal opinion is that government decision are not made on the basis of scientific findings but of political demands. I do not expect government to do things any other way. It is very frustrating to realise that even in the current administration, with many people from the academic sector, decisions are not substantially supported by science. The problem is that this kind of behaviour by the new generation of government officials turns us into pessimists because we thought that they would have a different attitude towards science and politics.

**Actor 4**
Government is not interested in science although it should be. I know some researchers who have demonstrated the contribution of some industries to pollution but have been censored by government. Any scientific finding that sheds light on who the main polluters are, is discarded as unscientific while their authors are stripped of financial support to carry out their research.

Political factors, corruption and repression are the most important factors that, according to the Green activists interviewed, prevent government from basing its
decisions in scientific knowledge. For some of these actors, government’s use of science in the planning process is political since its purpose is not to support decisions but to pretend that science is its main tool in the planning process. Yet the decisions are also political and non-scientific since they depend on the political demands of various social groups.

Corruption was mentioned by one of these actors, as the factor that prevented decisions from being based on science. He said that a top environmental official was promoting an anti-pollution device, while he was the owner of the enterprise that manufactured them. In the case of repression, one actor commented that rather than basing its actions on scientific findings, government censored findings that revealed the contribution of certain major factories to air pollution. According to him, any scientific finding that provided elements for identifying major polluters, particularly if they were economically or politically powerful, were discarded as non-scientific and its authors penalised.

All the interviewees in this sector agreed on the importance of science in decision-making, but they did not believe that government was basing its policies and programmes on scientific findings. Science was a purely rhetorical device for politicians to legitimise their actions. One of the interviewees thought that even the new generation of well-trained environmental government officials failed to take scientific findings into account in their planning activity.

**Political Parties**

**Actor 1** (Green party)
Science would ideally be the sole criterion on which decision-making was based. However, this is not possible in the real world. When you analyse environmental problems all that you find are economic and political interests. Government has to decide which party they will favour with its decisions, the polluters’ interests or the public’s interests. All the recent administrations have favoured the polluters’ interests which is why environmental quality has deteriorated. I feel that scientific knowledge would be a good criterion for finding out what kind of decisions government is making.

**Actor 2** (Institutional Revolutionary Party)
Science is our best ally in the planning process. In Mexico, as far as I know, decisions are made on the basis of the best knowledge available, in other words, the criteria used in the developed world. However, science is not a magic wand. On the one hand, it is not possible for science to know everything. That is why government often does not have many options in its decision-making. On the other hand the relationship between government and the academic community is not as close as it should be. In this context, it is clear that despite its importance, science is not always
available as a resource for supporting the planning process.

**Actor 3 (National Action Party)**
I think that science is rather an obstacle for government. People working in the environmental offices just mention science as part of their discourse. Science is not a good tool in the hands of government because when you say science you commit yourself to the truth. Do you think that government is committed to the truth? I do not think so. Decision-makers would prefer scientists not to tell them who the main polluters in the city are. Moreover, they prefer scientists not to inform the population of the truth, because in that case, people would demand that they took action against these people.

**Actor 4 (Democratic Revolutionary Party)**
I think that scientific findings would be the best basis for any public policy. However, the authorities do not base their decisions on the truth but on the interests they represent. Several studies have demonstrated the main causes of pollution but government has refused to deal with them. As soon as a study proves that there are powerful interests behind air pollution, government either refutes or minimises it.

The majority of the political parties interviewed acknowledged the important role that science should play in the planning process, but all of them, except the representative of the ruling party, agreed that government failed to take science into account in decision-making. In addition to the economic and political interests that influence the policy making process, these actors mentioned others aspects of scientific knowledge. For one of the interviewees, scientific knowledge could be used to find out how government had protected polluters at the expense of Mexico City’s air quality. For another actor, science was an obstacle for government because whereas government tried to protect the polluters, science could discover who they were. For another member of this sector, however, it should serve as the basis of the decision-making process. The ruling party representative said that science was the best ally in the planning process and he believed that Mexico City’s environmental authorities based their decisions on the best knowledge available. Conversely, the representative of the left political party, said that government based its decisions on economic and political interests rather than the truth. Government knew who the main polluters were yet did nothing to penalise them.

The majority of the political party representatives felt that government was not interested in science and that its decisions were strongly influenced by the interests of major polluters. However, these actors presented contrasting points of view on the role of science in the policy-making process. However, most of them did not believe that government gave science an important role in the planning process.
International Organisations

Actor 1
All we have to do to make things better in the environmental planning system is already contained in scientific knowledge. Unfortunately I have observed that international findings on various aspects of air pollution do not reach Mexican environmental offices. I do not know why all the findings from experiences in Los Angeles, Athens and Bangkok are not included in the diagnosis of official programmes. My country has helped many different countries with environmental problems, but when we try to share those experiences with our Mexican colleagues, they always say that their problems are very different. Nevertheless, I think comparing problems and policies between countries is a good way of avoiding mistakes in dealing with problems.

Actor 2
I think that the Mexican government has understood the importance of basing its decisions on the best knowledge available. Part of our work has to do with this. We give technical and scientific support to Mexican authorities in those fields where we have had a great deal of experience. But science and technology is not a choice but a necessary instrument for solving air pollution problems. In the future only with the support of the international scientific community will it be possible for a country to solve its problems. We are talking about a large community which is devoted, in different countries and using different methodologies, to eliminating pollution.

Actor 3
In Mexico City, experience has shown that science has not been the most common means of solving problems. First because government has refused to base its decisions on such a neutral tool. Second because scientific findings are contradictory and ambivalent. This is why it is very difficult for government to implement well-defined environmental policies.

Most of the international organisations' representatives thought that, despite the need for all governments to base their decisions on scientific knowledge, the Mexican government was particularly reluctant to use international experiences to address the air pollution problems of this city. According to these actors, all government officials argued that the Mexican case was different.

However, for one of the interviewees, the Mexican government did base its decisions on science. He said that his country had given technical support to Mexico. In his view, there was no way to solve environmental problems except by basing decisions on the findings of the international scientific community. Another actor, however, felt that although it was necessary to base decisions on science, it was not easy to do so since scientific findings were frequently contradictory and ambivalent.

Most of these actors felt that Mexican government showed no commitment to science in its decision-making, but they thought that science played a decisive role in
dealing with environmental problems, particularly the findings of the international scientific community.

b) How objective is existing knowledge on Mexico City’s air pollution, according to the actors?

**Government officials**

**Actor 1 (Federal environmental official)**
There is a body of knowledge that I feel is really objective. For example, we know about some important aspects of atmospheric Chemistry. But there are a lot we don’t know about. We have an emissions inventory that tells us which the main sources of air pollution are. However these inventories are not as accurate as they should be. We also know something about the health consequences of air pollution, but we are unaware of most of them, because our specialists have only investigated a few cases and a small range of pollutants. The problem, I feel, is not the objectivity of the knowledge but that there is not yet enough knowledge to contribute to the decision making process.

**Actor 2 (Local government environmental official)**
I feel that knowledge is partially objective. For example, in government research institutions, we are working to prioritise the main environmental problems as a necessary step to making different kinds of decisions, but I feel that in the academic sector researchers are not working according to the same logic. This has to do with objectivity because the kind of topic that you select to investigate reflects either a clear or confused understanding of the general problem. Researchers in the academic sector do not understand what needs to be investigated to solve real problems. On the other hand, from the technical point of view, I think that the problems were identified a long time ago, but these analyses lack a critical, innovative approach. This has negatively affected the proposal for actions. There is no possibility of proposing a political strategy to deal with a highly political issue using the prevailing approaches.

**Actor 3 (Local government environmental official)**
I feel that we have a basic knowledge of the causes and consequences of air pollution. This knowledge is what we base our policies and programmes on. This is, I think, objective knowledge. All our actions have been supported by this knowledge and it has been the reason behind our success in eliminating and reducing certain pollutants. For example, we have practically eliminated Sulphur Dioxide and lead from Mexico City’s atmosphere. However, we have no knowledge on many pollutants. If we did, we would be able to combat air pollution more effectively.

**Actor 4 (Government public health official)**
I think that existing knowledge is objective. I say this because I know all the academic teams working on the relationship between pollution and health. There are at least four national institutions carrying out comprehensive research projects on various aspects of health damage. Our researchers are working together with international teams and the quality of the results meets international standards.

All the government officials interviewed agreed that the knowledge available
to them was objective and that they based their actions on this knowledge. However, they realised that, despite its objectivity, existing knowledge was insufficient. In their view, many areas had not been investigated and the failure of official policies was due to the incomplete nature of available knowledge on air pollution.

One of the interviewees felt that an important aspect of the objectivity of knowledge had to do with the selection of topics to be researched. He thought that the academic sector failed to investigate real, concrete, urgent topics. In his view, researchers in government institutions were undertaking more useful research, since they gave priority to topics that were closely related to the decision-making process. This actor thought that the old approaches to air pollution would have to be changed because they were unable to deal with a highly political issue such as air pollution.

For some of the interviewees, proof of the quality of available knowledge lay, on the one hand, in the success of official programmes in eliminating certain pollutants from Mexico City's atmosphere. It was also borne out by the capacity of both government and academic sectors, who were working together, according to this actor.

Most actors in this sector shared a positive image of the quality of existing knowledge on air pollution. They were quite certain that their decisions were not only based on scientific knowledge but also on extremely objective knowledge. In their view, academic research was misleading since it did not focus on the concrete, real problems. Government research institutions appeared to be the only ones capable of contributing to the planning process.

The academic sector

Actor 1 (Atmospheric sciences)
We have objective scientific knowledge on many key aspects of air pollution in Mexico City. We have demonstrated many of the negative consequences of government decisions. For example, we told them that it was a mistake to eliminate lead from petrol as abruptly as they did. We have proved that the current magnitude of the ozone problem is the result of that irresponsible measure. The real problem is that government is not interested in having a sound knowledge of air pollution. All the infrastructure government created to study the characteristics of air pollution in Mexico City since the 1960s was set up to conceal and minimise the importance of air pollution.

Actor 2 (Environmental sciences)
We have investigated some of the factors that cause pollution and some of the kinds of health damage it produces. In those areas of research, knowledge is objective and rigorous. But we have a problem of
communication with government. They do not know what we are researching and are sometimes reluctant to accept our findings. There other areas of research where knowledge is hotly disputed. For example, there is a great deal of discussion on the causes of ozone formation. Some researchers say it is due to industrial activity but others think that is due to the poor quality of petrol. But despite these disagreements, the sources of ozone, namely industry and transport, have already been identified. What is needed is more co-ordination between researchers working on health damage and those working on ecology.

Actor 3 (Public health specialist)
The quality of knowledge is good, although communication between government and the academic sector is poor. But although government knows the scientific findings, it does not take them into account. I think this is because of the different interests involved in these issues. On the other hand the academic sector does not participate in the policy making process and therefore cannot help government to choose the most appropriate measures. Even with the best knowledge being produced in academic institutions, the lack of scientists' involvement in policy design reduces the possibilities of success in eliminating air pollution.

Actor 4 (Social sciences)
I think that we do not always have objective knowledge of air pollution. I am not sure whether the Mexican scientific community is really critical of its own practices. In my opinion, both the authorities and the scientific community are a little bit improvised. They did not know very much about environmental issues and they began to find out about this topic as they went along. Even now, many people have been unable to master the theoretical basis of the problem which is why they are not objective. Many people joined the field with passion and if you put too much passion into your research you run the risk of being biased. If you are methodologically insecure you will be biased in favour of or against something, which, in my view, is a real problem in our way of analysing air pollution issues here in Mexico.

The majority of the academics interviewed thought that existing knowledge on the causes and consequences of air pollution in Mexico was good. Some of them thought that the problem was lack of communication with the government. Although people in the academic sector were conducting research on some topics, government was unaware of what they are doing and was sometimes unwilling to accept or to implement academic findings. Even more important in their view was the lack of participation by the academic sector in policy design.

For the academic sector, knowledge of air pollution issues was hotly disputed and strongly influenced by political interests. In the first case, there was not one but often several versions of the causes and consequences of air pollution: the knowledge required for decision-making is not homogeneous but highly debated. In the second case, knowledge could be critical of government planning activity which is why it constituted an alternative to the official version of problems. According to one academic, ozone, in other words, the pollutant that exceeds standards most
frequently, was caused by an erroneous decision made in the mid-1980s. By abruptly eliminating lead from petrol, government changed the chemistry of the atmosphere and created the ozone problem. For this researcher, however, all the institutional structure existing since the 1960s was set up by the government to conceal the air pollution problem.

Finally, the social scientist was not sure that whether the knowledge generated by the scientific community in Mexico was objective. He felt that the scientific community in Mexico was uncritical of its own research activity. In his view, this situation was due to the fact that most members of the scientific community, like the government officials in charge of the government offices, joined the environmental field with no previous experience. He also thought that some researchers were so emotional and passionate about their research that their findings were biased.

The image of the quality of knowledge provided by this sector was positive, although their views regarding government handling of scientific findings were negative. Both academic and official government communities appeared to have been challenged not only as regards the interpretation of problems but also in the policies and programmes implemented for Mexico City’s air pollution problems. In academic discourse, government was depicted as being reluctant to accept scientific findings and highly receptive to political influence. Decisions did not appear as a consequence of scientific findings but rather as a result of political dispute.

The entrepreneurial sector

**Actor 1 (Industrial sector)**
I think that we do not have a profound, comprehensive analysis of air pollution in Mexico City. We have some serious rather than deep studies. I think that, for example, in the field of health damage there is a lack of objective analysis to tell us about the health consequences of air pollution. Government is only interested in declaring that lead is under control and that the health consequences of pollution are not that important.

**Actor 2 (Transport sector)**
I think that people in the universities know a lot about the problem. However I feel that they exaggerate. People working in my public transport company have not been affected as regards their health. I have sometimes felt symptoms that might be associated with air pollution, but I am often so tired because of my work and because of driving long distances from home to work, that these symptoms would appear even if I lived in a cleaner city.

**Actor 3 (Car dealer)**
I think that our scientific community is trained to know some of the main causes of air pollution. But I think that is not the problem. The problem is
that government does not take scientific findings into account. I think that we have well trained people here, and even if we did not have them, we could bring in the necessary specialists from abroad. This is why I think that the problem is more political. We have to investigate why government ignores what scientists say about the causes of pollution.

The opinions of the interviewees in this sector regarding the quality of existing knowledge on air pollution were not homogeneous. For one of the actors, there was no profound, comprehensive knowledge available on air pollution. Health damage appeared to be one of the most neglected areas of research yet government disseminated the idea that there were no important health consequences because of pollution. In the view of a public transport entrepreneur, objective knowledge was available but he felt that researchers exaggerated the magnitude and consequences of air pollution. His proof of the unimportance of environmental problems was rather subjective: neither he nor his employees had experienced health problems because of pollution.

For another actor, although objective knowledge was available in Mexico, he felt that the problem was not knowledge but rather the political factors that prevented government from making decisions when knowledge was available.

Perception of the quality of knowledge in this sector was rather diverse. Two of the interviewees were critical of the government’s planning activity while one was concerned about its particular situation and focused on his individualistic perception of knowledge. For one of them, the problems of knowledge referred to the field of knowledge itself. Yet for another interviewee, the relationship between knowledge and the decision-making process was somewhat political.

Green activists

Actor 1
In some areas there is an objective knowledge of air pollution, but there are many important problems that have not been studied. For example, nobody pays attention to carbon monoxide and benzene. Benzene is present in the Mexico City atmosphere in huge amounts but public opinion ignores it. There are also others hydrocarbons that are not studied by the scientific community.

There is proof in the international scientific community that the official measurements of carbon monoxide misrepresent people’s actual degree of exposure. Between 1987-1988, the U.S. Environmental Protection Agency carried out an analysis that found that in many American cities, people’s actual exposure to carbon monoxide exceeded the norm although it was not reported in the official monitoring system. This fact has to do with existing deficiencies in the criteria used to measure air pollution exposure. The monitoring system stations are located in a position higher
than the altitude people really breathe. The Mexican system has the same problems, which government is reluctant to admit.

Actor 2
It depends on the area you are talking about. There are areas where we have a very mature and well trained scientific community but there are others where people just improvise. The objectivity of knowledge produced depends on these circumstances. What I really notice in these communities is a feeling of distrust toward the Green movement. They want to say, "Look, we are the people who really know, we are the scientists, we are the people who have the right to talk about these issues." This distinction they make between those who do research and those who raise people's awareness of environmental problems is a serious problem.

Actor 3
I think that the Mexican scientific community has the capacity to study air pollution issues objectively, but that is not the problem. On the one hand, there are problems about the financial costs of doing research in this area. The equipment needed is very expensive and the research process takes years. On the other hand, many Mexican scientists, who have obtained important findings on the health consequences of air pollution, do not want to publish them because they are afraid of government reprisals. Once a group of health specialists gave me lots of information on winter air pollution and then suddenly they stopped. When I asked why, some of them told me that it was because they were called by some government officials, who told them that it would be better for their future careers not to divulge that information. When you ask me about the objectivity of knowledge in the Mexican context, these sorts of experiences immediately come to mind.

Actor 4
I think that the quality of knowledge produced by Mexican scientists is good. I think that even in government spheres there is both technical and scientific capacity. The problem is that the people working in government are extremely dependent on their political bosses. This is why they manipulate information and misrepresent the facts on air pollution. Some weeks ago, I was with the director of the official air quality monitoring system, and he told me that it would be very difficult to alter the information generated by the system. I know that is difficult but they do it. I feel that the proof they have well trained scientists working in government is that they lie and manipulate data without being noticed by the general public.

Actor 5
I am not sure about the objectivity of the knowledge produced by the scientific community. I think we have very good scientists but the problem is that their studies are not serious enough. For example, why do they only concentrate on two kind of polluters, namely industry and transport? I think that there must be more. On the other hand communication with government is really bad. Scientists needed to have the doors open in government to advise them on the best solutions. I am really disappointed by some of the proposals made by some scientists.

Members of this sector cast doubts on the quality of existing knowledge on air pollution. For some of the interviewees the objectivity of knowledge depended on the area of research involved. In some areas it was good but in others it was poor
because of improvisation. The problem some of these actors observed in existing knowledge on air pollution in Mexico City was that the research agendas of both government and the scientific community were both ill-designed and limited. They focused on certain problems while neglecting others that were crucial. There were flaws in the methodologies used to monitor air quality and they both distrusted the Green organisations’ work on behalf of the environment.

Some members of this sector mentioned important factors that affected the quality of knowledge produced on air pollution in Mexico and its ability to solve air pollution. One was repression against those researchers whose findings were regarded as embarrassing by government officials. Another was corruption in the official air quality monitoring system, that minimised the data on pollution. Another was the lack of communication between government and the academic community.

The main characteristic of the opinions of this sector regarding the quality of existing knowledge on air pollution was its criticism of both government and the academic community’s research and planning activity. In the view of their representatives, both were extremely limited in their approach to air pollution problems and the solutions they proposed.

**The political parties**

**Actor 1 (Green party)**
The scientific community knows about the problem but government doesn’t. In government offices they see what they want to see. However more funds are needed to encourage research in certain critical areas, particularly those related to health damage. I know people working in that area and I think that they are doing a good job. Most of our claim activity is based on the scientific community’s findings.

**Actor 2 (Institutional Revolutionary Party)**
From a technical and scientific point of view the knowledge generated in Mexico is good. The scientific community has identified the main causes of air pollution. I have no doubts about the theoretical and methodological seriousness of their proposals, but I think that there is an aspect that has not been included in those studies. This aspect has to do with the behaviour of Mexicans toward environmental problems. If the scientists do not take this part of the problem into account, they are not being realistic and comprehensive. Something has to be said about that idiosyncrasy of the Mexican people who do not want to admit the existence of problems such as air pollution.

**Actor 3 (National Action Party)**
I think that the Mexican scientific community has a very clear understanding of the air pollution problem. From my point of view, it is the lack of communication between knowledge production and production processes and governmental policies, that makes it difficult to
solve air pollution problems in Mexico. Government has to link scientific research to the planning process. It is the responsibility of science to contribute to solving social problems because it is society who pays for the research institutions.

**Actor 4 (Democratic Revolutionary Party)**

I have no doubts about the objectivity of the knowledge produced in Mexican research institutions. But it is one thing to know the causes of some problems and another thing is to have the capacity to solve them. I have often felt that to know the problems as they really are, which is the purpose of scientific research, is a hindrance for those in government political positions, particularly as regards their task of legitimisation.

The political party representatives interviewed said that existing knowledge on the causes and consequences of air pollution by the Mexican scientific community was objective and reliable. According to the interviewees, the problem was not one of science and knowledge, but rather, the following crucial aspects: lack of funds for research, neglect of certain crucial areas that were not being investigated, lack of communication between government and the academic sector, absence of links between science and the planning process and the inability to translate knowledge into action.

