Air pollution and citizen awareness

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Abstract

The collection of texts included in this book present the aims and results of the project entitled "Enhancement of citizen awareness for the formulation of air pollution control policies in three metropolitan areas of Latin America", which was implemented by the Sustainable Development and Human Settlements Division, with support from the Government of Japan, over the period 2000-2002.

The project focused on an area that is crucial for the success of plans for air pollution control: citizen awareness of environmental issues and, in this specific case, air pollution.

In this context it is appropriate to ask: What value do we place on citizens' awareness of this problem? Is it simply a matter of conviction that leads us to adopt lifestyles that are compatible with environmental protection, or are we facing a more complex phenomenon, such as the need to understand the causes and effects of the problem in order to promote citizens' participation in decision-making aimed at achieving a socially acceptable standard of air quality? Citizen awareness is essential to encourage such participation, and thus to ensure the success of environmental protection policies.

The book is divided into two parts: the first includes two studies, one on the degree of citizen awareness needed to promote air pollution control and proactive action on the part of citizens, and another on the links between participation, citizenship and pollution. The second part of the book presents the results and conclusions of the project carried out in Mexico City, Santiago and São Paulo.

The first chapter contains an analysis of theories on environmental problems as viewed from the perspective of the social sciences, and of the importance of achieving a greater level of citizens' participation as a complement to the traditional ways of formulating environmental protection policies.

The second chapter provides a more in-depth analysis of citizen participation as it relates to the implementation of air pollution control policies in Latin America. The main issues considered in this connection are popular participation in public management and qualitative changes in the relationship between the State and civil society, which are potential turning points in the strengthening of public policies.

The second part of the book examines three case studies conducted in Mexico City, Santiago and São Paulo, including their findings, conclusions and possible future trends. The cities selected are three of those with the region's most serious air quality problems.

During the project's implementation it became clear that none of these cities has attained a degree of citizens' awareness that goes beyond the most basic level, and that a proactive approach to environmental protection is still a very distant goal. There is no question as to the need to involve citizens in actions to restrict the circulation of vehicles, but citizens also need to participate in decision-making processes that will lead the authorities to effectively perform functions for which they already have responsibility, but which they do not carry out because of a lack of pressure from citizens. This last conclusion implies a need to strengthen democracy through a more active level of citizen participation in order to overcome the limitations of the representative model, which in many cases has reached a critical juncture in the region.

Preface

This book brings together the results of a project entitled "Enhancement of citizen awareness for the formulation of policies to control air pollution in three metropolitan areas of Latin America", which was implemented by the Economic Commission for Latin America and the Caribbean (ECLAC), with the support of the Government of Japan, over the period 2000-2002. The project falls within one of the issue areas of ECLAC and its Sustainable Development and Human Settlements Division, namely the creation of environmental citizenship. Citizenship entails a mutual engagement between State authorities and individuals, an engagement that is related to rights and responsibilities in a context of new development imperatives.

Air pollution has become one of the most critical problems of daily life in large cities, and this project focused on a matter that is crucial to the success of plans for controlling it: the participation of the inhabitants of the affected cities. One goal was to undertake a comparative assessment of possible new strategies and mechanisms that would enable the State and the public to make common cause in the efficient management of air pollution control policies in three of Latin America's most emblematic metropolitan areas: Mexico City, São Paulo and Santiago.

This study's underlying premise is that citizen awareness determines the nature of policies to reduce air pollution. More specifically, it assumes that the systematic progress made to date on environmental matters can only be maintained if all citizens are committed to the cause. This means, on the one hand, that the State should consider citizen participation as a central factor in policy-making. On the other, it means that citizens should take charge of the problem since responsibility for it, in the end, is shared.

In view of the special importance of this study, which is related to topics that ECLAC is expecting to address over the next few years in connection with the promotion of more sustainable consumption patterns for citizens living in the urban areas of the region, I felt that the book deserved broader exposure.

For this reason, it is a pleasure for me, one year after the appearance of the Spanish version, to present this new edition in English. I am sure it will be very useful to decision-makers, as well as to citizens, researchers and scholars interested in the complex environmental issues involved in combating air pollution and in the comparative study of different cases in which this problem has been tackled, with varying results.

José Luis Machinea

Executive Secretary of the Economic Commission
for Latin America and the Caribbean (ECLAC)

Introduction

The creation of environmental citizenship is the key to fostering social and environmental responsibility

Alicia Bárcena[1]

The notion underlying this book is the creation of citizenship in the realm of a crucial contemporary environmental issue: air pollution in large cities. Such citizenship is understood as a widening of the public sphere in order to counter the centrifugal force now evident in the private sphere. The aim is to create more mature societies that are aware of collective challenges, and of the responsibilities of individuals and groups towards social organization as a whole.

There is no question that the issue of the environment has opened up new political space for citizens groups in the last decade, and that it has enhanced the goals and strategies of some traditional social struggles. Condemnation has given ever more ground to recommendation, and fanaticism has steadily yielded to informed and more aware citizen control of rights and responsibilities. The most active environmental groups include

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those that emerged from the struggle to improve quality of life in the large cities. In Mexico, for example, air pollution became a leading priority on the citizens' agenda in the 1980s (Bárcena, 1999).