Some of these actors had a poor opinion of the government’s attitude toward science. For the representative of the Green party, government lacked a clear understanding of air pollution issues. For another actor in this sector, government was not interested in science which it tended to view as an obstacle to its needs for legitimacy, since scientific truths highlight the government’s inability to solve air pollution problems.

For the members of this sector, government officials and the academic sector appeared to have a contrasting attitude toward science. In their view, the academic sector alone was trained to do research and explore the air pollution problems of Mexico City.

**International organisations**

**Actor 1**

Both government and scientists in Mexico know a lot about the problem. However, the planning system is not working properly. There is no urban planning or transport planning nor is there a technological policy to stimulate innovation. On the other hand, the juridical apparatus has to be transformed in order to make compliance with the law possible. There are many laws, norms and requirements in Mexico, but there is no enforcement. Corruption is another factor behind air pollution because is cheaper to bribe than to comply with the law.
Actor 2
The findings of the Mexican scientific community are not totally objective. I think that they do their work moderately well. For example, there is too much disagreement over key aspects of air pollution, and there are misrepresentations of problems that people regard as true. I agree with those who say that ozone is not the main air pollutant in the Mexico City atmosphere. If you ask me whether ozone is the main risk factor for a child after 20 or 30 years of exposure, I would not know the answer, because the scientific community lacks the technical capacity to know the answer. There are huge gaps in the knowledge of key aspects of the relationship between health and pollution.

Actor 3
I think that government is working on the basis of sound scientific knowledge of the air pollution problem. I think that the problem is to know whether certain necessary political measures will be good for the economy, because government has to take this factor into account before making its decision. I think that there is good, effective communication between government and the scientific community. Some members of the academic community participate in the Metropolitan Commission for Environment. All the representatives of society participate in that forum and they can agree or disagree with the main proposals.

Most opinions in this sector agreed that existing knowledge on air pollution was good. Most of them also thought that government based its decisions on sound scientific knowledge. The problems they encountered were concerned less with knowledge than with other related issues. For example, one of these actors mentioned three kinds of crucial problems that prevented air pollution policies from being successful. One of them involved the lack of a sound planning system in all the areas linked to air pollution. The second was the government’s inability to enforce the many norms and regulation linked to air pollution policies. The third concerned corruption as regards compliance with the law.

For another international representative, the problem was not knowledge itself, but the unreliability of available knowledge. The causes and consequences of air pollution were sometimes misrepresented, making it difficult to make decisions. At other times, there were different opinions on the same problem. In his view, both these factors hindered the decision-making process.

Finally, one of the international representatives, who thought that communication between government and the scientific community was good, said that the problem of implementing certain political strategies, even when they were based on scientific knowledge, was to know whether or not they would contribute to aspects such as the economy. In his view, what was good for the environment was not always good for the economy and government should take this aspect into
account.

The international representatives regarded the quality of existing knowledge in the policy making process as positive. They portrayed a government with a positive attitude toward science. In their view, government appeared to be highly sensitive to scientific advice, and for one of them, communication between the two sectors was not only good, but also well promoted since government had incorporated the scientific community into the advisory council of the Metropolitan Commission for the Environment.

4. Fourth set of questions: the solution of air pollution problems according to actors.

a) Is it possible to solve Mexico City's air pollution problem?

**Government officials**

**Actor 1** (Federal environmental official)
It is difficult but possible. It depends on your ability to deal with different interests and perspectives. My first task is to eliminate institutional resistance. Before being appointed to this government position I thought that it would be easy to convince the various members of public administration to work together with an integral perspective of environmental problems. But it is actually very difficult. I am talking about institutional rather than personal resistance. The current institutional arrangement is extremely rigid and moreover, we do not have the sectoral proposals that think of the environment in a wider sense.

**Actor 2** (Local environmental official)
I think we can clean up Mexico City's atmosphere. To achieve this, all the levels of government need to work together in a co-ordinated approach. We have to start with common actions to decentralise the city. It is easy to say that but it is very difficult to implement common measures for goals that are not common to every sector. But if we start doing that, we will soon notice a difference.

**Actor 3** (Federal health official)
It is possible to solve air pollution. For those of us working in government, we have to start by raising awareness among the top government officials of the importance that should be given to air pollution. At present environment is not a priority and it must be in order for us to have a more suitable budget. It was because we had 4.6 billion dollars allocated for this purpose that we were able to stop the exponential increase of ozone.

**Actor 4** (Federal environmental official)
It is possible but not in the short term. We are talking about a city where the norms are exceeded on 8 out of every 10 days. With the current technology, it would be necessary to stop all industrial activity and the
entire car fleet to reduce emissions in a meaningful way. We have to accept the fact that over the next twenty years, air quality will be bad. If we take the appropriate measures now, we will begin to notice some significant changes after that.

Most of the government officials interviewed were very optimistic about the possibilities of solving air pollution problems in Mexico City. Most of them thought that the solution to the problem lay in the government structure itself. For example, a federal environmental official thought that the main problem in dealing with air pollution from governmental positions was what he called institutional resistance to working together, and using an integral approach for all sectors of public administration involved in air pollution. In his view, one of the main tasks of an environmental official within the government structure was to make people aware of the importance of having all the sectors contribute to solving the air pollution problem. A local environmental official had virtually the same idea of emphasising the need to work toward common goals. In this context, he pointed out the need to decentralise the city as the first common environmental goal for the different sectors of public administration. A federal health official agreed with these suggestions but emphasised the task of consciousness raising among government officials to encourage them to place more importance on environmental goals. He considered this an important task since the environment is not regarded as a priority by most sectors.

However, one federal environmental official was rather pessimistic. In his view, there was no short-term possibility of solving the air pollution problem. The problem was so severe that all the activities in the city would have to be stopped to achieve a significant reduction of emissions. Drastic yet viable measures would have to be taken immediately to have a significant impact on air pollution. However, despite these measures, it would still take twenty years for the changes to be noticed.

Most of the actors in this sector were optimistic about the possibility of solving the air pollution problem in Mexico City. For most of them, solutions were highly dependent on their own activity and on their own will and capacity to work together as a team, mainly by creating a shared sectoral interest in environmental problems. However, one of them offered a rather discouraging evaluation of the problems and presented a rather bleak description of what would be necessary to have a significant impact on air pollution.
The academic sector

Actor 1 (Atmospheric sciences)
I think we could clean up the city, but we would need to take realistic measures and avoid those irresponsible proposals such as stopping all industrial activity and car circulation. I think it is possible to clean up the air, but this can only be achieved in the long term by taking more radical measures now.

Actor 2 (Environmental sciences)
I think that the air quality in the city can be improved. But doing this will require more radical political measures. You would have to take on powerful interest groups. For example, at the beginning of the 1980s, drastic measures should have been taken to regulate the car industry, but government decided not to force this sector to introduce catalytic converters that were already available on the market at the time. By implementing that measure alone, government could have prevented the extent of air pollution we have now.

Actor 3 (Public health specialist)
I think it is possible. But doing so would take an extraordinary amount of work. I will just give you one example. I think that the different social groups that constitute our city and our community will have to show more commitment. For example, social awareness is needed to encourage the general public to participate more. To this end, the academic sector must inform and educate people. But government must also participate in this task of consciousness-raising, because if it is really interested in the environment, it will need public support to be able to implement its proposals. Without people’s involvement and awareness, there is no way the problem can be solved. In the 1970s, there was an Under-Secretariat for environment; suddenly the office was closed and nobody noticed.

Actor 4 (Social sciences)
Society will have to be better informed. People will have to know what their choices are. In other words, what paying this tax means, in terms of quality of life, or the ecological significance of not using their car once per week. I think that people have the right to know how important the problem is, how many sacrifices they will have to make and how they will be rewarded in terms of social well-being. If you give people proper information, they will become more involved and more committed.

Members of the academic sector were also optimistic about the possibilities of solving air pollution. But their optimism was dependent on the possibility of both government and society taking some rather radical measures. For example, they mentioned the need to take realistic drastic measures to achieve beneficial results in the long term. They also mentioned the need for radical measures to deal with the political interests surrounding the main polluters. Government would have to show greater determination in subduing the powerful economic and political groups that have traditionally avoided the rule of the law as regards environmental issues.

Some academics stressed the need for greater public involvement in the
solution of the problem. They felt both government and the academic sector should raise the general population's awareness of environmental issues. As part of this task, people would have to be informed of the benefits of making certain sacrifices to achieve a better environment. Air quality should be valued as an important part of people's well-being.

What characterises the academic perception of the possibilities of solving the air pollution problem is its inclusion of both governmental and non-governmental factors. Solutions are dependent on both governmental and societal commitment to a non-polluted environment. In their view, both the raising of awareness among the general public and the implementation of radical measures to force major polluters to comply with the law, are crucial factors in solving air pollution problems.

The entrepreneurial sector

**Actor 1 (Industrial sector)**
I think that is possible to clean up the environment, but this does not require destroying industry. If you impose too many costly regulations, you will destroy the sources of wealth and without wealth you won't be able to take care of environment. That is a task in which all sectors will have to work together. Some governmental measures simply eliminate any possibility of development. Quite simply: if you do not have development you will not have progress; without progress how can you avoid environmental damage?

**Actor 2 (transport sector)**
Yes, it is possible, but it all depends on government. We are just waiting for their instructions. We do always what they want us to do. Even when the measures taken by government affect our viability as a private enterprise. They put up the price of petrol and everything goes up, and we also have to pay costly environmental regulations. How are we going to survive? I think that it is necessary to stop government intervention in such things as public transport fares.

**Actor 3 (Chemical industry)**
Yes, it is possible. To achieve it you will have to sensitise people. Nothing is going to move people except commitment to the environmental cause. We have to make people responsible for their environment. This a principle of coexistence, harmony and a basic social value. Society has to tell its members what it expects from them in terms of environmental behaviour.

Most of these actors seemed optimistic about the possibilities of solving the air pollution problem. However, what really worried them was the possibility of paying for the cost of cleaning up the air. One of these actors was very emphatic about the need for government to preserve the viability of entrepreneurial activity. In his view, they were the producers of wealth and wealth was the most valuable resource in the
fight against pollution. For another actor in this sector, the problem was that in order to be successful in dealing with air pollution, government overspent and forced the transport sector to pay for the entire cost of cleaning up the atmosphere.

One of the members of this sector focused on the need to sensitise people to the environmental cause. In his view, it was necessary to create a new attitude toward the environment and encourage social participation in order for society to achieve its goals. Society should be the guiding force in this fight to protect and value the environment.

This sector, while optimistic in its opinions about the possibilities of cleaning up Mexico City’s atmosphere, showed a need to protect itself as a group, against the government’s intention of cleaning up the air at their expense.

The Green activists

**Actor 1**
Cleaning up Mexico City’s air will require exerting more influence over the entire transport planning system, since transport is the main source of pollution. The Secretariat of State for the Environment has no power in the various government offices; all it does is control the official monitoring system. There are many possibilities, but you have to think and act integrally. It is essential to decrease fuel consumption, and the only way to do this to give priority to the public transport system.

**Actor 2**
It is possible, but to achieve this we would need a more effective government. It is amusing to see how many laws this government issues without their being adopted in practice. Mexico has very strict environmental standards, but nobody complies with them. There is no enforcement. In that respect, it would be better to have fewer regulations that we could control and enforce.

**Actor 3**
It is possible but difficult. The first step would be to confront and control economic and political interests. We have the knowledge and we know what we would need to do. But these things are futile if we are unable to place general interests over private interests. What we need is a strong government with more radical measures. You cannot go up to a major industrial corporation and ask it whether or not it would like to improve its environmental performance. You have to force it to comply and enforce the law.

All the interviewees among the Green activists shared the same view on the possibilities of solving Mexico City’s air pollution problem. However, in their view, government was responsible for solving problems, particularly in its capacity to enforce environmental laws. There was a general demand for a stronger and more powerful government with real power to control major polluters.
In their view, there were too many laws, norms and standards that no-one obeyed because there was no authority with the power required to enforce them. There were many measures mentioned by the Green activists interviewed as a means of solving the air pollution problem. For instance they mentioned the need to improve public transport which was the main source of air pollution. They also mentioned adopting an integral approach to the problem and decreasing fuel consumption.

For one of the interviewees, there was enough knowledge to solve the problem, but there was no real government capacity to place general interests over those of large corporations which were primarily responsible for air pollution. Another interviewee thought it would be better to have fewer laws and norms that the government could really enforce.

The Green activists' view of the problem focused on the power required by government to enforce the laws. From their perspective, government and large corporations were the real forces that determined the possibility of cleaning up the air.

The political parties

Actor 1 (Green Party)
We would need a different government, because the one we have now is very corrupt and a firm ally of major polluters. You can verify this simply by analysing which enterprises have the best contracts for doing road, public transport system and general infrastructure work. Government and private capital are doing business with the local environment.

Actor 2 (Institutional Revolutionary Party)
It is possible to clean up the city air but we need the government to act more decisively and implement stricter measures. The poor quality of Mexico City's air is the best proof of the lack of government will to solve the problem. Government lacks conviction, environmental convictions and principles. Moreover, economic and political interests really determine the destiny of Mexico City's inhabitants.

Actor 3 (National Action Party)
The conditions for cleaning up the air exist, but not the will to do so. Why doesn't government promote reforestation, education and public participation? Government is only interested in promoting its public image. It is only interested in the decisions and actions that will benefit it from a political point of view.
Government has created a problem of lack of authority and disorder. Everyone exerts pressure on the government and forces it to do nothing: The owners of the public transport system, the entrepreneurial sector, car owners, political parties, etc. All them threaten government with failure to comply with environmental law. How can they make decisions and what kind of decisions are they going to make?
Actor 4 (Democratic Revolutionary Party)

We can clean up the air which would be the moral obligation of any democratic government, but the current one is not democratic and is extremely corrupt. The only way to have a better environment is to have a government that is committed to the environment rather than to economic and political interests. It is during the time that the ruling party has been in power that the environment in Mexico has suffered the greatest deterioration.

All the political party representatives believed that it was possible to have better air quality. However, all of them agreed that what was needed to have a better environment was a government with a greater commitment to the environmental cause. What they saw was a government which lacked the will and power to take radical measures to deal with the economic and political interests behind air pollution.

For some of the interviewees, an important factor in government failure to solve air pollution problems was corruption. According to some of these actors, government was less committed to the environment than to economic and political interests. For one interviewee, government had no convictions or environmental principles and in the meantime, economic and political groups determined the quality of the environment in Mexico City. For another actor, government was a hostage to the various political groups involved in air pollution. Since it lacked the will and power to make decisions, these groups were free to destroy the environment at will. For the left wing party representative, the main problem that prevented government from cleaning up Mexico City’s air was the lack of democracy and corruption in an authoritarian political system that had been in power for decades.

All the party representatives agreed in citing partnership between government and business, the lack of environmental commitment on the part of government officials and corruption as the main reasons behind government failure to solve air pollution. For this sector, however, government was primarily responsible for the magnitude of air pollution in the city.

International Organisations

Actor 1

In the short term, I do not believe so. I think that a technological change is needed. I do not know whether new technology will be available for the next generation. In the current circumstances, all what we can do is maintain the status quo and not clean up the city. But to maintain the
status quo would be a significant achievement. In addition the meteorological conditions of Mexico City do not help to clean up the air, because, sometimes, even with only a few emissions, air quality is poor.

**Actor 2**
I think that it is possible to clean up the air, but we have to use resources more efficiently. Different institutions are doing the same work with no communication between them. On the other hand I do not see any awareness or responsibility among the various sectors that participate in Pollution.

**Actor 3**
I am not sure. I can see lot of problems. Lack of co-ordination between government institutions, lack of funds, lack of people specialising in air pollution problems. Moreover, the planning system is really inadequate, with no possibility of being implemented. Finally the problem of corruption is an important factor to be taken into account because it is one of the main contributors to the deterioration of air quality.

This sector expressed a variety of views on the possibilities of solving air pollution. Some of them cast some doubts on the real possibilities of cleaning up the air, at least in the short term. The majority of these actors thought that there was a problem of inefficient use of resources and lack of communication between those in various sectors of society who were working toward the same goal of cleaning up the environment.

One of the interviewees said that the combination of the lack of technological alternatives and inadequate natural conditions made it virtually impossible to solve air pollution problems in the short term. The most people could hope for was to maintain current air quality conditions, even though the latter were not good. However, preserving this status quo would require drastic measures.

Some of the interviewees felt there was a significant problem of lack of responsibility among the various sectors of the population that explained the failure to solve air pollution in Mexico City. Moreover, an inadequate planning system and corruption were cited as some of the main factors that had prevented these problems from being solved.

This sector introduced a number of other factors to explain the reasons that prevented Mexico City's atmosphere from being cleaned up. They mentioned technological factors, sectoral and social environmental commitment, governmental will and capacity and meteorological conditions as elements that were crucial to solving Mexico City's air pollution problems.
b) What are the obstacles and the solutions that the actors propose to solve air pollution?

The government official

Actor 1 (Federal Environmental Official)
In my view, the solution to the air pollution problems of Mexico City is not just a problem of technical capacity but a rather more complex one. We know about some problems and we could deal with them but for political reasons we do not act in a congruent way. Of course we do not know about several aspects of air pollution. It would be pretentious for anyone (even for a scientist working in the field of atmospheric chemistry) to say that everything is already known. I think that in its essential aspects we have enough knowledge on the stationary and mobile sources of air pollution.

Conversely, we cannot say that everything depends on political solutions. I think that we could end up in a dangerously voluntaristic situation because we could have a strong political will to combat air pollution but with such dramatic consequences on economic performance that such a project would be impossible to implement. Nevertheless, there are some cases where I certainly find a lack of political will. Politicians are sometimes unwilling to pay the political price of confronting several specific causes of pollution.

It is because there are many causes rather than one and a variety of social dynamics behind the causes, that dealing with air pollution means dealing with interests in every social sphere. A perfect example of government reluctance to pay the political cost of attacking air pollution is the urban transport sector. At some point government failed to impose a radical change from the existing fragmentation of the different modes of public transportation to a more rational system from the point of view of energy consumption.

But when I speak of will, I am not just referring to government will but also to societal will... in this respect as either individuals or as a society we need a stronger will to act and a major decision to change.

Actor 2 (Federal Environmental Official)
It is a crucial issue for air pollution that every year there are two hundred thousand new cars on the road in Mexico City. From this point of view, nothing you do in terms of petrol quality or exhaust emissions tests is important if the number of cars is constantly increasing.

I think that the main cause of air pollution is transport because industry only pollutes at the local level. You only have to worry about a few factories contaminating approximately thirty districts surrounding the industrial site, but that does not have a big impact on the metropolitan area as a whole.

We cannot say that our officials lack the technical capacity to deal with and solve air pollution. We have had people working on the environment for a long time. Some of them are environmental engineers, chemical engineers, etc.

Actor 3 (Federal Environmental Official)
Change will not be easy or fast. For many years we neglected the city's air quality. It was between 1980 and 1990 that the air quality of Mexico City radically deteriorated. Reversing this trend would be very complicated. At present we still have high levels of pollution but we do not have the dramatic levels reached two years ago. I think that we are beginning a stationary trend that gives us the opportunity to design a
strategy to reduce pollution levels as fast as we can.
For me the main problem is the amount of people living in Mexico City.
People have often discussed the quality of fuel we consume in this region,
but I think that the problem has nothing to do with fuel quality but with
the quantity of fuel we consume in cars, industry and services.
Problem number two is lack of information. We have some information
on health consequences from pollution but nothing definite. We have no
idea about chronic ozone exposure. Research in this field has only
recently begun in Mexico and we are looking forward to its scientific
findings.
The third problem has to do with the carrying capacity of the region. No-
one in Mexico has analysed how much pollution the Mexico City
Metropolitan Area will tolerate before its precarious equilibrium is
destroyed.
My proposal to the Metropolitan Commission for Environment was to
construct special lanes for public transport, built so as to prevent bus
drivers from changing lanes; unfortunately the environmental and
transport authorities ignored my proposal.

Actor 4 (Local Environmental Official)
The main obstacle to curbing air pollution is budgetary. We have made
the fundamental mistake of allocating the budget once in a year at local,
state and federal levels. This procedure does not work well because if, for
example, for whatever reason I have forgotten to buy nuts and bolts, then
the machine, programme or activity is put on hold. We should work like a
private enterprise assigning resources as they are required.
Another crucial aspect is the regulatory system. We are beginning a
consensual strategy to convince different industrial sectors of the need
and advisability of observing environmental norms. We have to be careful
about the strict application of norms because if we, as the authority, try to
apply more rigid standards, industry could declare bankruptcy. It is
better to negotiate with the industrial sector in such a way that they tell us
how much and over what period they are going to reduce emissions.

Actor 5 (Local Environmental Official)
When you talk about environmental problems you have to realise that it
involves more than one sector of public administration. If you want to be
successful you have to horizontally interact with other sectors. We have
now started to work in this direction. When people started to talk about
the environment and more recently about sustainability they used to think
about it as something to be added to a development programme or to a
national social or economical programme but not as something on its
own. Now we all realise that to be successful in environmental terms,
each and every one of the public administration sectors has to incorporate
environmental criteria into its actions. Environment should not be
regarded as something incidental, but as a structural element. It is not
enough to restrict environmental policies and programmes to the scope of
the Secretariat of State for the Environment. The most important
achievements are those expressed in changes in ways of thinking,
behaving and planning.
One example of what I am talking about is the transport system. Those
who design transport systems for Mexico City should not be working
separately from those designing environmental policies.

Different levels of knowledge and proposals were involved when government
officials talked about the obstacles and solutions to air pollution. For some of them,
obstacles and solutions included the social, technical and political aspects involved in
the air pollution problem. Others felt that a few rather technical obstacles and solutions should be included to achieve better results in addressing air pollution problems. For the former, purely technical solutions would not suffice to solve a complex problem such as air pollution, but including the political dimension did not mean taking irresponsible measures even against major polluters. Sustainability had to be reconciled with economic viability. For these actors, the main obstacles had to do with the various social and political interests and dynamics involved in air pollution in both government and in society. They also cited the cumulative effects of years of neglecting the air pollution problem as an obstacle, together with the lack of more detailed knowledge on the health consequences of pollution and the carrying capacity of Mexico City's atmospheric basin. In their view, solutions should include both technical and political aspects as well as the various interests and dynamics involved.

The latter felt there were problems such as the inadequate distribution of the budget, the number of cars and people in Mexico City and the lack of co-ordination between the different modes of the public transport system. One of these actors suggested creating bus lanes as a solution to the public transport problem.

Those working in the federal offices seemed to have broader perspective on the obstacles and solution to air pollution and mentioned several contributing factors. However neither group of government officials probed any deeper into other social, economic or political aspects linked to obstacles and solutions. Most of them described the obstacles and solutions at the government level.

The academic sector

Actor 1 (Public Health)
I do not know whether there are any interests that prevent Mexico City's atmosphere from being cleaned up but what I can say is that there are certain interests that restrict knowledge of the health consequences of air pollution. That has adversely affected the effectiveness of the environmental agenda. Air pollution is a huge problem that needed radical measures but taking radical measures is not a characteristic of the Mexican government. From my point of view, it is a critical problem that requires drastic solutions which could affect many interests. I think that what is needed is support for research and power to determine the scope of the problem. Unless the authorities are aware of the scope of the problem, they cannot have the punch they need to solve it. I won't propose any radical measures but I think that Mexico City's threshold for tolerating hydrocarbons is really low. The number of petrol vehicles that can be tolerated in Mexico City is extremely low.
Geographically speaking, Mexico City cannot tolerate that many vehicles. This means that we have to make radical decisions such as whether to change the kind of vehicles we use or to change the type of transport system we have.

As far as industry is concerned, I am not sure whether this sector should be relocated outside the Valley of Mexico. I think that industry should perform its job well and if it is unable to do so or is unwilling to perform its job, it should go out of the city. But more importantly we have to define the kind of industry we would like. We have not had an industrial strategy for the Valley of Mexico. We must define our objectives, our goals in terms of controlling pollution and to try to be rigorous as regards the measures to be implemented. Rather than preventing the development of the city, this means of dealing with air pollution problems would help to support its development.

I regard the social consciousness of social groups as very important and I would like to see them create an agenda. I would like to see the academic sector providing scientific material for social groups and the public sector. The latter must assume its responsibility more vigorously. In the past, we had an Under-secretariat of State for the Environment. It was born, grew up and died without any concern from society. The first air pollution monitoring system was installed in the seventies but when it was dismantled, nobody worried about it. The Under-secretariat for Environment disappeared and nobody cared about that. But environmental problems were not on people's minds in those days; nowadays the situation is different.

Actor 2 (Environmental Sciences)

Well, it is not a problem of obstacles. What we have are the so-called "end of pipe techniques". In other words, if there are pollution problems, it is because some processes discharge waste into the atmosphere. All we have to do is to find out where this waste is going and install some devices to modify, stop or alter the discharge of contaminants. I feel that this "end of pipe" technique is very insufficient. There is a difficulty, even for decision makers, of placing themselves at the beginning rather than the end of the pipe in conceptual terms in order to avoid the production and generation of waste.

It does not make much sense to continue inventing new catalytic converters; that is not the solution. We have to think of different solutions such as electric transportation, mass transportation, and a more efficient transport system. Thinking in terms of "end of pipe" strategies is a futile exercise.

We have to think of collective rather than individual strategies, which means asking what kind of city we want, what kind of transport system we would like to have and what kind of sacrifices we are prepared to make in terms of our everyday life in order to have a better environment. Improving air quality will involve major changes in our individual and collective behaviours. We have to tune up our cars instead of paying bribes. We will have to provide objective information and avoid minimising problem. But before asking people to make sacrifices, and effect changes and modifications in their behaviour, we will have to inform them of the costs and benefits associated with the measures to be implemented. People will have to understand what the implications of the problem are in terms of health and the economy to decide whether they are willing to pay for that and how much they will have to pay.

Many people say that cleaning up the environment is very expensive and because we do not have enough money to pay for a better environment because of the crisis all we can do is to forget about it. This is not true because we are paying anyway. We are paying with money, time, quality of life and the shortening of our life. We can argue about how are we paying, but we are certainly paying. We will have to tell citizens what is
happening, the real cost of pollution and what the solutions and alternatives are. Then people will have to decide for themselves. Obstacles include powerful economic interests such as those linked to the car industry. A small number of people own cars and privatise the benefits of using them while socialising the damages: that is great business. This is what ensures that a very powerful middle class sector, is not interested in modifying its behaviour unless you negotiate with them. There are lots of interests that make it necessary for government to negotiate and achieve consensus before implementing its policies.

Actor 3 (Social sciences)
In discussing possible solutions to the air pollution problem, we have to consider the dominant economic model and the economic crises in that model. For example, installing anti-pollution devices in either factories or the car fleet is a costly strategy that these sectors are reluctant to adopt. For lots of enterprises now the main aim is to recover from the negative effects of the crisis. However, air pollution is not a problem that begins in just one sector but in different, contradictory ones. It has to do with transport planning, with city planning, with the logic of the current process of urbanisation and its economic, demographic and political concentration; it also has to do with the numerous interests that determine the environmental agenda.

The economic cost of cleaning Mexico city’s air will have to be borne by government since the entrepreneurial sector is in the midst of a crisis. But from this perspective, the problem does not only depend on the federal office for the environment but on all sectors of public administration. I am sure that the federal office for the environment has the will to deal with the problems but they are beyond its jurisdiction. Conversely, I do not feel the same way about local authorities. I have my doubts about the way local authorities are dealing with the problems. They are focusing on isolated problems but without any causal perspective. The only real solution would be a change in the economic and social model.

The solution is also a problem of development alternatives. The point is that decision makers have a very narrow view of environmental issues and the only thing they implement are neo-liberal strategies. They do not want to seriously affect the current economic model. They do not want to implement measures that might affect the profitability of the enterprises.

Actor 4 (Environmental engineer)
Political and social aspects are very important in the search for solutions to air pollution. There are some very funny government officials who wanted to solve environmental problems using purely economic instruments; I do not believe in such solutions. I am more of an engineer than an economist. I realise that there is an economic component but there is also a technical one.

There are some people with textbook perspectives and solutions and it makes sense in that context to suggest very logical steps for attacking air pollution. The problem is that in the real world there is no way such measures can be implemented because of the economic and political interests involved in air pollution. For example these people propose reducing the amount of fuel sold in Mexico City and banning the circulation of all vehicles over four years old. I would like to know what politician would dare to implement such a measure. We all agree with the idea that fewer cars produce less pollution but the problem is how to put that textbook solution into practice.

What is really dramatic in Mexico is that all the political groups involved in air pollution have their say and as a result of this no-one makes any decisions. Government discourse is very similar to that of environmentalist groups. The authorities do not have a clear position and their discourse is poorly defined which is terrible. I would prefer them to
The political parties

**Actor 1 (Green Party)**
The main problem concerning the solution to air pollution is the lack of an integrated approach. Government officials do not have a long term perspective, they are always working on a short term basis. On the other hand, all government actions are guided by the idea of modernisation. They do not think of environmental policies as something designed for human beings but of the interests that are at stake. We need a more objective planning system to regulate urbanisation, industrial zones and rationalise water and energy consumption. We also need to encourage civic participation in public policies.

**Actor 2 (Institutional Revolutionary Party)**
I believe that the lack of an integrated approach to air and environmental problems has been one of the main obstacles to solving it. Apart from this I have seen a lack of will to act and the predominance of economic and political interests in the area of decision making. Water, air and other environmental problems have to be considered together. It is frustrating to see how government actions ignore the links between the various environmental problems.

**Actor 3 (National Action Party)**
The main obstacle is that government has created total chaos. It lacks the authority to enforce the law. It is not the rule of the law that guides actors' behaviour but anarchy and the lack of respect for government. Minivan drivers, taxi drivers, bus drivers, economic and political groups all pressure government to act according to their own interests and in fact they do what they want. This is the main obstacle to solving environmental problems. Government has identified certain problems but instead of dealing with them, it tries to put off finding a solution and begins negotiating with the actors involved. In the meantime, problem get worse and worse. Government should solve the problem quickly otherwise it will be more difficult to solve in the near future.

**Actor 4 (Democratic Revolutionary Party)**
Centralisation and the lack of an integrated policy make it difficult for government to solve air pollution. It is very important to plan environmental issues to have a global conception. But a global perspective is just a sort of framework for decision-making at local and regional levels. It is the lack of this kind of dynamic conception of problems that makes it very difficult for government to deal with air pollution problems appropriately. What we are asking authorities to do is to introduce radical changes into the transport system and urban development and to enforce urban law.

Most political party representatives agreed that the main obstacle to solving air pollution in Mexico City was the lack of an integrated approach. According to them, problems should be thought of from a global perspective that would allow policy makers to make global, regional and local decisions on environmental problems. What political parties meant by an integrated approach was, on the one hand, to regard environmental problems (air, water, soil) as interdependent problems. They also meant designing and implementing policies and programmes from a sectoral
air pollution and obstacles and solutions to the latter. Their views were rather like a brainstorming session in which the ideas have to be arranged in an analytical order.

The entrepreneurial sector

Actor 1 (Industrial sector)
That is difficult question. I think that there is no one solution. One of the main problems with government strategies is that they think that it is possible to solve air pollution by implementing one simple measure. That is the case of the government program “One day without a car”. They thought that this program could magically solve our pollution problems but that did not happen.

Actor 2 (transport sector)
Government is the main obstacle. It does not want to solve the problems but to project a public image of really taking care of the environment while actually doing nothing. We are the ones who pay for their mistakes. They would like to portray public transport entrepreneurs as the only polluters in the city.

Actor 3 (Chemical sector)
This is a problem that is the responsibility of society as a whole. The main obstacles come from the lack of a social consciousness and of a will to really participate in the search for solutions by all members of society. All of us are responsible for pollution and we have a moral responsibility to work on the solutions. Government has to implement a more aggressive educational program to raise awareness of the importance of environmental problems and public participation.

Actor 4 (Car dealer)
I think that we need to implement a process of education at the societal level in environmental issues. Without environmental education, Mexicans have demonstrated their capacity to destroy their environmental legacy. I have observed the absence of a culture of responsibility. People demand lots of things but they do not think in terms of duties. You can see the same irrational behaviour in all the different social groups. It does not matter whether you are rich or poor, everyone has a negative attitude toward the environment. Government and academic institutions must work together to educate people, particularly the new generations, because they will be responsible for preserving nature.

The answers given by members of this sector varied considerably. Each of them mentioned a different aspect. One thought that there was no one solution, contrary to the government’s belief. Another actor identified government as the main obstacle since, rather than solving the problem, it seemed more interested in projecting a public image of really taking care of environment. For this actor, who was involved in the public transport business, government had decided to depict the transport sector as the sole cause of pollution. In his view, government did not want to solve the problem but only to find a culprit it could blame for pollution.

Other actors from this sector agreed that one of the main problems had to do
with the lack of awareness of environmental problems. In this context both of them called for government to implement an educational programme to foster responsibility and a new attitude to environment.

The main obstacles and solutions that this sector perceived as regards air pollution, were the lack of more alternatives, the lack of a will to solve problems and a lack of awareness that meant that the implementation of an aggressive educational programme was required.

The Green activists

Actor 1
I think that there is a lack of both will and capacity. This is one of the main obstacles to solving air pollution. There is a lack of an integral training of environmental officials that prevents them from regarding environmental issues in an integral fashion. All them are under great pressure from different interests. Local government and its Head Offices for Urban Transport are organisations that are very closely linked to urban developers, car industry, etc. This is also true of the United States. Transport and environmental authorities are doing the opposite to what they should be doing to solve the air pollution. They should be supporting mass transportation such as the Underground and longer vehicles with a greater capacity than those operating now. Instead, they are constructing more roads and freeways for private cars. There is a set of measures they could implement to reduce the use of private car and to improve public transport, but they doing the opposite. There are lots of things that can be done but we need an integral perspective. Technical measures are important but what is more necessary is to reduce the amount of fuel consumed in the city. All those aspects that encourage private car use should be stopped and those that support public transport encouraged.

Actor 2
I think that what we need is a more coercive government. There is no other way. These coercive measures have been successful in other countries. We do not need democracy as much as more effective measures. We have to modernise the city, we have to change the entire car fleet. All these are major measures but air pollution in Mexico City is also a major problem.

Actor 3
I think that it is possible to clean up Mexico City’s air but we will have to affect economic and political interests. That is my answer; I think that the knowledge and the know-how already exists. Mexican scientists have thousands of programmes. There is an excellent study that classifies the substances discharged into Mexico City’s atmosphere; they have been detected, we know how to monitor them. We are now at a moment of absolute knowledge. What is now required present is a strong policy and the will to change. But industries are not going to leave Mexico City of their own volition, there are too many economic and political interests at stake.

Actor 4
One of the main obstacles is that environmental government officials lack
both an environmental awareness and adequate knowledge of the problem. The person in charge of the local and federal office for environment is a crucial factor in improving the environment. Some years ago we had a mayor who was very concerned about environmental degradation, but the last one was really pathetic in his lack of awareness and interest. There are some people now who have some ideas on the problem. Nevertheless, environmental policies at present are very negative because the mayor repealed the environmental laws requiring all investors wishing to set up a factory in Mexico City to carry out a study on environmental impact. This is a step back to what we had before 1985.

**Actor 5**
In my view, the solutions are as follows: first, we must have an informed, responsible society. Second, the law must be modified to strengthen the institutional framework. Third, the monitoring system and the control mechanism must be reinforced. All this is linked to the need for society to mature in terms of its rights and responsibilities. What I want to stress is that the rule of law can replace the traditional mechanisms of corruption.

Most actors in this sector agreed that government had failed to solve the air pollution problem. Government was portrayed as a corrupt body lacking the will and technical capacity to deal with air pollution successfully. The obstacles and solutions perceived by the Green activists varied. One had to do with the narrow approach prevailing in the government offices as regards dealing with the environment. Another obstacle was the influence of economic and political groups and the corruption in government offices. A different aspect emphasised by one of these actors was the need for an effective authority that could really enforce environmental laws and norms. According to this actor, since Mexico City’s air pollution problems were so large, they required correspondingly large political measures to deal with them.

Lack of awareness and knowledge were depicted as crucial factors that prevented the problem from being solved. However, according to one actor, even if it had enough knowledge, government would need a more aggressive enforcement programme. For him this was more important than democracy.

Members of this sector were extremely critical of government air pollution planning activity. They did not trust the government’s current capacity, will or consciousness to solve air pollution. In some respects they thought that government was doing the opposite to what it should be doing to be successful in cleaning up Mexico City’s atmosphere.
The political parties

**Actor 1 (Green Party)**

The main problem concerning the solution to air pollution is the lack of an integrated approach. Government officials do not have a long term perspective, they are always working on a short term basis. On the other hand, all government actions are guided by the idea of modernisation. They do not think of environmental policies as something designed for human beings but of the interests that are at stake. We need a more objective planning system to regulate urbanisation, industrial zones and rationalise water and energy consumption. We also need to encourage civic participation in public policies.

**Actor 2 (Institutional Revolutionary Party)**

I believe that the lack of an integrated approach to air and environmental problems has been one of the main obstacles to solving it. Apart from this I have seen a lack of will to act and the predominance of economic and political interests in the area of decision making. Water, air and other environmental problems have to be considered together. It is frustrating to see how government actions ignore the links between the various environmental problems.

**Actor 3 (National Action Party)**

The main obstacle is that government has created total chaos. It lacks the authority to enforce the law. It is not the rule of the law that guides actors' behaviour but anarchy and the lack of respect for government. Minivan drivers, taxi drivers, bus drivers, economic and political groups all pressure government to act according to their own interests and in fact they do what they want. This is the main obstacle to solving environmental problems. Government has identified certain problems but instead of dealing with them, it tries to put off finding a solution and begins negotiating with the actors involved. In the meantime, problem get worse and worse. Government should solve the problem quickly otherwise it will be more difficult to solve in the near future.

**Actor 4 (Democratic Revolutionary Party)**

Centralisation and the lack of an integrated policy make it difficult for government to solve air pollution. It is very important to plan environmental issues to have a global conception. But a global perspective is just a sort of framework for decision-making at local and regional levels. It is the lack of this kind of dynamic conception of problems that makes it very difficult for government to deal with air pollution problems appropriately. What we are asking authorities to do is to introduce radical changes into the transport system and urban development and to enforce urban law.

Most political party representatives agreed that the main obstacle to solving air pollution in Mexico City was the lack of an integrated approach. According to them, problems should be thought of from a global perspective that would allow policy makers to make global, regional and local decisions on environmental problems. What political parties meant by an integrated approach was, on the one hand, to regard environmental problems (air, water, soil) as interdependent problems. They also meant designing and implementing policies and programmes from a sectoral
perspective. This would involve the need to plan urban development, the transport system and industrial policies as interconnected and interdependent government policies. Yet in order to achieve an integrated approach, one actor also suggested the need for planning with a long term perspective and harmonising human, environmental and economics goals.

Some actors in this sector thought that government had abandoned its regulatory role, by leaving the environment to market forces. In this scenario, economic and political groups (minivan owners, industrial groups, car owners, taxi drivers, etc.) were free to fight to impose their particular interests, without no regard for the environment. In this context, government had generated a great deal of anarchy.

**International organisations**

**Actor 1**
The main obstacle to solving air pollution anywhere in the world are the interest groups who are only concerned with defending their own perspectives. In my country, the big oil companies, the chemical industry and the car industry are very powerful, and they often determine some of the policies implemented. They exert their power via the lobbyist who represents their interest in government spheres and other centres of power.

**Actor 2**
The main obstacles to solving air pollution in Mexico City are the rate of growth of both population and industry. Whatever you do, unless you stop the number of people, factories and cars in Mexico City you will always be beaten. We pretend to control pollution but we continue emitting substances. The population asks: How is it that we have failed to control air pollution? But, if I were radical I would tell them, you have two choices: leave the city or stop using your car.

**Actor 3**
The main obstacle is people’s education. I have noticed that people do not have a benevolent attitude toward the environment. This is not only a problem in Mexico but all over the world. We have to create a new attitude, a new behaviour. Government has to start educating people through special programmes, but is not just a problem for government but for all the formal and informal institutions in society.

The opinions of the international representatives on the obstacles and solutions for air pollution were not homogeneous. Each of them gave a different answer, and all these answers corresponded to some of the general answers given by the rest of the interviewees. For example, one of them said that the main obstacles were the economic and political interests of powerful enterprises. For another actor, the
obstacles were the rate of growth and concentration of both industry and population. There could be no feasible solutions unless the number of people and factories stopped increasing. For this actor, there were two possible solutions in this context for people, to leave the city or to stop using their cars.

For another actor from this sector, education was the main problem that prevented people from having a better environment. Under these circumstances, both government and society should implement environmental education programmes to foster new ways of dealing with nature and a different, more benevolent attitude towards their environment.

5. A general overview of the social construction of air pollution

a) The emergence of air pollution and its importance for actors.

The Environmental ideological and political constructions (EIPC) of the social actors interviewed in this research were different, and sometimes contrasting. They explained the emergence of environmental problems as a matter of public concern mainly as a result of the magnitude the problem had achieved in Mexico City. From this perspective, they suggested that it was the damage associated with air pollution, particularly damage to human health, that explained why people were concerned about air pollution.