The study's underlying premise is that citizen awareness is a key factor in environmental management geared to reducing air pollution. It is written in the conviction that the systematic progress made to date on environmental matters can only be maintained if all citizens are committed to the cause. This means, on the one hand, that the State should consider citizen participation as a central factor in policy-making. On the other, it means that citizens should take charge of the problem since responsibility for it, in the end, is shared. The acquisition of citizen awareness depends crucially on transparent and systematic access to information. With a problem as important as air pollution, this is the only way to bring public perceptions closer to technical reality.

The incremental growth of motor vehicles contributes to increasing air pollution in large cities. In São Paulo the population grew by 3.4% between 1990 and 1996, and the number of vehicles increased by 36.5%. The same is happening throughout almost all of Latin America. Mexico City has well over 4,000,000 vehicles, and the number in Santiago doubles every five years. Motor vehicle use, in large part private, is one of the main sources of urban pollution. The high rate of vehicle ownership would not necessarily cause serious traffic congestion if cars were not used daily by their owners to travel to work along overcrowded roads. Such behaviour is encouraged by deficient public transport and by the huge size and functional segregation of the cities. These factors contribute to vehicle emissions, and thereby directly affect levels of air pollution.

Measuring air quality is a key element of citizen control. A small group of cities have set up adequate and efficient systems to monitor it, but the vast majority of cities in the region lack such a system. The former group includes Buenos Aires, Mexico City, Rio de Janeiro, Santiago and São Paulo, which are among the world's 21 most polluted cities. All the other cities in the region are in the latter group. They have no means of acquiring regular, reliable and systematic information on the various parameters used internationally to measure air quality. In the last ten years, the cities in the former group have made significant progress on introducing new technologies. These not only measure air quality but also expand the cities' capacity to prevent critical outbreaks by anticipating the decline in atmospheric conditions, thus allowing the authorities to take timely pre-emptive measures. Progress in this area is also evident in the adoption of suitable regulations to shape government policies and initiatives. Cities like Santiago, São Paulo and Mexico City have instituted regulations of a standard close to that suggested by the World Health Organization (WHO).

Carbon and sulphur dioxide are exceptions; in the Latin American cities, the regulations governing emissions of these gases are more permissive (Iizuka and Nicod, 2000). In many cases there are at least mechanisms to act when permitted thresholds are breached (what are known as "environmental emergencies"). The countries that have made progress in the struggle against pollution complement the long-term programmes —changes in production procedures, improvements in the kind of fuel used and so on— with episode-specific measures in the event of emergencies, such as halting some industrial activities, limiting vehicle use and so forth.

The steps taken to reduce air pollution have had a positive effect in some of the region's big cities. In Mexico City, for example, emissions of lead and particulate matter were reduced by such measures as eliminating leaded gasoline and introducing a programme ("Don't Drive Today") to limit the number of vehicles on the roads. Santiago's experience has been similar; the number of emergencies has fallen every year for five successive years. In São Paulo, too, measures such as the abolition of leaded gasoline and control of industrial emissions have helped reduce levels of some atmospheric pollutants in recent years. In general, however, the quality of the air in the region's cities is still unsatisfactory. In the interests of improving it further, the cities should first upgrade the efficiency of the existing institutional apparatus.

The multisectoral nature of environmental management in general, and of air quality in particular, calls for the involvement of a wide range of sectors pursuing sometimes contradictory social goals, such as transport, industry and health. The big cities, moreover, generally consist of large conurbations that fall under different geographic and political jurisdictions. That circumstance calls for sometimes highly complex coordination among local and federal institutions. Hence one of the main challenges facing large metropolitan areas consists of connecting sectoral and regional public policies so as to ensure inter-sectoral and inter-jurisdictional coordination between the regional and federal levels.

It is worth noting that the volume of pollutants released into the atmosphere from fixed and mobile sources is generally related to the level of economic output. Meteorological and topographic conditions influence the dispersal and movement of such pollutants, as well as the scale of the concentrations affecting the environment and its inhabitants. Generally, the effects on the population are much greater in big cities with significant emission levels, adverse dispersal conditions and high urban density. In São Paulo, Santiago and Mexico City, for instance, meteorological factors such as thermal inversion constrain the dispersal of pollutants, while topographic conditions and the direction of the winds in Mexico City and Santiago help mar the quality of the air.

In contrast to air pollution in industrialized countries, which was caused by certain features of the industrialization process, motor vehicles are the prime source of pollution in most Latin American and Caribbean cities. In two decades the main source has shifted from production processes to consumption processes. Between 1970 and 1990 the number of vehicles grew by a dramatic 250%, bringing the total to 37,000,000. If appropriate steps are not taken soon, it seems likely that air pollution in Latin America and the Caribbean will continue to go from bad to worse, undermining quality of life and endangering human health.