The majority of the social actors' EIPCs linked the emergence of air pollution as a matter of public concern to the damage it caused. However, this was not a completely uniform, shared perception. Perceptions ranged from those of members of the academic sector, to those of Green activists and political parties. The former were more likely to understand the public emergence of air pollution issues as being related to changes in the perception of problems that had arisen from a new concept of the quality of life, new values and a sort of a new, environmental, global awareness. Within this new, global, environmental awareness, the environment appeared as something that was relevant for human beings. The latter viewed the emergence of air pollution awareness as something that was more closely related to the obvious severity of the problem. People actually felt affected or were able to perceive, without any social or cultural mediation, that air pollution was a major problem because Mexico City's atmosphere looked so polluted. Even the
international representatives shared this perception of the problem. Between these two extremes, government officials were uncertain whether to cite air deterioration or cultural aspects as the factor that had triggered public concern over air pollution. The business sector was more likely to cite the deterioration of air quality as a trigger factor even if its EIPC were not homogeneous. From this perspective, the academic sector and government officials were closer to a constructionist approach than the rest of the social actors, particularly the Green activists.

On the other hand, most actors placed a great deal of importance on air pollution. Government officials and academics agreed on the importance that air pollution had in terms of affecting mainly human health and the quality of life, although they were not particularly concerned about the damage caused to nature. For some international representatives, the air was so polluted that there was no doubt about the importance and magnitude of the problem, while others did not appear to be very convinced about the severity of the problem or the damage it caused. Many of them had no doubts about the acute health consequences of air pollution or the severity and magnitude of the problem. However, there were significant differences in the way they gauged the importance of the problem. For example, for Green activists and political party representatives, air pollution was a major problem that was out of control. For some of them, government intervention had actually exacerbated the problem, because of its unreflecting attempts to solve it. These two group of actors depicted Mexico City’s air pollution problem as not only important but also a problem of survival. The EIPCs of this sector presented the air pollution problem in a highly dramatic way, that is similar to what the authors who focus on the claim-making process analysed in Chapter I view as a necessary condition for the ability of an environmental problem to attract public attention. These two groups of actors agreed over their perception of air pollution as a real danger that threatens human beings and nature. However, Green activists believed that the main culprit for the severity of air pollution problem was government.

On the other hand, the EIPCs of representatives of the business sector provided a different and contrasting view of the problem. In their view, air pollution was not as serious as the Green activists claimed. In fact, air pollution, as a menacing problem of survival, appeared in businessmen’s perception as an invention of politicians and Green activists, who were merely seeking to obtain public support and achieve legitimisation while appearing to protect the public from a dramatic
problem. For this sector, it is because Green activists were so receptive to international environmental discourse, that these ideas had gained currency in Mexico. According to the constructions of this sector, air pollution was relatively harmless and only artificially significant. Most social actors’ EIPCs considered Mexico City’s air pollution important. However, actors disagreed over the importance they placed on the problem. Some of them, such as government officials and academics, considered that air pollution was a serious problem. Nevertheless, despite acknowledging its importance, they were somewhat cautious in expressing this perception. However, there were other constructions of the problem that ranged from the denial of its severity to its dramatisation. The former were exemplified by entrepreneurial perceptions, the latter by Green activists and political party perspectives.

Both the perception of the factors determining the emergence of air pollution problems and the importance that actors gave them are socially constructed. They are not determined by their magnitude as registered by existing data but by a broad range of perceptions that lead to a different way of constructing the problem. It is assumed here that ideology appeared in all the dimension analysed in Chapters I and II. First, as a constitutive element of society, since the shared fear of air pollution appears to unify people. Second, as the expression of relations of power, because the magnitude of Mexico City’s air pollution demands the concealment and manipulation of facts by interested economic and social groups. Third, as way of finding out about social facts that emerges when social actors show a grasp of the problem according to their condition of specific actors and, in short, are influenced by their social condition.

\textit{b) The severity of Mexico City’ air pollution problem.}

All social actors’ EIPCs perceived air pollution as an important problem, but not all of them believed that it was really severe. There were two contrasting positions on the matter. First, government and the entrepreneurial opinions agreed that problems were not as serious as they appeared in environmental discourse. However, the reasons behind their assertions differed. For the former, air pollution was not severe because of government intervention and for the latter, the severity of the problem was a dramatic, apocalyptic image disseminated by the Greens.
Government and representatives of the business sector also coincided in wishing to exonerate themselves from responsibility for the problems. The former, because it stated that official programmes were reducing air pollution; the latter, because they held that other sectors were the main culprits.

The second contrasting position was held by most of the others actors, namely academics, Green activists, political parties and international representatives. This does not mean, however, that all of them perceived the problem in the same way. Academics and the Greens' EIPCs, for example, were the closest yet with significant differences. For the academic sector, air pollution was a more serious problem than it appeared in government discourse. Academics detected attempts on the part of government to conceal the magnitude of air pollution for the purposes of legitimisation and to prevent them being regarded as the sole culprits. However, according to the academics' perception, society as well as government had the will to conceal or deny the problem. Academics perceived that people denied the problem as a socially constitutive element because they felt defenceless. On the other hand, Green activists portrayed the problem as not only severe but also dramatic and menacing. For this sector, both government and the business sector were the main culprits and both seemed to be conspiring to prevent the disclosure of the magnitude of the problem. As part of this conspiracy theory and dramatisation of the situation, they considered themselves the witnesses of certain highly confidential studies in which the severity of the actual magnitude of air pollution damage is documented.

Political party representatives agreed over the severity of the problem. The ruling party alone stated that the problem was not that serious. For the international representatives, air pollution constituted a major problem in the city. As proof of this, one of them mentioned the salary policies of their countries that paid them a supplement for living in heavily polluted cities such as Mexico City. Both sectors cited government as the main culprit as regards the magnitude of the problem, although one of the international representatives added that society was also responsible for practising a culture of corruption that encouraged people to pay bribes rather than comply with the law.

The diversity of opinions and the factors included to explain either the severity or the unimportance of air pollution reflected a social construction of the problem that introduced a wide subjective aspect into the appreciation of the problem.
c) The magnitude and the importance of air pollution vis-à-vis other environmental problems.

The majority of the social actors' EIPCs coincided as regards the magnitude of air pollution. However, they disagreed over the importance of air pollution in relation to the rest of environmental problems. Both academics and government officials diverged in the way they ranked the problem. Some of its members considered air pollution to be the main problem but another group thought that water should be the prime cause of concern. Others mentioned sewage, hazardous waste and soil erosion and pollution as the most worrisome problems. However, when describing the problem in greater detail, both sectors provided elements for establishing differences between air and other problems. Government officials who viewed air as the main problem, emphasised the short and long term health consequences associated with air pollution and the harm caused to all the social groups. Those in this sector who regarded water as the main priority pointed to the exhaustion of water courses, the desiccation of water bodies, pollution, economic costs and water waste. The academics who consider water the main problem argued that water problems were minimised because of lack of knowledge, and sensorial difficulties in appreciating water pollution and the economic costs of the latter, its scarcity and pollution. Members of this sector who cited air as the main problem stated that air pollution was more severe than official data suggested, affected everyone, was denied by government and had not been fully analysed. In this respect, Green activists went even further in describing the magnitude of both air and water problems by accusing government of concealing key information that demonstrates that both water pollution and PM are killing people in several parts of the city.

One important difference between government officials' and academic EIPCs entails the special emphasis that the former gave to the prioritisation of the problems, while the latter were more concerned about explaining why air pollution, despite not being the only air pollution problem in the city, had gained the reputation of being the main problem. For them, air, water and hazardous waste were significant, worrisome problems, yet none of them except air had been analysed in any detail. Academics stated that the daily report on air quality and the dissemination of scientific knowledge had been decisive factors in explaining the bias toward air pollution. They found that not only the general public but also government was
biased toward air pollution.

This scenario of a variety of environmental problems, in which air was not minimised as a significant problem but ranked differently by social actors, was made more complex by the EIPCs of the other actors. For example, for some entrepreneurial representatives, water rather than air was the main problem. For them, air was primarily regarded as important because of public perception. They did not feel that there was sufficient proof of the health risks of air pollution. For one of these actors, air pollution was not only a problem of Mexico City but of many other cities around the world and people should not worry too much about it. Some international representatives regarded air as the major environmental problem in the city, but expressed concern about both government and the public's ignorance about the existence of environmental problems other than air.

Despite their different perceptions of the problem, all the political party representatives agreed that air pollution was the major environmental problem in Mexico City. In their view, the causes that had made air pollution so severe ranged from the more general, such as the national model of development and patterns of industrialisation, urbanisation, demographic concentration to the more specific, such as fuel consumption and the irrationality of the transport system.

This was one of the most hotly disputed aspects of social constructions concerning air pollution. It also provided an opportunity of discovering the various social factors that influenced the appraisal of environmental and air pollution problems as a matter of public concern. The social dimension of environmental problems emerged here in more detail, particularly as ideological and political constructions. These constructions included the need to select the problems to be addressed by government, which in turn would determine whether air or water would be regarded as the most worrisome problem. They also included the academic position of placing importance on all the environmental problems of the city without denying the magnitude of air pollution, while waiting for more knowledge on other areas of problems. At the same time, Green activists depicted air and water as dramatic problems, blaming government and the business sector for concealing the details of their magnitude. Political parties were the only sector that was firmly convinced that air pollution was the main problem, an appreciation that seemed to reflect a political need to agree on one general perception, commented on by some actors, which cited air pollution as the single most worrying environmental problem.
in the city.

d) The credibility of the government's will and technical capacity to solve problems.

EIPC's varied regarding the credibility that actors gave to the government’s will and capacity to solve Mexico City’s air pollution, even among government officials. The most extreme perceptions were found among Green activists and international representatives. For the former, there was a lack of will to solve problems in addition to problems of capacity. For the latter, government had both the will and the capacity. Moreover, they rated government performance in environmental issues positively. In their view, the Mexican government was dealing with the problems in time and its well-trained officials and the appropriate measures taken by government had prevented problems from being exacerbated.

The remaining social actors' constructions were situated in the middle of these extreme air EIPCs. Government officials and academics shared some common perceptions of government will and capacity. Most of them offered a heterogeneous mixture of comments on its will and capacity. Some stated that it had the will but not the capacity; while others said that it had the capacity but not the will to solve problems while others believed that it lacked both. Some actors in both sectors felt that solving the problem was not only a matter of will but also of the social and political context surrounding air pollution. Both sectors mentioned social factors and even in government an actor talked about the need for a societal will to perceive and address air pollution problems as a condition for solving the latter. However, it was in the academic sector that most elements concerning the social construction of air pollution were revealed. For some academics, it was not only a matter of will but also of the capacity to deal with economic and political interests and of a clear understanding of the real causes and consequences of air pollution. For other academics, government was extremely confused about environmental issues. However, the academic sector was also aware of other aspects involved in addressing air pollution. One of them was that despite having the necessary will and technical capacity, some government officials lacked the experience required to deal with bureaucratic and political issues. They are trained to solve non-political issues, but air is a highly political matter, meaning that government officials were overwhelmed
by the situation. Academics, Green activists and the most radical political party representatives coincided in regarding government solutions to air pollution as purely rhetorical and unlikely to be implemented if they affected its economic and political interests.

The entrepreneurial representatives’ EIPCs comprise some of the elements mentioned earlier. They were uncertain about the government’s will and capacity, tending instead to focus on technical capacity rather than on the social and political aspects surrounding air pollution. One of these actors was convinced of the will and capacity of government, citing government success in reducing certain pollutants as proof of this.

Most actors agreed that government failure to solve problems was more a question of lack of will than lack of capacity. Interest, corruption, the lack of a clear, broad understanding of the problems, the inability to deal with political issues and the need to place greater priority on other vital, non-environmental problems were mentioned by the actors as the reasons behind government failure to solve problems. All these aspects reflected the ideological, political and therefore social construction of the perception of environmental and air pollution. However, it was academics and government officials who offered the broadest social elements for including a social dimension of air pollution.

\[ e) \quad \textit{Government room for manœuvre in solving problems.} \]

It was widely agreed among social actors, except international representatives and one member of the ruling party, that government lacked the room for manœuvre required to solve air pollution. However these social actors did not refer to the same factors and circumstances when talking about government difficulty in taking effective action against air pollution. For example, government officials focused on institutional and juridical obstructions within the government structure, that prevented them from carrying out their regulatory work. On the other hand, academics, Green activists and political party representatives attributed the government’s lack of room for manœuvre to factors outside institutional government arrangements. In their view, economic and political interests, such as public transport companies, factories and the car industry were the real forces that determined government policies and programmes. From a different perspective, business
representatives identified the political forces preventing government from making decisions as the political and Green organisations who attacked non-existent problems and created culprits to satisfy their own needs for legitimacy.

Government officials claimed that they lacked an adequate institutional structure to introduce environmental criteria throughout the sectoral planning structure. They recognised the integral nature of environmental problems and the need for an integral planning process but encountered sectoral resistance to thinking and acting on the basis of this approach. However, most non-governmental actors had an answer to the problems faced by government when addressing air pollution. Most of them agreed that government did not want to have room for manoeuvre. The ability to make decisions can be created with social support but government was not interested in taking advantage of this political power from society. To have a more adequate institutional arrangement and the power needed to counteract the economic and political interests behind air pollution, government would have to incorporate citizens into the planning system and use public involvement as the empowering force to oppose the polluters' power. An international representative commented that this public involvement in environmental policies had been the key factor in cleaning up the environment in his country.

Some actors in the business, political party and international sectors believed that government had enough room for manoeuvre. In the opinion of one transport entrepreneur, government had sufficient room for manoeuvre and actually over-intervened in environmental affairs. The ruling party representative thought that government had a wide enough margin of action and believed that it was gaining ground in a neglected area of public intervention. In the eyes of one international representative, government officials were a group of courageous and decisive people who were determined to improve the environment despite the many obstacles around them.

When observed in detail, what appeared to be a general agreement on the many obstacles faced by government in addressing air pollution, showed significant differences. A broad social perception and constructions of the various factors involved in the obstacles to decision-making emerged when actors expressed their EIPCs. Government appeared to be trapped in a perception that was highly dependent on its own governmental sphere. All the obstacles government officials found were related to the government's institutional structure. Conversely, non-
governmental actors did not attach too much attention to obstructive institutional factors, but rather to private interests and the lack of government will to modify the obstructing social and government structure that prevented it from implementing more effective measures to address air pollution. The factors preventing the reduction of air pollution appeared to be social and political while the EIPCs themselves revealed their social nature because of their wide subjective spectrum.

f) *The importance given to science in government air pollution policies.*

There were two main, contrasting positions on the role of science in the planning process. One was held by government officials and the other by all the non-government actors. According to government EIPCs, the role of science was decisive in Mexico City's policy-making process. According to government perception, both communities, i.e. government officials and academics, worked together and were respectful and understanding of each other's needs. Most government officials said that they always sought the advice of the scientific community in any decision-making. They noted that some current government officials used to work in the academic sector. There were common consolidated teams and research agendas between both sectors.

However, for one local official, although it would be useful for government to take scientific advice while designing air pollution policies, it was not always possible to do so, since academics failed to investigate key aspects of air pollution. In his view, the research interests of scientists were somewhat generic while government needs for knowledge were highly specific. In general, however, government officials stated that unless knowledge was unavailable, they based their decisions on scientific findings.

Non-governmental actors disagreed with this perception, with the academic community being particularly critical of the negative government attitude toward scientific knowledge. For most of them, science should be central to the policy making process, although this was not the case at the time. Some of them said that the participation of the scientific community in the Metropolitan Commission for Environment, the top metropolitan environmental authority, was little more than a farce. This authority only called on them to legitimise decisions that had already been taken. They never received the documents in advance and government never
paid attention to their recommendations. But even as regards scientific findings in government-funded projects and institutions, academics perceived an unwillingness on the part of government to incorporate that knowledge into the planning process. Some academics were aware that decision-making in a conflicitive area of government intervention, is not only a matter of possessing knowledge but also of the social conditions that influence the planning process. Most academics, however, felt that government used scientific discourse to legitimise its actions rather than to make decisions on the basis of scientific findings.

Despite some variations, the remaining non-government actors agreed with these perceptions by the academic sector. For representatives from the business sector, science should be the main basis of the planning process, although this was not the case at the time. For the Green activists, political factors, corruption and government censure of scientific findings, were the main reasons that prevented government from supporting its decisions concerning science. For most political party representatives, science should be the key factor in decision-making, although they thought that government officials did not welcome science, because its purpose is to discover the main causes of pollution, whereas the government's role is to protect polluters. Most international representatives felt that government was reluctant to base its decisions on science, particularly international findings, using the argument that the Mexican case was different.

Apart from government, all the actors interviewed agreed on the inadequate use of science by government. Science appeared as a legitimising tool in the hands of government. From this perspective, government decisions are made according to the rules of economic, ideological and political factors rather than based on scientific findings. Some academics and other actors mentioned this social influence of the planning process and the necessary yet insufficient conditions of scientific facts in the policy-making process.

g) The objectivity of existing knowledge according to the actors involved.

All the social actors' EIPCs coincided in rating the quality of existing knowledge on air pollution in Mexico City positively. Nevertheless, these agreements concealed certain key disagreements and contrasting perceptions on the role of objective knowledge in the search for solutions to Mexico City's air pollution
problem. For example, government officials were quite certain that existing knowledge on air pollution was objective, and that it constituted the main basis of the policy-making process in the city.

The problem for them was not objectivity per se, but the choice of the topics to be investigated. They believed that the academic sector was not investigating real, concrete or urgent air pollution issues. They felt that the research done in the government institutions was better since it addressed the practical needs of the planning process. Government findings were reliable since they had helped to eliminate certain pollutants from Mexico City’s atmosphere. Government officials were anxious to create an impression of planning activity as a process guided by the certainty yielded by scientific knowledge.

The view offered by government EIPCs contrasted with that of the academic sector. According to these actors, existing knowledge on Mexico City was good although there was a problem of lack of communication between the two sectors. They felt that government was unaware of the research agenda drawn up by the academic sector and that academics had no effective participation in the planning process.

Nevertheless, the academic sector wielded another kind of argument to show that the problem of knowledge concerning air pollution was not a matter of having objective knowledge, but of the current features of this knowledge. On the one hand, knowledge appeared to be hotly contested and disputed. There was not one but many different scientific truths. Decisions were made in an atmosphere of uncertainty. On the other hand, scientific knowledge could be different from and contrasted with the official version. Official knowledge used in decision-making was accused of creating additional problems when translated into government decisions. According to one actor, an institutional planning structure could be created not to shed light on a problem but to conceal it, as was the case in Mexico City. Nevertheless, the academic perspective was criticised by one actor. He denied the objectivity of existing knowledge because of its improvised nature and the lack of a self-critical attitude among the scientific research community. Like the government officials interviewed, he noted that most academics working on the environment had no experience in the field. According to some academics, decisions were determined by political rather than scientific factors.

The rest of the non-governmental actors shared the widely-held view that the
government should base its decisions on science, although the majority criticised the government's handling of scientific research. Business representatives were particularly critical of the government's misuse of scientific findings. In the Green activists' view, both government and academic agendas were biased, since they focused on certain problems while neglecting others. An additional problem observed by this sector was the alteration of official data on pollution, which included censuring any scientific findings that might expose polluters and the lack of communication between government and the academic sector. For the international representatives, knowledge should obviously be used in decision-making, although they found that the main problems included the lack of a sound planning system, problems of enforcement and corruption. Political party representatives felt that knowledge was useful but say that the problem was not unsound knowledge, but rather the lack of research funds, the neglect of certain crucial research areas, the lack of communication between academics and government and lack of congruence between scientific findings and the planning process.

EIPCs regarding the quality of the knowledge reflected the various social aspects linked to air pollution. What emerged from the perspective of the actors interviewed were the social, political and scientific factors that intervened in the generation of knowledge and in its utilisation in the planning process. For most actors, the problem of the relationship between knowledge and government decisions, was not only a matter of effective knowledge, but of the social and political factors that determined the production and utilisation of scientific findings to support the planning process.

**h) The possibilities of clean up Mexico City’s air.**

The majority of social actors agreed over the possibility of solving air pollution. However, their levels of optimism varied, and for some actors was highly dependent on a set of social and political conditions. For government officials, most measures for solving problems were restricted to the government sphere. They mentioned the need to overcome institutional resistance to working together in the sectoral structure. To achieve this, some actors proposed raising awareness among the different sectors and officials of public administration. For these actors, what was required to solve air pollution was to create a large governmental team to work with
shared sectoral interests on environmental problems. The other social actors, particularly the academic sector, had different ideas on how to solve air pollution. For academics, the solution did not only lie in the government’s institutional structure, but was also to be found at the social and political level. In this context, the implementation of radical measures despite the political interests protecting major polluters, a strategy to for achieving public involvement and the implementation of programmes to raise awareness among the general population, were regarded by the academic sector as essential measures for solving air pollution. Polluters must be penalised and the general population must be informed of the benefits of adopting government policies.

The rest of the non-governmental actors also believed in the possibilities of cleaning up Mexico City’s atmosphere. However they focused on government responsibility, either as regards its failures or the possibility of cleaning up the air. The entrepreneurial sector believed it was possible to clean up the air, but thought that this would require raising people’s awareness and preserving the viability of the entrepreneurial sector as the main producer of wealth. No measures would have to be implemented to affect this sector’s social role. Green activists also believed it was possible to solve air pollution, but thought that it depended on the government’s will to enforce the law and place the public interest over those of major corporations and other polluters. For the political parties, it was possible to achieve better air quality, but government would have to be committed to environmental causes rather than to economic and political interests. This sector regarded government as a hostage to the various political groups involved in air pollution. Without an effective regulatory authority, these groups were free to destroy the environment. For the international representatives, there is no possibility of cleaning up the air because resources were not used efficiently, and there was no communication between those working for a better environment in the different sectors of society.

The possibilities of solving air pollution in Mexico City exist in the EIPCs of all the actors interviewed. However, the social actors thought that this possibility was determined by a variety of social factors. The way solutions are constructed reflects the social dimension that must be incorporated in the planning process. For some actors, such as government officials, the intervening social factors are restricted to the government sphere. For non-governmental actors, these social factors are derived from the different spheres of social life.
i) **Obstacles and solutions to air pollution according to the actors**

Social actors’ EIPCs contain some concrete examples of obstacles and other rather general ideas for solving air pollution in both government and non-governmental spheres. Government officials are polarised between those who focus on a wide range of solutions that include both social and technical proposals and those who focus mainly on technical solutions. There is no general rule, but those with a broader perspective usually work in federal offices, while those who have a more restricted approach, tend to work in local offices. The former perceived political and social interests as the main obstacles, but thought these interests existed in both government and society. They mentioned the need to take technical and political measures, but called for no extreme or radical measures that would affect the economic viability of the country or the city. When talking about obstacles, they also included the cumulative effects of the many years that air pollution failed to be addressed by government. The latter focused more on such problems as the inadequate distribution of the budget, the increasing numbers of cars and people living in the city, and certain specific measures for improving the public transport system. Neither group of government officials probed more deeply into the social, economic and political factors around air pollution.

The obstacles and solutions contained in academic EIPCs have a wider range of factors but also include more general proposals. They began by criticising certain general aspects such as what one of them called the neo-liberal model of development and ended up criticising the entire planning system. In between these aspects were some of the other obstacles and solutions they mentioned. This is the case of obstacles to solving air pollution such as economic and political interests, lack of awareness in both government and society as well as in the academic sector, problems of approaches and the lack of understanding of the causes and consequences of air pollution. However, not all the academics interviewed shared the same perspective. Moreover, they were unable to suggest more practical, articulate proposals when asked to. Most of the non-governmental actors mentioned some of the same obstacles and solutions pointed out by government and academics, yet with varying degrees of emphasis. The Green activists mentioned other obstacles and solutions such as corruption, the need for a more coercive environmental authority,
that would really enforce both the law and environmental standards.

EIPCs in relation to the perceived obstacles and solutions do not permit the reconstruction of any concrete policy or programme for dealing with air pollution. Both government and non-governmental sectors showed a lack of clear, concrete measures for dealing with pollution. The answers given by most of these actors, including academics and government officials, consisted of vague generalisations.
Conclusions

Mexico City’s air pollution has been measured with a certain degree of accuracy. Official data, however, have been criticised for underestimating the total amount of pollutants discharged into Mexico City’s atmosphere. Official data have also been criticised for their failure to include certain toxic contaminants that, according to some specialists, pose the greatest threat to human health.

In this context, the four million tons of substances expelled into the atmosphere annually could be increased with the inclusion of these other substances. According to data from 1996, ozone standard violations occurred on 90% of all the days in the year while suspended particles standard violations occurred on more than 50% percent of all days. Although carbon monoxide and hydrocarbons are under control, they represent a vast amount of substances that, despite harmless to humans, are dangerous to ecosystems, at not only the local but also the global level. Existing data also enable some of the major air pollution sources to be identified. As analysed in Chapter III, 75.5% of the pollutants that generate ozone are produced by the transport system and 12.5% by industry and services. However, industrial activities are responsible for a large proportion of the most toxic pollutants released. At the very least, Mexico City’s air pollution can be classified as a serious problem.

As far as the health consequences of air pollution are concerned, increasing evidence has emerged on the health damage caused by pollution, as described in Chapter III. Many social sectors have been affected by certain substances or by a combination of the latter. Lead, ozone and suspended particles are the main substances responsible for specific damage to the general population’s health and to specific groups such as women, children, and the elderly. Few specialists disagree over the negative consequences of air pollution on health and the quality of life in general.

It is assumed in this research that if any doubts existed regarding the reliability of official data in terms of the magnitude of air pollution, its sources and its effects on human health, they would concern the minimisation of the problem by official data rather than its overestimation. Data from the 1970s and 1980s estimated that air pollution was even greater than at present. Some official sources reported five
270

million tons of substances being discharged into Mexico City’s atmosphere in the mid-1980s. Awareness of air pollution was not greater then than it is now. It was only later, in combination with other social circumstances, that people began to talk about environmental problems.

On the other hand, and in relation to the ideas expressed in Chapters I and II, particularly in the context of environmental risk as a social construction, problems such as air pollution do not merely become an object of concern because of their physical presence, however significant this may be. Within the context of the framework presented in Chapter II, it is assumed here that socially shared values lead to specific and often highly differentiated, concrete perceptions. However, these perceptions are also influenced by the individual, group and institutional reconstruction of environmental problems on the basis of their concrete ways of life and social positions. In the case of air pollution and general environmental risk, two important aspects should be mentioned. On the one hand, air pollution constructions can, in some respects, be regarded as the result of the activity of certain socially recognised agents, such as government and the scientific authorities, responsible for determining what should be regarded as a matter of public concern in environmental issues.

What the population perceives and reconstructs as an environmental problem is partly mediated by these two sources of authority. At the same time, however, it is not only the general public but also those who certify risk (government and scientific authorities), who are influenced, in some ways, by the rest of the social actors involved in various ways in the problem of pollution. This was the case of the other sources of social construction and transmission of environmental images analysed in this research, such as the entrepreneurial representatives, who shaped their environmental images, using, among other elements, the group ideology of the producers of social wealth; the Green activists in their role as consciousness raisers; political parties in their role as mediators of social demands and international representatives in their role of providing financial and technical assistance. Interests, values, perspectives, different levels and kinds of knowledge contribute to the images and constructions of the various problems faced by social actors in their everyday lives. Even actors regarded as experts are exposed in varying degrees to this way of
experiencing, perceiving and constructing collective problems such as air pollution. Within this context, it is possible to speak of the social construction of environmental problems. For the analytical purposes of this research, these constructions have been called Environmental ideological and political constructions (EIPCs).

Chapters I and II mention that the three main dimensions of the EIPCs are linked to the constitution of society, power and knowledge. From this perspective, air pollution as a social construction has to do with these three aspects of ideological influence.

It is assumed in this research that all these perceptions and constructions of air pollution problems as EIPCs also include a definition of what is true and good, as well as the people who are authorised to talk about them. For this reason, when creating their air pollution constructions, social actors and the general public must also include the socially shared values of what is true and good. Environment, air quality and the quality of life emerge as socially-produced conditions of life assumed and processed by individuals, groups and institutions with specific characteristics.

This is what is meant by the will to perceive something as a problem. Air pollution may or may not be perceived by social actors as a problem. It may also be classified as important or otherwise. Unless social actors regard it as a significant problem, they will do nothing to solve it. If they feel it is important, they will compare it with the rest of the problems they have to deal with in order to decide how much they would be willing to pay for a better environment. Different levels and degrees of environmental quality exist for individuals, groups or countries. This is what determines whether or not people include environmental quality as part of their social demands.

In this context, actors’ answers to questions on significant aspects of Mexico City’s air pollution revealed a social construction of air pollution, since, on the one hand, their answers revealed a wide variety of perceptions and constructions on the same subject, while reflecting significant disagreements over specific aspects of air pollution. On the other hand, even among members of the same sector, actors disagreed over certain basic aspects of air pollution, creating an image of air pollution problems as something drawn from actors’ own ideas and assumptions.
rather than from the physical presence or amount of pollutants described by official data.

Environmental perceptions and constructions produced in this way are the result of argument, debate and disagreement. Certain existing consensus constructions reflect shared constructions, but even these contain a wide range of subjective variability that does not allow one to speak of a monolithic, undisputed discourse surrounding a physical problem.

This subjective variability reflects the social facts derived from specific ways of experiencing and perceiving problems, and in this respect it refers to a form of reality distinct from its physical nature. These environmental social constructions are ideological and political because they contain elements of social constitution, as in the case of a shared attitude of concern over or denial of air pollution problems by the social actors interviewed in this research. In the same way that the notion of ideology is analysed in Chapters I and II, these EIPCs express perceptions linked to specific interests and points of view derived from individual, group or class perspectives by means of which social actors express some of the essential aspects of their social condition. These are not the only ideological content of groups or institutional EIPCs, but they appeared at some point during the interviews.

In the entrepreneurial sector, the emergence of this ideological element linked to private perspectives and power is more evident, particularly as a result of the insistence of certain members of this sector on presenting themselves as not responsible for pollution, revealing environmental points of view clearly identified with their group points of view. In fact, however, a similar thing happened with the rest of the social actors when their individual, group, class or institutional identity and perspectives emerged at some point in their discourse. One example of this was the government official who focused all the solutions to air pollution on aspects of institutional arrangement and co-ordination. Moreover, although he defended the reliability and usefulness of the knowledge produced by government, he criticised what he considered to be irrelevant studies undertaken by the academic community. When dramatising environmental problems or defending their role as claim-makers and environmental consciousness raisers, Green activists identified themselves as a different and necessary group. The representatives of political parties, when not in
power, used their criticism of government and certain economic and political groups, to carve out an identity that allowed them to capitalise on citizens' will, a vital element in their quest for electoral support. It is symptomatic that political parties regarded air pollution as the single, major environmental problem, an assertion that, in the view of the remaining social actors, warranted at least some clarification. Political parties seemed anxious to agree with the widely held view that air pollution was the main air pollution problem. International organisations also expressed their identity and their group or institutional interests, at some point in their EIPCs, by emphasising the relevance of their economic and technical assistance. However, ideology as the expression of a group's interests does not always appear as mechanically associated to a particular group or actor. In some occasions, actors from various sectors expressed an opinion that was not representative of their material positions. Some entrepreneurs or government officials, for example, recognised their own responsibility in air pollution.

Ideology as a form of knowledge was also present in all the EIPCs of the actors interviewed. Every one of them, from entrepreneurial representatives to government officials, and including international representatives, political parties, Green activists and the academics showed a wide variety of types of knowledge. These ranged from those drawn from everyday life that reflected shared social values to those derived from group, individual, class and institutional positions. EIPCs also comprised various types and levels of scientific knowledge. The differences in the level and quality of knowledge they had, however, rather than being an obstacle to understand the different aspects involved in air pollution, appeared as different pieces that allow the reconstruction of the jigsaw. They expressed in some ways opposite perspectives on air pollution, but these perspectives, even being contested, can be seen as complementary.

All these ideological and political components of social actors' ways of experiencing and perceiving air pollution, reflecting a socially constructed fact, were present in varying degrees in the actors' answers to the various aspects of air pollution included in the empirical material of this research.

The purpose of this research was to investigate certain aspects of the social dimension of environmental problems. Situated in the field of social sciences,
particularly in the area of research opened up by social thinkers who analyse reality as a social construction, the research seeks to contribute to studies that analyse various aspects of the social construction and emergence of environmental problems. Within this theoretical context the analytical interest of this research was to explore this social dimension of environmental problems, particularly air pollution. Exploring the social nature of problems such as air pollution does not entail denying or minimising their physical or technical aspects. However, it does involve incorporating an additional area of research with the same analytical legitimacy into air pollution programmes to make them more effective in dealing with the problem. Two hypotheses have been tested in this research. The first affirmed the lack of an adequate social dimension in official air pollution programmes for Mexico City between 1979 and 1996. Chapter IV provides the elements for testing this hypothesis. The second hypothesis affirmed that a social construction of air pollution existed in Mexico and that this construction could be found in the way various key social actors perceived and reconstructed air pollution problems. Chapter V presents an analysis of the empirical data for testing this hypothesis.

In relation to the first hypothesis, analysis of the three main official air pollution programmes revealed the social handling of air pollution by government. The 1979 PCMCA, was the first official air pollution programme analysed. The explanatory elements of this programme, as explained in detail in Chapter IV, focused on the physical-chemical-technical characteristics of pollution. All the explanation remained at what has been defined in this research as Level 1 (the technical dimension) of analysis. There are certain elements that could be regarded as components of a Level 2 of analysis (the social dimension), such as demographic, industrial and vehicular concentration and the amount of fuel consumed. However, these elements were simply additional items and served no explanatory purpose. The main failure of this aspect was the absence of links between what was described as the physical causal factors of air pollution and what was presented as its social causal variables. There was no analytical order between the two levels that would have allowed a causal relationship to be established. The social elements included in PCMCA excluded social agents, the distribution of resources and relations of power. In fact, demographic, industrial and vehicular concentrations are the consequences of
social factors, but the programmes regarded these concentrations of activities and things as causal elements in themselves. Most of the solutions proposed by PCMCA reflected its physical-technical approach. Consequently, it lacked any measures to address its social causal factors. PCMCA did not have the institutional structure necessary to implement its proposals. For example, at that time, Mexico City authorities did not have an office to deal with environmental problems. Instead, there was a federal health authority responsible for local environmental affairs. This was symptomatic of a city with a severe air pollution problem. At the same time, lacking any conceptualisation of the integral nature of air pollution or the institutional structure to carry out an environmental planning process, PCMCA devised an inter-sectoral strategy in which most sectors of public administration had to participate. PCMCA established, classified and distributed actions for the various government offices of public administration, at both local and federal levels. However, this strategy had two drawbacks. First, this sectoral assignation of tasks was not the result of an analytical effort to explain the comprehensive nature of air pollution. Second, PCMCA lacked the authority to enforce its proposals and measures and had no mechanism for surveillance, administration or sanctions that would have given it control over its proposals for action. In short, PCMCA did not have the social and political actors, an analytical justification of its sectoral proposal and or the institutional structure to undertake its sectoral strategy. Moreover, there was a lack of congruence between what its diagnosis established as the causal factors of air pollution, and some of the concrete measures implemented. After the programme had been implemented for a number of years, air pollution data actually recorded an increase.

In the midst of what was regarded as an environmental crisis, PICCA was launched in 1990. When this programme was drawn up, two factors meant that it had a greater likelihood of success. One was the availability of scientific findings on the causes and consequences of air pollution. Another was the elaboration of the first rigorous Emissions Inventory containing information on the main sources of air pollution in Mexico City. PICCA included further elements to explain air pollution. It presented physical-technical factors combined with social elements, in other words, Level 1 and Level 2 factors, as defined in this research. PICCA introduced
more explanatory factors such as industrial processes and their relation to technology, combustion systems and anti-polluting technologies. For PICCA, pollution was the combined result of industrial processes, services and the transport system. It also introduced more general social factors to explain the increasing magnitude of air pollution, particularly industrialisation and urbanisation and described other socio-economic factors. But what appeared to be a social explanation of air pollution was not strictly social. For example, it focused on the vast concentration of processes, activities, factories and cars. The problem of transport was reduced to counting the number of vehicles and the number of motors repaired and measuring the amount of fuel consumed. The transport system was not analysed as regards its modal structure, its economic dimension or the political factors and actors involved. There was no possibility of transcending the first level of analysis, in other words, the physical-technical level and moving onto the second, socio-political level, because even what appeared to be social was technical since there were no social dynamics, actors or political forces behind its constituent social elements. PICCA had the necessary instrument to go beyond its technical nature. It had an Emissions Inventory that described the main sources of pollution, classifying human activities (transport, industry and services) and natural sources. The data content in the Emissions Inventory enabled sources to be linked to economic activities (industrial processes, modal structure of transport) and economic and political agents. Analysing these links is what permits the transition from the first to the second explanatory level. A social explanation of air pollution obviously has to include social agents to effect the transition from the level of the physical and technical existence of problems to that of a socio-economic and political nature.

PICCA focused all its proposals for action on some of the technical aspects analysed in its diagnosis. However, the main political measure implemented by PICCA was fuel quality improvement. The programme was only partially successful. It reduced the SO2 and lead content in petrol. Nevertheless, other substances such as ozone and hydrocarbons increased. PICCA had a more adequate institutional structure. Local authorities already had an environmental office and, at the federal level, more environmental institutions were created. The legal framework was also more appropriate for dealing with environmental problems. The technical proposals
for action implemented by PICCA were congruent with the technical nature of its diagnosis: both belonged to level 1. Neither economic processes nor economic and political agents were included in PICCA’s analysis and proposals. Consumption was emphasised yet no significant mention was made of production. Sectoral proposals focused exclusively on the institutions involved with the technical aspects of the problem such as CFE (the Federal Electricity Commission) and PEMEX (the State oil company).

Proaire was publicly launched in 1996. The programme appeared to have overcome the traditional technical approach to air pollution adopted in government environmental programmes. Apart from presenting a broader physical-chemical-technical perspective, it also included a greater number of social factors. The former showed a deeper understanding of the physical and chemical behaviour of pollutants, meteorological dynamics, energy consumption, fuel quality, technology and controlling emissions in industries and vehicles, etc. The latter included references to economic, social, cultural and political factors.

Proaire exemplified what is understood here as a lack of social and political explanatory factors although social phraseology was introduced. The social conception of Proaire lacked the idea of social processes and failed to incorporate real social actors. The urban order was seen as the result of co-operative forces living in harmony. There was no conflict because urban citizens were only analysed within the sphere of consumption rather than as producers, and as participants in various social dynamics in which people not only co-operated but also competed with each other. Proaire idealised the urban order which it conceived as a co-operative order in which all the social actors, despite their differences, lived together with no substantial expressions of conflict.

However, in other parts of its diagnosis, Proaire also included certain isolated elements of a more integrated approach to environmental problems. At times, its discourse was environmentalist, at other times, it introduced the idea of the systemic nature of environmental problems, and it even mentioned economic, social, political and cultural aspects of air pollution. The other programmes analysed here cannot compete with Proaire in terms of the number of factors regarded as significant.
However, this inclusion of social and environmentalist perspectives served no analytical purpose. Proaire provided no reflection on the many aspects involved in the air pollution problem, framed in the concepts provided by the social sciences and the environmentalist approach. Proaire referred to social and environmentalist words and phrases rather than to concepts and explanations.

Since the diagnosis failed to incorporate real social actors, institutions and processes, the proposals for action were not designed to deal with the political influence or interests of major polluters. Proaire had the most sophisticated institutional structure for dealing with air pollution, the most recent scientific findings, the most detailed data on the sources of air pollution. However, its inclusion of social elements was non-analytical and it did not specify the political nature of air pollution issues, particularly in the policy-making process.

The period between 1979 and 1996 saw significant changes in Mexico City, as regards both environmental, socio-economic and political aspects. In environmental terms, a new awareness began to emerge in certain sectors of society. International images of ecological destruction, daily air quality reports, scientific findings released by the national and international scientific community and disseminated by the media, combined with the sensorial perception of the poor quality of Mexico City's air, were factors that contributed to the emergence of air pollution and environmental problems as a matter of public concern, in certain sectors of society. A number of important changes also occurred in social, economic and political terms. Changes in the quality of fuel consumed in the city led to changes in the composition of substances released into the atmosphere by economic activities. New technologies were introduced in factories and cars, which had a significant impact on the local atmospheric basin. Moreover, the economic, social, cultural and political changes that had taken place in Mexico during the past two decades, especially in Mexico City, modified the social structure and relations between political forces. New social and political actors emerged on the local and national scenarios. These new actors and the new social and political atmosphere were partly responsible for public interest in environmental issues.
However, neither the diagnoses nor the proposals for action of the three air pollution programmes implemented during the period considered here, managed to incorporate this changing situation. With a few rhetorical changes, particularly as regards the inclusion of more elements, both technical and social, the three programmes restricted the sphere of analysis and government intervention to the level of the physical and technical existence of problems. The general conception formulated by PCMCA (1979) was maintained in the most recent programme, Proaire, (1996). Most aspects included in the diagnosis and proposals for action in the last programme focused on the three main sources of air pollution identified by PCMCA in 1979: transport, industry and natural sources. When analysed for intervention purposes, all three programmes showed a lack of analysis of the socio-political forces and actors behind air pollution.

Proaire was the most comprehensive programme. It incorporated economic, social, cultural, technological and certain political elements. All these aspects appeared in the context of an environmental discourse that recognised the importance of sustainability, a new attitude towards nature and the need to reconcile environment and development. However, Proaire did not regard these elements as the driving force behind air pollution, which must be analysed to find the underlying causes and consequences. Instead, it included them on the basis of an additional rather than an explanatory logic. The notion of society in Proaire was abstract. It did not conceive of the social order as being governed by competing forces and interests but as an amorphous entity in which good faith, ethical principles and responsibility reigned. It tried to encourage people to collaborate to find solutions. Its notion of society was politically neutral and reproduced an egalitarian ideology that avoided establishing responsibilities, assigning costs and correcting or punishing the actions of those who degraded the environment.

However, Proaire merely represented the culmination of a planning process begun in 1979 on the basis of a misunderstanding of social dynamics. The first programme was clearer in its technical approach. Air pollution was primarily regarded as a matter of actions and reactions between chemical substances caused by natural sources and by the enormous concentration of industry, population and vehicles. Proaire presented the same perspective, couching it in social, cultural and
environmentalist terms. In the three programmes, the real proposals for actions were technical because they did not incorporate social, cultural or political objectives, and because the social and political dynamic behind air pollution was ignored in the decisions made.

The second hypothesis of this research affirmed the existence of a social construction of air pollution by various social actors. This construction can be demonstrated by analysing the way in which a set of social actors perceived and constructed Mexico City’s air pollution problems. Analysis of the interviewees’ answers showed that such a social construction existed, and that it introduced another dimension into air pollution problems which, if taken into account, could contribute to a better understanding of the problem and to the design and implementation of more effective policies and programmes. This last aspect is not analysed here, since one of the objectives of the research linked to this second hypothesis is simply to prove whether or not that social construction exists and to define its characteristics.

Air pollution emerges as a debated and contested issue. The social construction of air pollution appears in the way actors define the emergence, the severity, the magnitude, the government capacity to solve the problem, the role of science in the policy-making process, and also in the possibilities, obstacles and solutions the actors suggest for Mexico City’s air pollution problem. Actors viewed the emergence of air pollution as a matter of concern, reflection and government intervention in a contested way. It is not just the damage inflicted on nature and people but also the public appearance of a new attitude, the diffusion of alternative values and principles and the repercussions of the international environmental movement, what is thought by some actors to be the triggering factors of air pollution consciousness. The majority of the actors interviewed acknowledged the importance of air pollution as a real source of concern. This acknowledgement reflects a certain degree of agreement between what the data describe as a significant objective problem and what people perceive about it. However, two important analytical aspects must be emphasised. First, the relative general agreement on the importance of air pollution is not unanimous. There are significant differences among the actors over the accepted degree of air quality degradation that makes air pollution socially relevant. For
example, academics and government officials generally acknowledged the importance of the problem. However, they did not share the almost apocalyptic view of Green activists and political parties of the damage and deterioration caused by poor quality of Mexico City’s air. Contrasting sharply with the Green activists’ and political parties’ perceptions was the entrepreneurs’ denial of the importance of air pollution. For the former, air pollution was a problem of survival for Mexico City’s inhabitants. For the latter, the extent of air pollution damage was heavily exaggerated by environmental groups and politicians. In terms of existing data, both positions are extreme, and both contain a broad subjective variability. In this respect, both positions differed considerably from what existing data describes as the physical dimension of air pollution. Both reflected a clearly social dimension of the air pollution problem.

On the other hand, the social actors interviewed perceived the emergence of environmental and air pollution problems with a broad margin of variability. One group of actors thought that air pollution had emerged in the public awareness, as a result of the degree of environmental degradation and because of the damage inflicted on people. In their view, social and cultural mediation was unnecessary for the recognition of a severe problem. Another set of actors did not think that the magnitude of the problem or the attendant damage, were the only reasons behind the emergence of air pollution as a matter of public concern. It had more to do with changes in values and cultural and social changes that determined what was tolerable or intolerable. In this case, academics and Green activists held opposing views. The former cited social facts and values as triggering recognition of a problem as a social threat. The latter believed that the magnitude of the problem itself automatically led to an awareness of air pollution damage. Most of the remaining actors’ positions fluctuated between these two extremes.

These actors’ answers were not only influenced by social, ideological and political factors, but also reflected a social constructionist perspective, whether conscious or not, used by the actors to explain the emergence of air pollution. Some of the perspectives analysed in Chapter I indicated that there were two main ways of explaining the emergence of environmental awareness. One cited the magnitude of the problem and direct damage as the reasons behind awareness. The other suggested
that concern for environmental problems was not due to the magnitude of environmental problems or to the damage they inflicted but rather to a change in values and the emergence of a willingness to perceive problems.

In this context, when the actors interviewed for this research answered the question on the factors explaining the emergence of air pollution as a matter of social concern, they mentioned factors linked to one or other of these two perspectives. Academics and Green activists expressed two extreme positions. The former attributed environmental awareness to a changing perception of problems in the modern world which meant that at some point, environmental issues became relevant for different social groups, first in the developed world and then throughout the rest of the world. For the latter, consciousness had emerged as a result of the severity of the problem and because many of them had begun to notice that their health was being affected. No social or symbolic mediation was required for consciousness to emerge, the degree of damage alone sufficed. Not all the actors can be classified into one of these two positions, but their respective perceptions expressed different degrees of agreement or disagreement with them. The social construction of these air pollution perceptions were expressed by the different social conditions that led the groups to focus on certain trigger factors, such as the physical nature and damage caused by pollution in the extreme case of the Green activists, and the more cultural and social elements expressed by the academics. For academics, the explanatory possibilities were broader, since they included different disciplines and approaches. Conversely, Green activists had to focus on a narrower range of factors. Describing the extent of the damage and the threat due to the physical magnitude of a problem was better suited to their role as claim-makers.

But it is not only in the appreciation of the triggering factors of the public emergence of air pollution in which actors show their divergence, but also in the way they qualify the severity of air pollution in Mexico City. What separates actors in this specific issue is the way in which they present their argument to define either the harmful or the harmless character of air pollution problem. Some actors transmit an image of urgency while others argue that the problem is overemphasised by extremist positions. The interviewees' answers reflected these contrasting perceptions of this issue. At one extreme of this perceptual spectrum, government and entrepreneurial
representatives held that air pollution was a significant problem, but not as serious as some groups declared. At the other end of the spectrum were the rest of the social actors, the academics, the Green activists, the political parties, and the international representatives who expressed their concern over the severity of air pollution. Yet these two extreme positions did not mean that all of those within a particular position shared the same reasons and arguments. For example, government officials and the entrepreneurial sector gave different reasons for their denial of the severity of air pollution. For the former, the main reason was government’s success in reducing pollution. For the latter, its severity was exaggerated. However, both insisted on exonerating themselves from responsibility for the problem. On the other hand, the rest of the social actors in the opposite position included more diversity in their answers. The Green activists and academics gave the strongest arguments to explain the severity of air pollution. However, while the Greens regarded government and the entrepreneurial sector as the main culprits as regards air pollution, the academics used more social groups and more social explanations to explain the reasons for air bad quality. The academics insisted that it was not only the government’s and entrepreneurs’ responsibility to clean up the environment, the latter was also a societal obligation. In their view, even society was reluctant to perceive the severity of the problem and to become more involved in the search for solutions. For the Greens, both government and the entrepreneurial sector were involved in a conspiracy to pollute while the Greens, armed with certain confidential official documents, were trying to show the population the true facts to raise their awareness and achieve greater public involvement in the solution.

The social construction of air pollution, particularly its severity, was borne out by the wide range of perceptions. However, even more important were the possibilities of observing some of the ideological dimensions that define an EIPC, such as those used in this research. For example, some of the answers given by government and the entrepreneurial sector reflected a need to express their own institutional or group perspective, thereby proving their particular point, in other words, that ideology in these circumstances works as a legitimising mechanism to reproduce the status quo. On the other hand, the academics’ inclusion of more social factors to account for the severity of air pollution, not only reflected their greater
analytical scope, due to their use of more rigorous methods, but also exemplified one of the ideological dimensions used in this research, which operates as a constitutive element of social life.

Air pollution also emerged as a social problem through the way in which actors compare it with other environmental issues. Most actors agreed over the magnitude of air pollution. However, they disagreed over the relative importance given to air pollution. Water, sewage, hazardous waste and soil erosion competed with air pollution for the role as Mexico City’s major environmental problem. With the exception of political party representatives, who unanimously cited air pollution as the most worrying problem in the city, each of the sectors interviewed gave different answers. There was relative consensus in some sectors, but in most of them, the other environmental problems mentioned above were regarded as more important. However, air and water were usually considered the main problem. There were, however, some distinct differences in the various actors’ social constructions. For example, government was more interested in prioritising problems and selecting just one to focus on, be it air or water. Rather than emphasising the range of problems, academics were more concerned with explaining the conditions that ensured that a particular problem was socially accepted as the most significant. In describing the importance of both air and water, government stressed the physical aspects of these problems that had made them an object of social concern. Academics, on the other hand, acknowledged the importance of considering all the environmental problems in the city, attributing the wider recognition of air pollution to knowledge and communication of the latter to the general population. In their view, government, as well as the general public, was biased toward air pollution. Among the rest of the social actors, air and water vied for consideration as the main environmental problem of the city.

The general agreement over the magnitude of the air pollution problem, reflected the shared feeling, that, according to the actors, was present at the societal level. In this respect, EIPCs revealed their socially constitutive dimension. However, ideological influence can also be viewed as a means of reproducing group and institutional perspectives. This is the case of government’s need to prioritise environmental problems in order to focus its planning activities on a socially-
acknowledged object of concern, namely air pollution. The need to legitimise its actions is a plausible explanation for the government’s bias toward air pollution issues. The academic sector did not attempt to prioritise the problems. In their view, all of them deserved the same analytical attention. They were more interested in explaining the social reasons behind the emergence of environmental problems. Finally, the political parties cited air pollution as the city’s main environmental problem. The fact that this coincided with the view of the general public fitted in with their need for public support.

Another area of social definition of air pollution has to do with the views actors hold regarding whether or not government is willing and trained to solve the problem. Green activists and international representatives gave the most contrasting answers. Most of the Green activists thought government had neither the will nor the technical capacity to solve problems. Conversely, most international representatives thought that government had both the will and the capacity and gave a very positive opinion of its planning performance. The rest of the social actors’ constructions were somewhere between these two extremes. However, what was striking was the relative agreement between government officials and academics in their views on government’s will and capacity or otherwise to solve air pollution. In both sectors at least one interviewee stressed that solving the problem was not only a matter of will and capacity but also of other social conditions. However, the academics suggested a wider range of social factors to explain government failure to solve the problem. In their view, economic and political interests hampered the solution of the problem. Moreover, government lacked a clear understanding of the problem while government officials were not properly equipped to deal with political issues such as air pollution. Academic, Green activists and certain political party representatives viewed government policies and programmes as purely rhetorical with no intention of adversely affecting polluters’ interests.

This aspect of air pollution construction was one of the most controversial. Both government will and capacity were regarded by most, including certain government officials, as a social fact. There was even a social construction of will and capacity that emerged in the perceptions and constructions of some of the actors. For example, government will and capacity were viewed as the result of economic
and political forces, rather than as something that could be explained purely within the government sphere. According to some actors, capacity, even in its technical dimension, had to be described as a social capacity in order for government to grasp the combination of natural, technological, social, economic, political and cultural facts involved (with varying degrees of explanatory capacity) in air pollution issues. Dealing with this social and political dimension of air pollution requires a clear understanding of the non-technical aspects involved in air pollution issues on the part of government decision-makers. The actors' EIPCs of the government's will and capacity to solve air pollution problems, reflected the desire of certain actors to perceive a social and political dimension in problems such as air pollution, traditionally regarded as purely technical.

But actors also disagreed over whether or not the government's current institutional structure allowed it to take adequate political measures to solve the problem. The two main perceptions of the problem reflected both a governmental perspective and a non-governmental point of view. The former, despite its awareness of the integral nature of environmental problems, focused on the obstacles to decision-making within the internal governmental institutional structure. In this respect, government officials based the construction of the problem-solving issues on their own planning activity. In this case, ideology operated at two levels; first, as an incomplete way of understanding the factors that determined decisions and second, as a legitimising element that allowed government to depict itself as the only agent involved in policy decisions. The latter cited economic, political, and analytical factors as the main forces preventing effective decision-making. With the exception of the entrepreneurial sector, which attributed government's lack of room for manoeuvre to attempts by Green and political organisations to fabricate problems, most actors coincided in their perception of a variety of social dynamics involved in air pollution, and government reluctance to obtain more room for manoeuvre. In their view, government showed a greater commitment to polluters' interests than those of the public. Most actors viewed government failure to control the forces preventing any improvement in air quality as self-serving. In this case, ideological resources were being used to preserve and reproduce the economic and political dynamics that
degrade the environment. But it also implied an incomplete and ideological understanding of the intervening factors in air pollution issues.

An important factor in the social construction of environmental problems has to do with the way people conceive of science as a crucial factor to solve environmental problems. As was explained before, in some social sectors, scientific knowledge is considered to be a fundamental and decisive factor for a public policy to be successful. The argument is that the more scientific the diagnosis on the causes and consequences of pollution, the more effective the implemented policies. However, scientific knowledge, as was mentioned, is not a body of uncontested truths, but a very contested and ambivalent set of findings. In this case, actors also showed contrasting points of view. Two extreme positions emerged here as regards the importance of science, one expressed by government, the other by all the other, non-governmental actors. For the former, scientific knowledge, when available, was the main factor in decision-making. Most government officials were anxious to show the central role of science and the scientific community in the policy design process. This statement has a three-fold ideological aim. The first is to prove that science is a decisive factor in decision-making. The second is to promote the idea of a single, undisputed version of scientific knowledge that can be used in effective decision-making. The third is to legitimise decisions by demonstrating their basis in sound, socially reputable knowledge. These three recourses to ideology have been discussed in the existing literature on these issues, as shown in Chapters I and II.

Nevertheless, even some of the non-governmental actors interviewed cast doubts over this. They agreed over both the need to base decisions on scientific knowledge and over the use of science as a rhetorical instrument for legitimising government actions. Economic, ideological and political factors make it impossible to base decisions solely on scientific findings, according to most non-government actors. Yet because government does not want the power to control the economic and political interests behind air pollution, it is not interested in either scientists or genuine public participation in the policy making process. However, since science is reputed to be the only producer of scientific facts, government needs a symbolic, fictitious participation of science in the planning process. Most non-governmental EIPCs suggested that economic, political and ideological problems, that not only
prevented decisions from being based on science but also inhibited a fuller understanding of the problem, mediated between government decisions and scientific findings.

In the context of the government's will to project a social image of effectiveness and certainty in its decisions on air pollution issues, most government officials classified existing scientific knowledge as objective and of good quality. In accordance with government's ideological use of science, knowledge must be objective to be useful in the planning process. The academic perspective highlighted the social nature of knowledge, not only revealing a range of perspectives but also reflecting the relative and competing nature of the knowledge. This social nature reflects the social factors that intervene in knowledge production analysed in Chapter I. Contrary to the government's perception and construction of the problem, scientific knowledge is hotly disputed, frequently challenged and a factor of uncertainty. Decisions have to be made within a scenario of multiple competing truths and scientific findings. In this context, the social and critical aspects of knowledge are viewed as an integral part of its real nature.

Finally, the actors also showed a variety of conceptions and ideas of how to face and solve air pollution problems. Most actors shared a general optimism over the possibilities of solving the problem. However, differences began to emerge when the actors specified the conditions required for the problems to be solved. Government officials emphasised their institutional perception of the problem. Solving the problem would require streamlining the institutional structure, raising awareness among all the government officials in the different areas of public administration, and creating a sort of inter-sectoral team to work together on the environment. Government intervention was depicted as a central factor in solving the problem. Government officials mentioned a wide range of obstacles to decision-making, including social, economic, political problems. They also referred to more concrete obstacles such as budgetary restrictions, vehicular and population concentrations and proposed highly specific measures for improving the transport system.

For most of the other actors, particularly for academics, the problem could be solved, although radical measures would have to be taken, which would mean
affecting powerful economic and political interests. Yet while academics mentioned the need for both societal and government commitment to the environmental cause, the rest of the non-governmental actors, particularly the Greens activists and the political parties, attributed the entire responsibility for the problem to government failure to enforce regulations and poor environmental performance on the part of the entrepreneurial sector.

All the social actors perceived at least some of the social elements that either helped or hindered the improvement of air quality. According to some perceptions, government actions appeared to be influenced or shaped by economic and political forces. According to others, government was paralysed by these political forces. However in their own perception, government officials depicted themselves as a more independent body, which would be able to provide solution through the more efficient use of their technical and human resources. However, while all the actors were very clear about the obstacles to improving air quality, most of them experienced difficulties in proposing solutions. The proposals they made were either very general, such as changing the development model or very concrete and isolated, such as building special tracks for public buses, improving fuel quality, etc.

Until now, the two hypotheses of this research have been discussed. The first has to do with the lack of an appropriate social dimension in air pollution official programmes. The second is related to the existence of a social construction of air pollution in Mexico City, which can be reconstructed in the contested way different actors perceive the problem. This final part of the conclusions covers a form of dialogue between the two parts. Proaire, the current government air pollution programme will be the means to establish such a dialogue. The purpose of this dialogue is to observe how the voices of the different social actors are in some way included in official programmes. This does not mean that Proaire has included the exact opinions given by the interviewed actors. This dialogue intends to show that some of those opinions have been present in the social atmosphere as a type of a communitarian social construction of air pollution, and that government programmes such as Proaire have incorporated them as a way of legitimising their planning purposes. It will be argued here, that this incorporation is not analytical but
rhetorical. Air pollution programmes, from this perspective emerge as ideological and political construction.

It is not completely correct to affirm that air pollution government programmes do not include a social dimension. What is more correct is to maintain that the inclusion of social factors is more rhetorical than analytical. When analysing air pollution programmes, particularly Proaire (as was presented in scheme 3) in its two components: analytical and programmatic, what can be observed is that the inclusion of social elements (not concepts) is restricted to the analytical or diagnosis level. This inclusion of social factors by Proaire has been considered rhetorical because, on the one hand, those social elements are not presented as the embodiment of social relations but as words without any analytical purpose. On the other hand, what is said at the diagnosis level is not translated into a proposal for actions at the programmatic level. The analytical and the programmatic components of air pollution programmes such as Proaire, do not seem to have the purpose of solving problems but to present in the public scenario a representation of the problem that gains social recognition and that can mirror the public’s construction of air pollution.

Programs to combat Mexico City’s air pollution are examples of Environmental Ideological and Political Constructions (EIPC). An EIPC synthesises a way of thinking about, living in and perceiving the environment by actors. It also involves an appreciation of what is bad and good, judgements about risk by individuals and communities; all these are factors that include a social notion of well-being. But this is a construction that gives also account of power relations and of an individual or group will to promote values, perceptions and ideas to favour groups and perspectives. This combination of ideology with power gives this social construction the character of an ideological and political construction.

What is implicit in the concept of EIPC is that those environmental problems, which are the object of an environmental policy, do not have an immanent existence. This also means that their inclusion in public policy does not always depend on their magnitude, severity or physical dimension. An environmental problem does not emerge as a government and citizen concern as a result of a rigorous scientific knowledge of it and its consequences, despite the fact that knowledge is a very important factor in the policy-making process. A political proposal on certain
environmental problems is a moral and political fact that has to do with consciousness and power relations at the communitarian level.

There is a non-coincidence between the physical and social presence of pollution construction. Government programmes to attack pollution are the expression of the balance between both aspects. What we are talking about is of the move from the physical aspect of pollution to its incorporation into the public consciousness. It is because public policies do not take place independent of the social context that they reflect the process through which a particular problem, such as air pollution, is constructed in the social sphere. In this sense it does not only express levels of knowledge according to scientific criteria but also the way this knowledge is incorporated in the citizen consciousness and values. Public policies are the scene where interests, perceptions and mobilised meanings confront each other and are negotiated according to the resources the different agents command.

Public policies are the expression of conceptions, interests and experiences of a wide variety of actors, such as those who live pollution, those who reflect on it, those who manage it, those who raise consciousness of it and those who provoke it. The lack of efficacy in programmes is neither a mere expression of government official failures, nor a lack of a political will to undertake radical actions. This is rather the consequence of such factors as an extra governmental incapacity to think about the environment from a wider perspective, a lack of social will to make pollution a political demand and an absence of governmental authority to force polluters to treat the environment with more respect.

Under this perspective, the emphasis that governmental agents place in the physical aspects of pollution and their inability or lack of will to incorporate more effective economic and political factors in the proposals for action, are not just a government responsibility but also a civic one. Under this environmental construction made by government, society ranks its priorities, giving air pollution either a primary or secondary priority in relation with other social problems. This construction is also the space where attitudes such as the rejection to believe in the magnitude of air pollution, a shared attitude between government and society, makes sense as an expression of perceptions and interests where it can be found in ideological and political factors mixed together. This is clearly reflected in the phrase
expressed by one of the interviewed: “the best remedy against pollution is ignorance”.

Apart from that level of determination that results from the action of those groups able to resist or to oppose more drastic measures, there is another more concrete level of causes that causes environmental problems to emerge or to be minimised. This is the process of construction of a communitarian notion of well being. The idea of deterioration and its association with pollution has to be included in the package of social well being measures to be demanded by a community. This aspect of social construction of pollution is very closely related to the distribution of power. Power and democracy, in this context, have to do with the incorporation of a better environment as an important component of a notion of quality of life to be demanded by citizens. The lack of a more generalised construction of environmental problems as real problems in Mexico City explain the fact that, most air pollution programmes have confined citizen participation in air pollution management to the installation by government of a mailbox to receive public demands.

On the other hand, air pollution programmes from 1979 to 1996 were improved in terms of better diagnoses and with the inclusion of explanatory variables of greater analytical scope. However, proposals for action remained without substantial changes. For example, the 1996 diagnosis is more comprehensive than the 1979 programme and it manages to incorporate an environmentalist discourse that is not present in the first one. However, proposals for actions are really similar in the three programmes.

As it was already mentioned, the plan of strategic intervention of 1996 is almost similar to the one of 1979. From this perspective it is possible to affirm that the implementation of a more radical or more effective policy is not a problem of knowledge but rather of ethical and political nature. It is ethical because the society must include environmental degradation in its scheme of values to be able to demand it, and political because the programs that are implemented depend on the social, economic and political forces involved in the environmental problematic.

This phenomenon can be explained in the following way: the knowledge on air pollution problem doubtless increased in the public and private academic institutions. However, this knowledge mostly did not reach the citizen sphere and the
part that did, was not enough to push the planning system to change the strategy. There was change neither according to government diagnosis nor to that of the contested ones. This has become a vicious circle because it is necessary that pro-environmental forces, particularly citizens fighting for a better air quality, have access to knowledge and information, but those who produce it do not want or do not know how to disseminate their finding to a larger public. This movement from the generation of knowledge sphere to the public is fundamental for the general public to form their criteria and to rank air pollution among their different priorities. From the beginning, government programmes incorporated a certain level of knowledge on air pollution regardless of being confined to its physical aspect. Some decisions could be taken on the basis of this knowledge, but that was not the case. The problem is that at citizen level there did not exist any social or political force to push for a more energetic environmental agenda. The car industry was in the technological condition to introduce catalytic converters and the government could legally impose it. But the car industry had enough power to resist such possibility and the government was not under significant public pressure to force such decision. As a result of this, the car industry was allowed to emit substances that could have been avoided. A social construction of air pollution had to be incorporated into government programmes and to presented to the general public to be transformed into public demands for a better environment.

The only possibility at policy level of inclining the balance towards the protection of both health and environment was the pressure from citizen will that pushed the correlation of forces in that direction. With no counterbalances on the part of opposite forces, those practices that caused the environment to deteriorate did not find restrictions to prevent such operations. Government action is neither decided by the magnitude of the problem nor by the objectivity of the knowledge of its causes and consequences but by a game of social, cultural, political and ideological forces. These forces are the embodiment of the factors that this research has identified as those that decide the passage from air pollution as a physical problem to pollution as an object of public concern.

Proaire epitomise this. The existing level of knowledge on some aspects of air pollution is of good quality. Different agents involved in the issue agree in the
importance of the Mexico City’s air problem, regardless that some of them locate it as a secondary priority, after the water problem. These agreements between agents indicate the importance of transport in the generation of the problem (75% of the total emissions) and the crucial character of policies destined to abate the huge car contribution to pollution. However, transport policy, that is the most important government instrument to reduce emissions in this sector, is more discursive than effective. Environmental policies in fact does not have influence in this sector and the changes introduced into the transport system have failed to plan an adequate electric public transport as an alternative means of transportation to private car.

Given the existence of a relative level of knowledge, the inaction and the non-correspondence between diagnosis and actions, would be explained by a lack of citizen will to assume air pollution to be an important part of their living conditions. This is what can be called a non-social construction of the problem. Society “decides” to minimise air pollution and not to include it as a priority citizen vindication.

It is clear, when analysing the description that the interviewed actors make on air pollution problems, that there is a sufficient level of knowledge both in the government and in the non governmental sector that would make it possible to attack certain causes and to be more effective in the management of pollution, in spite of the existing bias in government programmes toward the physical and technical dimension. The governmental diagnoses have identified these causes, and the agents responsible for environmental policy make reference to what some of the different actors call the “deepest” factors. That is to say, the basic agreements between those who produce knowledge and those who are in charge of the management exist, at least in basic aspects that would make possible certain actions. In this context the government inaction is in part the consequence of lack of citizen pressure, that is particularly explained for the non-construction of the environment as part of the social package of well being.

This research has assumed that government action is something that is decided neither at the level of the physical problem nor in the cognitive sphere but as a consequence of a game of forces between agents, perceptions and interests. From
this perspective, the non-correspondence between diagnoses and proposals for action, as a real social approach makes necessary (Scheme 3), has to do with a citizen perception that does not construct environmental problems as urgent. Under this point of view, ideas from those who generate knowledge, whether objective or not, constitute a necessary but not sufficient element to defend the environmental cause. After being incorporated in the social package of well-being, air quality competes with other agendas. Since people in Mexico City are very concerned on issues they consider really urgent such as insecurity, unemployment and low-income levels, environmental problems are relegated to being non-relevant problems.

The programmes to combat air pollution are considered in this research as an example of environmental ideological and political constructions and Proaire could be considered as one of their typical examples. When analysing them in their two basic components, that is to say the analytical level (diagnosis) and the programmatic level (proposals for action), it is possible to find the different components of the notion of ideology that has been mentioned in the theoretical framework. The diagnosis constitutes the scenario of ideological conciliation, in which the different actors and their respective perceptions, ideas and interests on air pollution appear in great brotherhood and harmony. That is the place of philosophical and moral confrontation and where ideas of what is good or bad for a society are agreed. In this context of ideological negotiation environment and air pollution problems appear as something that is socially appreciated and with a certain level of importance. That is also the place where some agents express their desire for a conciliation of economic development and sustainability and where some of them fight for a new rationality that corrects the self-annihilating course of modern society.

The governmental construction that Proaire represents is a synthesis of different constructions: It contains that part of the academic construction that fits better with the government need for scientific legitimacy, emphasising an image of sound and uncontested scientific diagnosis on the causes and consequences of air pollution. Proaire alludes to the national and international scientific community's findings before presenting its proposals for action. It describes, in a meticulous way, the health damages associated to the criteria contaminants and it also mentions the problems with toxic contaminants and the potential damages associated with the new
formulation of gasoline. Proaire is particular anxious to demonstrate that it has included in its diagnosis, the medical aspects of pollution, in spite of the fact that in some occasions the medical findings that Proaire quotes, contradict their own government proposals for action, but Proaire does not seem to worry about it.

The ideological and political construction of the entrepreneurial sector is in some way detectable in government air pollution programmes, as is the case of Proaire. For the entrepreneurial sector, as can be noticed in the interviews, its role is a sort of humanitarian role. For them, to preserve the activities that the enterprise sector carries out is to preserve society. According to them a deterioration of the productive plant or any measurement of policy that could affect the way it works is susceptible of affecting the rational use of resources and provoking larger environmental damage. From this perspective, everything with negative impacts on industry ends up affecting environment. For the logic of the entrepreneurial discourse, a society has to establish a system of social priorities by means of which the members of the society will rank their social and economic needs. If the priority is to improve the quality of life, it will make necessary to generate larger volumes of material wealth. The governmental discourse contained in Proaire illustrates clearly this way of conceiving the relationship between economy and environment. According to Proaire, it is only by means of the achievement of high rates of productivity that better life standards can be obtained.

Both Proaire and the entrepreneurial sector constructions are allegorical representations of social relations, which work as ideological legitimisation because the production of material wealth is not the unique reason for economic activity. To generate wealth is also a means to generate benefits, and a fundamental factor of the market economy.

The environmental constructions from both government programmes and the entrepreneurial sector can be considered as an ideological mobilisation of meanings, representations and social values that sublimate the positive aspect, the human content and the universal values of economic activities. But this is also, at the same time, a political construction because those universal values associated with the common well being conceal relations of domination and an unequal distribution of wealth. These relations explain the different participation of social groups in the
construction of the social order, and in the generation and solution of social problems, such as environmental problems. Proaire coincides with that humanitarian ideology mobilised by the enterprise sector to give account of the economic activity.

From the academic and the ecologist discourses Proaire takes the scientific finding of the former and the radicalism of the later. However, the scientific aspect that Proaire includes in its analytical level is just to support its general assumptions; all the academic findings that do not fit with these assumptions are discarded. This is the case of the emphasis in the *criteria contaminant* and the minimisation of *toxic contaminants*. From the radical environmentalist discourse, as it was expressed in the interviews, Proaire takes its critical phraseology. Proaire undertakes an aggressive critique of some aspects of modernity such as the use and abuse of the automobile. This appears as the main predator in the urban environment. Nevertheless, when the time to take a decision arrives, Proaire does not propose any reasonable public transport system as an alternative to private car.

The influence of international organisms speech in government programmes is not only present in the conception of environmental problems and in the emphasis they give to air pollution in relation to the rest of environmental problems, but also in the priority they give to ozone as the main air pollutant.

The voice of political parties is also present in Proaire. Political parties see air pollution as an isolated problem. They think of air pollution as an additional problem added to a countless list of urban and metropolitan problems. Environmental problems appear as something secondary. In a similar way that government discourse, political parties are very concerned with the way public opinion ranks its social problems. If the environment does not emerge as a matter of public concern, political parties do not include it as something to be demanded. When proposing solutions, they promote measures at the physical level of air pollution. Air pollution is something that has to do with car exhausts and chimneys.

Proaire offers more what it can really achieve and this is reflected in the lack of continuity between diagnosis and actions. Each one of the two components of government environmental construction, namely the analytical and the programmatic, interpellate different agents. In the case of the diagnosis the
interlocutor seems to be an abstract entity called *public opinion*, in which social groups with different interests and perspectives appear mixed together in an amorphous mass of actors.

At this ideological legitimating level, environmental policy appears especially concerned with the well being of the population. The governmental discourse appeals to the language of sustainability and to the environmentalist discourse to present its evaluation of air pollution. At the ideological level, the governmental discourse tries to agree with the way public opinion constructs air pollution. The result of this bargaining and search for consensus with this abstract entity integrated by different agents, is the inclusion of an abstract construction of air pollution in the diagnosis component of Proaire. But this inclusion is without an analytical hierarchy. There is not intention to incorporate social, economic and political forces as explanatory factors. Finally, it seems that it does not matter what the programmes contain, the objectivity of things they include or the radical character of their discourse. The reason for constructing the diagnosis in this way is because its main purpose is not to be translated into concrete actions, but to get what Hajer (1995) calls a "problem closure" and to make public opinion conscious that programmes act upon problems in the same way in that public opinion would do it. This is one of the main explanations of the existing divorce between diagnosis and actions.

The interlocutors of the programmatic level (proposals for action), that is the real ambit of decision making, are those economic, social and political agents with enough power to present and to make their perspectives dominant, while minimising the opposite points of view. The concrete actions that programmes propose and those they carry out are less concerned with the social images than public opinion constructs and beliefs. On the contrary, actions rather express the real balance of the different economic and political forces involved in the environmental problematic. The main decisions in such aspects as fuel, public transport, emissions control for automobiles and car industry, land uses, etc., are taken according to the political forces of these agents. The car industry represents a case of economic and political power that has had an enormous influence in official programmes. It had the capacity to delay the introduction of catalytic converters for at least 10 years. It was only 1993 when the government could make it compulsory that all the cars were equipped with
this device. On the other hand, this industry has maintained a double production policy through which it manufactures car for domestic market that are more pollutant than those manufactured to be exported and that fulfil the US Environmental Protection Agency standards. Environmental authorities just have made recommendations to this sector, but they have not been able to force car manufacturers to produce domestic cars to export quality.

Another example of these powerful forces that have a major influence is in the public transport sector. All the air pollution programmes since 1979 have insisted on the necessity of planning a public transport system based on the underground and in the electric transport in general. Nevertheless, in the eighties microbuses were introduced despite their lower passenger capacity, in substitution of larger buses. In addition public transport routes were fragmented and rather than looking for the best articulation with the electric transport, microbuses made their business fragmenting and disconnecting the transport system. The only explanation for the introduction of this mode of transport was the creation of a new space for business. At present time, microbuses transport more than half of the total amount of passengers in the metropolitan area of Mexico City, while being one of the main sources of air pollution. These are examples of the economic and political forces that impede a better air quality. When it is affirmed that governance in air pollution issues has to do with bargaining and search for consensus, it is necessary to be clear that this is a negotiation carried out among groups with different access to material resources of power.

The agreements on which air pollution programmes are based give account of these differences in resources of power. This is the case of Proaire. Actions taken against private car owners are not subject to negotiation, they are compulsory. Factories are subjects of a special deal. There are special technical and financial programmes to help factories reduce their emissions and to meet environmental norms. In 1995 the Voluntary Programme for Industries was created by means of which industrial sectors were allowed to self disclose violations to air quality norms without penalties, if they committed to correct violations in a negotiable period of time.
Part of the explanation of the non-coincidence between diagnosis and actions, has to do with the fact that the real actors and forces that decide actions are not those interpellated by the legitimating discourse of the diagnosis components of programmes, but those interpellated by the concrete actions, particularly the more powerful agents and their political representatives. The degree to which these actors achieve their goals depends on the level of public consciousness and has to do with how those who represent the collective interest and who defend the environmental causes can construct social and political barriers to oppose the power of those agents. Economic deterioration, particularly its consequences on poor people, contributes to reduce the components of the social package of well being. Under extreme poverty people eliminate the environmental quality aspect of well being and concentrate all their concern on more urgent issues such as public safety, employment and alimentation. Information from different public opinion surveys shows that Mexico City's inhabitants do not perceive air pollution to be the main urban problem they face. On some occasions people recognise air pollution as a problem, but they fail to make the connections between bad air quality and health problems. It is because environmental problems do not seem to be a real big concern for most of the population, that polluters are so powerful, expressing their ability to push an air pollution agenda that is very relaxed for some of them.

Analysing government programmes in their two main compounds, namely diagnosis and proposals for action, it can be observed that the former is integrated by an ideological discourse that rationalises the irrational content of the later. The diagnosis has the role of getting a consensual perspective on air pollution. It calls for a conciliation of perspectives, trying to incorporate different air pollution constructions. As a result of this search for consensus, official programmes include that sort of inclusive and permissive discourse suitable to the public opinion, where moderate and radical language mix together in a confused discourse: this is the case of Proaire.

Governmental construction welcomes that synthesis of multiple constructions integrated by public opinion. This is the way government programmes such as Proaire legitimise their actions with public opinion. But diagnosis not only includes that abstract entity called public opinion, it also plays the game to incorporate all the
analytical possibilities at hand. In this context Proaire talks about the systemic approach with the same emphasis it talks about sustainability, the cultural approach and about different sociological perspectives. Proaire carries out a sort of ideological distillation, extracting from the different scientific and ideological discourses those aspects that suit better to adorn the political decisions it takes.

To the extent that the logic of the governmental discourse is inclusive and that it assigns the same grade of responsibility in risk generation to all the members of society, the solutions and commitments to solve air pollution problems appear as a societal task. If all the population generate pollution, all of them should participate in the solution.

Proaire confronts, in its intention to solve air pollution, an abstract notion of society. This does not appear in a world ruled by material interests and specific social behaviours, but in an amorphous world where reigns good faith, ethical principles and responsibility. All this depends on convincing people to collaborate to find solutions to environmental quality deterioration. The Proaire’s notion of society is politically neutral and it reproduces an egalitarian ideology that impedes attribute responsibilities, to assign costs and to prevent, to correct and to penalise the actions of those who cause environmental deterioration. For Proaire, the main responsible of air pollution is society. This implicates a socialisation of the costs of environmental damage and it leaves intact the individualistic appropriation of benefits of those who spoil the environment. Concrete agents, with different capacities to mobilise economic, political and ideological resources are depersonalised and homogenised because they are conceived as parts of an abstract notion of society. Society appears as the main actor in Proaire. It emerges as the subject of change and of the corrective and preventive action against pollution. It happens in this way because ideas, conceptions, perceptions and the reading that Proaire makes of air pollution is similar to that of another abstract being, namely, public opinion.

Proaire seems in different paragraphs of its diagnosis, to intend a sort of compendium of all possible notions and ideas on environment. Nevertheless, its purpose is not so much to clarify the multiple factors that affect the metropolitan environment as to make the community feel that they are taken into account in the
design of policies and to show that both government and public opinion perceptions are the same. This inclusion is not analytical, as the diagnosis logic demands, but ideological, as is required by the legitimising need. Both the inclusion of many discourses and visions on environment and the reduction of the real actors (who embody the social relations and resources) distract from the real scenario where decisions are taken.

In representing everybody, the governmental discourse pretends to acquire universality and it aspires to hegemony. As a reflection of this ambivalent form of presenting the problems, some public officials think of environmental problems as a result of complex processes that involve most human activities. Public officials play all together the role of scientist, green activist, international representative and defender of well-being. Nevertheless, when they have to play the role of government official, particularly in all the issues related to the proposals for action, they are not able to translate into integrated policies those multiple perspectives they manage to have and the integral nature they affirm that is characteristic of environmental problems. Instead, the programs they design are constrained to technical measures. This results in a focus just on actions and reactions between chemical substances without taking into account that apart from these, there are actions and reactions between social agents. But government officials do not translate their ideas into actions, in part because there is not a general social recognition of air pollution as a priority or urgent problem. In many occasions air pollution as a problem is just partially constructed. There is not a social force capable of going further in the air pollution agenda.

But government discourse can only be partially inclusive. There is a double difficulty in the government discourse to really be inclusive of the different perspectives that non-governmental sector has on environment and on air pollution. The first has to do with the fact that academic and environmentalist discourses are, in great measure, alternative and not complementary official programmes. Some members of the academic sector think that air problem construction is not part of an unintended consequence of human activities but, in some way, the result of decisions that have been taken. Some academics affirm that during the seventies the government constructed an ideological and institutional structure whose main
purpose was not to understand air pollution but to deny or minimise its seriousness. Secondly, official discourse gives account of a confusion of his role regarding air pollution. This confusion has to do with the pretension of some government officials to play different social roles in their intention to create a consensual air pollution construction.

Green activists, are more radicals in their critique to government construction of air pollution problem. For these government not only denies the presence of air pollution but it produces, increases and generates new forms of it. The real and concrete policies for transport, urban development and industry create more problems that those they solve. Government measures on transport, for instance, have deactivated all the transport efficient options, and they have favoured private transport use. Green activists do not think that government takes actions in favour of those options that increment pollution motivated by ignorance but because these options represent an opportunity to make business and to favour some economic groups.

The political nature of air pollution policy, and of Proaire in particular, is to be found in the concrete actions and in the relationships between these with specific social agents. Actions allow the legitimising ideological role of the diagnosis to show through. Diagnosis is not the referential analytical framework that sustains actions but a mechanism to establish a dialogue among the different groups and agents interpellated. Diagnosis is not necessarily translated into actions, because actions do not only depend on knowledge but on the political, economic and ideological resources that agents can mobilise to push their conceptions, representations and interests.

Proaire, the current air pollution programme that has been taken as an example of an ideological and political construction of environment, includes some of the definitions of the concept of ideology mentioned in this research. But one that is particularly emphasised is the role of ideology as a general and constitutive factor of social life and of group identification. An example of this constitutive role played by the ideological discourse of Proaire is the use of human health as what Hajer (1995) calls a discursive "emblem" to get social consensus to raise a particular
perspective of air pollution. Ideology works here in its general aspect, as a system of ideas that open a space to facilitate the dialogue and the agreements among different actors and perspectives. It interpellates the most general abstract and general ideas and the most common shared sentiments, to convoke to all the population. In this sense Proaire dramatises the severity of air pollution associating it with serious health damages to the Mexico City's inhabitants. Proaire calls for radical changes, not only in the direct environmental sphere, but also in cultural and political changes.

Proaire interpellates a wide spectrum of possible actors and diverse scenarios of subjectivity. In this sense the discourse is located in that general and abstract level of ideology that is contained in the notion of ideology as a general system of ideas. These are the symbols by means of which Proaire convokes to all the population with no distinction of group, individual and belief differences. The mobilised symbol is the population's health. As was mentioned before, of all the social aspects that are affected by environmental damage, health is the one people associate most closely with their well being. The medical discourse emerges as the one with greatest efficacy to raise consciousness and to generate interest for the environmental cause. With an integrative spirit Proaire does not interpellate to the individual or group but to the citizen and by means of this to the human being: he who inhabits the Metropolitan Area of Mexico City. For this reason Proaire exalts the medical discourse and redeems it as something to be included.

Health damage provoked by air pollution has been demonstrated in diverse investigations. This damage has been directly associated to environmental deterioration. It is different to those affecting economy and nature, but also requires a conceptual mediation to be understood by the general public. This damage is not internalised by people as something meaningful, because they do not link it to well being. In a society with a huge amount of people living in a survival level, and whose environment has been strongly interfered with by human action, it is very difficult to think of the natural environment as something with its own rights. Nature does not appear as a civic demand. The only component of well being to be perceived as relevant is the one associated with demonstrable human consequences: health. But it is only when people learn to associate pollution with damage that social environmental concern emerges. In Mexico City, the inclusion of health and
environmental demands both in government programmes and in public demands, has been the consequence of some level of social recognition of the links between air pollution and health damage, produced by the dissemination among the general public of some academic findings, and also because of the emergence of a green activism around them. It is in this context, that air pollution programmes get their public support, and that is the reason why government programmes emphasise that their main matter of concern is to protect the health of the Mexico City's population.

The emergence of the health emblem in air pollution issues in Mexico City at the level both of public opinion and government intervention illustrates on the need for a social construction of environmental problems to be socially recognised and politically demanded of government. Public dissemination of scientific findings has been considered (Hajer, 1995) as a crucial aspect for people to associate the physical dimension of environmental problems with environmental damage and social awareness. It is just after making the associations between events of different nature (that in some occasions, are temporally and spatially separated) that people construct their own environmental demands.

The incorporation of the social construction of environmental problems in government programmes, and its use to educate the general population, can be a crucial element of social support for more strict political measures to attack air pollution, particularly in a very deteriorated environment such as Mexico City's air. This recognition could be used to design educational programmes to educate people on environmental problems. This will help them to make the connections between environmental problems such as air pollution and human or personal health. A community well informed and more involved in air pollution issues, could be a source of social support to propose programmes and actions to a cleaner environment.

This is not an unusual practice in the Mexico City's case. During the eighties, when the most worrying air pollution problem was the huge amount of lead concentration in the atmosphere, the academic community started to release their findings on the relationship between atmospheric lead and human health. Many studies demonstrated the presence of high concentration of lead in the blood of
women and children. The public opinion was shocked by these findings and took the issue as an object of social and political protest. The government was pressured to take urgent measures to reduce lead from the atmosphere.

Consciousness started to emerge when those researchers working on the health effects of lead released their findings in journals, magazines and newspapers. Awareness also was raised when researchers were successful in their attempt to force the state Telephone Company to attach to the monthly bill of its customer a brochure describing the damage caused by lead. Children and women appeared in those brochures as the most vulnerable victims of atmospheric lead concentration. The responses from NGOs and public opinion were immediate. The government decided to start reducing lead from gasoline since 1986. At present lead has been completely eliminated from gasoline.

The various aspects of EIPCs analysed here reflect the presence of a social construction of air pollution. Actors agree or disagree over central issues related to the nature of air pollution, its magnitude, its importance in relation to other environmental problems in the city, the role of scientific knowledge in the planning process, the obstacles and solutions created by other actors and the role of values and social, economic and political forces in the policy-making process. There was some consensus over certain issues, but there were also disagreements. Air pollution emerged as a hotly disputed, and frequently debated and contested issue. This scenario of broad subjectivity reflected the social construction of the problem that this research sought to prove.

The results of the analysis of this research provided elements for proving the two hypotheses. First, air pollution programmes lacked an appropriate inclusion of the social dimension of air pollution problems. Second, this social dimension existed among a selected group of social actors involved in various aspects of the problem.

Chapter IV analyses the three main programmes, giving details of their failure to incorporate an analytical social perspective into air pollution analysis. In analysing the air pollution constructions of various actors, Chapter V shows the various ideas, conceptions and interpretations that can be used to reconstruct a relevant social dimension of air pollution involving values, economic factors, political forces and ideological meanings. According to some actors, air pollution is not restricted to its
physical-chemical and technical aspects but is also the result of the dynamic interplay of actions and reactions among social actors. These actors participate in the air pollution scenario as the embodiment of various kinds of knowledge, ideological principles, particular interests, social principles and demands that must be claimed for the benefit of society as a whole. All these aspects involved in the conceptualisation of air pollution and in the policy making process, constitute another reality, different from yet complementary to the physical nature of this problem. This reality has its own legitimacy not only from an analytical perspective but also as regards the needs of the planning process. Its inclusion in the policy-making process could enhance the efficiency of air pollution policies.

The air pollution programmes did not regard air pollution as the result of social factors, despite the fact that some of the most important social actors involved in the issue had a social perspective of the problem. While the latter experienced, perceived and constructed air pollution as a dynamic, contested and debated problem, subject to social subjectivity, and as a reality resulting from values, different kinds of knowledge, ideology, economy and politics, official programmes failed to understand the non-physical, non-technical nature of air pollution. While social actors disagreed over the need to include non-governmental factors and actors as necessary components of the policy-making process, governmental programmes regarded government as the main forum for programmatic intervention in air pollution issues.

Most social actors did not consider obstacles and solutions to air pollution purely on the basis of technical decisions. Likewise, social actors did not view environmental decisions and solutions as a problem that was solely determined at the level of knowledge and the will to make decisions, but rather as the result of different social dynamics in which scientific knowledge was a necessary albeit insufficient condition for decision-making. These appeared in the general discourse of some actors, as the result of the interplay between economic, political and ideological factors. Air pollution also appeared to be the result of awareness, and the will to perceive it. It was not solely determined by its magnitude or by the damage it caused, but was a socially constructed problem. This constitutes the social dimension of air pollution that the official programmes, analysed in this research, failed to incorporate when analysing the problem and attempting to solve it.
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Appendix
# Scheme 1. AIR POLICY IN THE VALLEY OF MEXICO 1979-1996: GOVERNMENT CONSTRUCTION OF ENVIRONMENTAL PROBLEM

## PROGRAMME

### PCMCA 1979

**Explanatory Factors**
1. Geographical
2. Diet et al
3. Demographic
4. Economic concentration
5. Increase in polluting industries
6. Increase in no of cars

<table>
<thead>
<tr>
<th>Physical—chemical-technical level (1)</th>
<th>Economic-sociopolitical level (2)</th>
<th>Analytical Hierarchization, levels 1 and 2</th>
<th>Classification of Atmospheric problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Problems result from concentration of emissions in unfavorable physical environment</td>
<td>1) Socioeconomic aspects intervene as spatial concentration of activities</td>
<td>1) levels 1 and 2 not arranged hierarchically, and importance of physical-chemical aspects is greater. Socioeconomic aspects appear as complementary. No causal relationship between levels.</td>
<td>Health problem that affects sensitive groups but dangerous conditions do not yet exist</td>
</tr>
<tr>
<td>2) Geographical and climatological conditions aggravate problems creating emergency conditions</td>
<td>2) Air mass consumption patterns: immoderate use of private cars</td>
<td>2) No social agents or links with economic-sociopolitical aspects exists</td>
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<tr>
<td>3) Fuel problems</td>
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</table>

### PICCA 1990

**Explanatory Factors**
1. Volume of fuel consumed
2. Quality and type of fuel
3. Industrial processes and combustion systems
4. Technologies used in industry and services to reduce emissions
5. Vegetation and soils in the area
6. Meteorological conditions
7. Air-substance interaction

<table>
<thead>
<tr>
<th>Physical—chemical-technical level (1)</th>
<th>Economic-sociopolitical level (2)</th>
<th>Analytical Hierarchization, levels 1 and 2</th>
<th>Classification of Atmospheric problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Emissions derived from industrial processes and automobiles</td>
<td>1) Pollution problem arises as a result of industrial growth, transport and population since the 1940s.</td>
<td>1) Proposal links emissions to processes, industry, services, transport.</td>
<td>1) Pollution has vastly increased and may double by the year 2000</td>
</tr>
<tr>
<td>2) Main explanatory factor in pollution is energy consumption</td>
<td>2) Greater well-being created at the cost of more pollution</td>
<td>2) These processes determine type of pollution and its volume</td>
<td>2) The problem is serious, the present and future risk considerable and actions should be multisectoral, systematic and long term</td>
</tr>
<tr>
<td>3) Pollution from natural factors exists but this is not what characterizes the problem</td>
<td>3) Air quality may not be fully restored, scope of activities makes this impossible</td>
<td>3) Since agents are not considered they are not included in any analytical order. No economic or sociopolitical link</td>
<td></td>
</tr>
</tbody>
</table>

### PROAIRE 1996

**Explanatory Factors**
1. Volume of contaminants emitted
2. Physical/chemical behavior of the above
3. Meteorological dynamic which determines their dispersion, transformation and innovation
4. Scope depends on urban processes
5. Formed by interactions between emissions, atmospheric conditions, type of fuel, technology in cars, ind. and serv., urban structure, transport and intensity of use of cars
6. Uses notion of Sustainable Urban Development, implying economic and social vitality in the metropolis, long term viability and biophysical equilibrium
7. The city whose functionality and excesses affect the environment is the result of many individual and entrepreneurial activities
8. Urban activities arise from individual initiatives and freedom. They may encourage ecological viability if well informed
9. Free access to common atmospheric resources to which all may have access at a low cost
10. Use of private cars appears to be main source of atmospheric problems

<table>
<thead>
<tr>
<th>Physical—chemical-technical level (1)</th>
<th>Economic-sociopolitical level (2)</th>
<th>Analytical Hierarchization, levels 1 and 2</th>
<th>Classification of Atmospheric problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Suggest need for cultural change</td>
<td>1) Pollution situation severe, causes broad and deep. Need to act unassificially</td>
<td></td>
<td></td>
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<tr>
<td>2) Level of intervention of social affairs in environmental problem ranges from considering economic processes to culture passing through spatial organization, transport, roads, land use, etc.</td>
<td>2) Progress has been made in the reduction of substances</td>
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<td></td>
</tr>
<tr>
<td>3) Technology in productive processes, services and automobiles, urban structure, modal structure, transport, no. km. travelled by cars</td>
<td>3) Causal relationship explains air quality (first level of diagram presented in PROAIRE) as the result of past and present emissions (2nd level) as a result of different types of fuel. These have different qualities and support different technologies (3rd level) and finally the last level (fourth level), which explains Proaire, shows technologies used in cars, industries and services, given a certain urban structure, a modal structure transport and no. km travelled. This last level is not congruent, it mixes analytical with descriptive levels, e.g. structures and processes with km. travelled.</td>
<td></td>
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<tr>
<td>4) These processes determine type of pollution and its volume</td>
<td>4) Productive and technological processes are disembodies; great aggregates mentioned, such as production, transport, consumption, culture, but no real agents</td>
<td></td>
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<tr>
<td>5) City and its processes appear as basis for explaining the environment</td>
<td>5) Agents mentioned are being regarded as users of goods not as bearers of resources and hierarchical structures, therefore, they appear as well or ill-intentioned, but eventually egalitarian. As likely to exist as to destroy</td>
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</table>
**Scheme 2. AIR POLICY IN THE VALLEY OF MEXICO 1979-1996: GOVERNMENT PROPOSALS**

<table>
<thead>
<tr>
<th>PROGRAM</th>
<th>Objectives and goals</th>
<th>Strategies</th>
<th>Institutional Framework</th>
<th>Observations of Congruence in Program Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCMCA (1979)</td>
<td>Objective: Prevent environmental degradation Goals: a) Short term: Emergency Plan b) Medium term; Actions to avoid Poor Air Quality and reduce Un satisfactory Conditions to 10% c) Long term: Maintain conditions are Good and Satisfactory.</td>
<td>1) Emergencies a) Measures to reduce dangerous levels (not mentioned) b) Establish public alert systems c) Increase monitoring network 2) Prevention-control of vehicle pollutants a) New vehicles Update regulations for reducing HC and CO Incorporate allometric compensation systems Catalytic converters not compulsory Pollution testing of new vehicles b) Vehicles in circulation Periodic inspection Supervise service stations to ensure strict inspections Reformulate petrol, add 4-4% methanol to Nova Use LPG in taxis and public vehicles Low S02 Diesel in freight and passenger transport c) Transport planning Synchronized traffic lights Increase electric transport Built bus stops for suburban buses at new underground terminals 3) Prevention-control of industrial pollution a) Use alternative fuel Convert industry and 2 thermoelectric plants to gas in 3-7 years Surveillance, training and control of handling emission in polluting industries b) Industrial relocation Relocated economically unviable industries to control emissions c) Evaluation of environmental impact for new industries d) Prevention-control of natural sources Farming-forestry actions Substitute vegetables for maize production Restriction and regulation of human and farming activities Expansion of woodland areas b) Dust control c) Mining d) Surfacing public roads, proper collection, transport and storage of solid wastes Rehabilitate S. Juan Aragon and examine incinerators e) Apply immediate measures f) Prevention-control of noise contamination a) Reduce car noise b) Promote noise-free electric cars c) Regulate land use related to noise d) Support measures e) Urban development Diversification of land use and self-sufficient metropolitan centres to prevent immediate auto use b) Education Text book content on the environment Connerence and training of teachers, students and parents on the environment c) Information Encourage participation and legitimization of measurements d) Promotion Community Collaboration e) Research on Physical and Chemical aspects and health effects caused by pollutants f) Human resource training g) Legislation Promote initiatives to reinforce basic aspects not considered. h) Evaluation 7) Interministerial relation * Interministerial Commission will supervise diagnosis and coordination of actions National System of Evaluation will carry out programmatic evaluation * Interministerial Commission will undertake technical evaluation</td>
<td>1) Environmental policy dictated by Ministry of Health (SSA) 2) No environmental authority in Mexico City but one in State of Mexico 3) Interdepartmental Commission for Environmental Improvement (CISA) created for Valley of Mexico. 4) Ministry of Health presides chairs CISA and assistant chairpersons are also SSA officials 5) SAHOP has Head Office of General Office of Ecological Protection and Order 6) Responsibilities assigned to Ministries and State Departments 7) National System of Evaluation exists</td>
<td>1) No diagnosis to underpin objectives, strategies and institutional framework. 2) No explanation of concrete actions to move from goals to strategies. 3) No logical, programmatic relationship between short, medium and long-term goals. 4) Internally, transport-related strategies bear no relation to scope of the problem. Relocating to other sphere of dirty industries contradicts anti-pollution logic. Impossible to have pollution export policy 5) Institutional arrangement is comprehensive and assigns sectoral responsibilities which is valid but does not respond to a conceptualization of handling the environment in an integral fashion. 6) The figure of the System of Evaluation is relevant 7) The institutional framework and that for assigning resources provides no elements allowing one to judge the institutional viability of proposals. The committee issues recommendations but there is proof of the effectiveness of its recommendations at the sectoral level.</td>
</tr>
</tbody>
</table>
### Scheme 2. AIR POLICY IN THE VALLEY OF MEXICO 1979-1996: GOVERNMENT PROPOSALS FOR ACTION

<table>
<thead>
<tr>
<th>PROGRAMME</th>
<th>Objective and Goals</th>
<th>Strategies</th>
<th>Institutional Framework</th>
<th>Observations of Congruence between Programme Components</th>
</tr>
</thead>
</table>
| PICCA (1990) | Objective: Curb the increase of pollution. This does not mean going back to the atmospheric condition of the past but situating them in a context of a new different reality. Goals: | 1) Improve fuel quality  
   a) Reformulate petrol  
   b) Reduce SO2 in diesel and fuel  
   c) Oxygenate petrol  
   d) Lead-free petrol in 1991 and later car models  
   e) Recovery if HC vapours in gas tanks | 1) National environmental policy is dictated by the Ministry of Urban Development and Ecology (SEDUE)  
2) The air policy in Mexico City and the ZMCM is the responsibility of SEDUE, the Federal District Department (DDF) and the State of Mexico  
   a) SEDUE: Institute of Ecology and Federal Attorney's Office of Environmental Protection  
   - Prevent and control fixed non-mercantile sources and joint participation with DDF in mobile sources.  
   - Issue ecological regulations for various sources and fuels  
   - Monitoring system  
   - Evaluate environmental impact  
   - Provide executive branch with measures to prevent and control contingencies  
   - Inspection, surveillance and sanction  
   b) DDF General Coordination of Urban Reorganization and Environmental Protection and other offices.  
   - Mobile and mercantile sources  
   - Traffic measures to reduce emissions  
   - Operate network of laboratories for analyzing pollution  
3) Ecological commissions in the Assembly of Representatives. Chamber of Deputies and Senators  
4) The PICCA is drawn up by the Technical intergovernmental Secretariat, comprised on representatives from the various secretaries of state, the governments of Mexico City and the State of Mexico. However, the actions they undertake involved a very small number of offices, especially those concerned with more direct actions: SEDUE, DDF, Gov. of the State of Mexico, PEMEX, IMP, SSA, CFE and the private sector. | 1) The PICCA shows congruence between its definition of the problem and the strategies proposed.  
2) It lacks congruence between the definition of the problem as produced by many causes and the public and private sectors which intervene  
3) The institutional arrangement whereby actions are assigned does not capture the complexity of the problem or take advantage of the multisectoral composition of the technico-intergovernmental secretariat to establishing commitments of greater sectoral scope and ensuring coordinate action. |

- **Objectives and Goals**
  - a) Not to exceed international lead norms  
  - b) Not to exceed national and international SO2 norms. Reduce SO2 content in fuel by 2/3  
  - c) To reduce particulates from natural causes and NOx  
  - d) To reduce HC in converters and use better combustion systems in industry and services  
  - e) Reduce total emission to 2.8 million tons  

- **Strategies**
  - 1) Improve fuel quality  
    a) Reformulate petrol  
    b) Reduce SO2 in diesel and fuel  
    c) Oxygenate petrol  
    d) Lead-free petrol in 1991 and later car models  
    e) Recovery if HC vapours in gas tanks  
  - 2) Rationalize-restructure transport  
    a) Catalytic converter in 1991 and later models and in minibuses  
    b) Expand underground, electric transport and public transport  
    c) Renovate Ruta 100 engines  
    d) Continue "One Day Without a car" programme  
    e) Expand verification programme  
    f) Reconvert freight lorries to LP gas.  
  - 3) Modernize industrial technology  
    a) Change fuel oil for gas  
    b) Control emissions  
    c) Prohibit polluting industries  
    d) Carry out industrial monitoring  
    e) Improve combustion processes in services  
  - 4) Prohibit new polluting industries and relocate thermoelectric industries  
    a) Use natural gas  
    b) Winter suspension of two electricity generating plants  
    c) Continuous monitoring  
  - 5) Recover, protection and restoration of affected natural areas  
    a) Urban reforestation programme  
    b) Reforestation of the Valley of Mexico  
  - 6) Control-disposal of solid wastes  
  - 7) Education, communication and civic participation  
    a) Support for scientific and technological research  
    b) Educational information on environmental problems and programmes  
    c) Training of professionals  
    d) Dissemination campaigns on problems and solutions
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<th>Scheme 2. AIR POLICY IN THE VALLEY OF MEXICO 1979-1996; GOVERNMENT PROPOSALS FOR ACTION</th>
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<td><strong>PROGRAMME</strong></td>
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<td>PROAIRE (1996)</td>
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Scheme 3. MODEL SCHEME OF GOVERNMENT ANALYSIS AND INTERVENTION

**GENERAL SOCIAL SYSTEM**
1) Economic model in force
2) Sociopolitical order
3) Accepted notions of well-being and quality of life

**URBAN ORDER AND ENVIRONMENT**
1) Territorial organization of economic activities
2) Pattern of human settlements
3) Territorial expression of exchange systems: transport-road infrastructure-networks
4) Social agents, control of resources and urban order

**Factors which produce pollution**
1) Geographical-natural
2) Meteorological
3) Technological
4) Organizational
5) Demographic
6) Socioeconomic

**Socio-economic processes and technological conditions**
1) Technology and organizational systems for production
2) Technical-physical-chemical characteristics of input
3) Levels and patterns of consumption. Notion of well-being. Socially accepted quality of life

**Economic agents**
1) Petrol industry
2) Metal mechanic industry -
3) Cement industry
4) Chemical industry
5) Automobile industry
6) Other

**Social and political agents**
1) Chamber of the Manufacturing Industry
2) Manufacturing associations
3) Parties
4) Different levels of government
5) Trade Unions
6) NGOs
7) Citizenry, public opinion
8) Other

**Characteristics and composition of substances in the atmosphere**
Emissions inventory
SO₂
CO
TSP
HC
NOX

**Air policy**
1) Strategy and actions per level
a) Physical-chemical
b) Technico-technological
c) Economic processes
d) Patterns/levels of consumption
2) Strategy and actions for other areas of the environment

**Planning system**
1) Hierarchization of policies
a) Economic policy
b) Social policy
c) Environmental policy
i) air
ii) water
iii) natural resources
iv) other

**Proposals for multisectoral action**
a) SEMARNAP
b) DDF
c) SHCP
d) other
2) Social org.
3) Academic org.
4) Political org.
5) Trade union org.
6) Citizenry

**Analysis of congruence**
1) Diagnosis and strategy proposals
2) Inclusion of the different agents in strategies
3) Hierarchization of action according to degree of effectiveness in achieving objectives
4) Congruent assignment of actions per sector and search for real margins for manoeuvre