The growth of economic activities in the cities requires energy and higher consumption, which generally means higher levels of pollutant emissions. In many emerging countries, increased pollution is seen as an inevitable consequence of economic growth. One argument is that economic growth is good for the environment, since there is an empirical link between a rise in per capita income and some indicators of environmental quality. It has been noted that when income rises, the environment deteriorates to a point at which its quality begins to improve. This phenomenon, known as the "Kuznets environmental curve" has provided a pretext for the "grow now, clean up later" approach.

This argument has to be viewed with care, and in the light of sustainable development. The latter has been defined as the kind of development that meets the needs of the present without compromising the capacity of future generations to meet their own needs. Environmental protection is an integral part of the development process, and that process is viewed from a global and long-term perspective. From that standpoint the Kuznets environmental curve argument is open to dispute, because the empirical evidence of the link is valid only for pollutants in the short term, not at the global level and over the longer run. Moreover, the inverted curve refers solely to the reduction of emissions at the national level, not the global level. A reduction in pollutants in one country, for example, might entail an increase in other pollutants in another country, or the transfer of pollutants to other countries. Finally, in most cases where a rise in income has been accompanied by reduced emissions, the decline stems more from institutional reforms, or better environmental legislation, or market incentives based on local interests.

Economic growth in itself, therefore, is not a panacea for the ills of the environment. It has to be underpinned by mechanisms that offer the right incentives for sustainable development.

In addition to a change in the traditional thinking about economic growth and environmental conditions, there have also been changes in the causes of environmental damage. The 1998 Human Development Report

by the United Nations Development Programme (UNDP) points out that world consumption currently stands at US$ 24 trillion a year, six times higher than in 1950. The report argues that unsustainable consumption growth is exerting unprecedented pressure on the environment. According to the United Nations Environment Programme's (UNEP) Agenda 21, current consumption patterns are the leading cause of continuing environmental degradation world-wide.

Developing countries need a new approach to environmental problems, one that includes sustainable consumption patterns in development processes and guarantees universal access to basic services. This is particularly important in the cities, which are the source of 60% of national output and are displaying many of the symptoms of the environmental and development crisis. Hence the cities, in line with national and local legislation and regulations, must institute and enhance programmes to resolve these problems so that their development can be steered towards sustainability.

As Agenda 21 points out, an improvement in the urban environment requires that social organization and environmental awareness be fostered. The effectiveness of such action is evident in those cases where the positive influence of a public of environmentally aware consumers combines with some industries' growing interest in adopting clean production techniques and entering the market with eco-labelled products.

In the past, environmental problems were resolved by regulating production processes. Now, environmental legislation and regulation are still applied, accompanied by market incentives. The change in the traditional thinking, and in the leading causes of pollution, demands an innovative approach to environmental management.

Tietenberg stresses the importance of investing in the provision of information on pollution control as a means of strengthening the legal and regulatory framework (command and control methods) and the market incentives. These latter, such as tradable permits, fines on emissions, reimbursable deposits and performance bonuses, have recently been introduced in some countries to replace or complement the traditional means of controlling pollution. In many developing countries, however, the effectiveness of command and control methods and market incentives is constrained by the limited financial, institutional and administrative capacity to apply them (Tietenberg, 1997).

In addition to these constraints, the region is finding it difficult to manage the environment effectively because of institutional deficiencies in the flow of information between key actors, and because of the latters' failure to participate.

An information strategy, one geared to the large-scale provision of public information on pollution, must be devised to tackle these difficulties and to ensure greater public and private sector participation.

The provision of complete information would, first, bring citizens up to date on the pollution issue and, second, induce their participation in the enhancement of environmental management, either voluntarily or through the pressure of public opinion.

When information on the environment is made available, it is important to identify the right users and to channel enough information of sufficient quality towards them. This enables people to make the right kinds of decisions about their consumption patterns, and to intervene as informed citizens in the participatory processes that must be a part of environmental management. The government's role in this is to supply exhaustive information on current regulations, market incentives, and changes in pollution levels. Moreover, it will be crucial to feed back the spread of information through indicators on citizen's understanding of environmental matters, on the quality and quantity of their knowledge and, above all, on the extent to which awareness of pollution has been raised. This is important for the new approaches to environmental policy-making.

Providing information is crucial in the case of air pollution, in which there is no contractual relationship between the polluter and the citizen affected by the pollution. The existing studies focus on those cases in which there is a clear connection between benefits and costs for the actors involved, and on small areas such as a home, a workplace, or a particular locality. In the case of air pollution, by contrast, the connection between benefits and costs is somewhat weak, and the context in which the pollution occurs is much more complex in terms of the actors' presence. Car drivers and people who operate some polluting device, for example, might not be those whose health is damaged by air pollution. The economic costs of medical care are shared out, and are unrelated to the costs of driving or to other polluting processes. Furthermore, even if a driver suffers from some illness related to air pollution, limiting his emissions (or limiting his benefits by not using the car) is of no direct advantage to him, and his illness persists because of the pollution produced by other vehicles.

Unlike environmental problems arising from industrial processes, the identity of the polluter is unclear; it could be oneself, or someone in another continent. This dissociation and overlap between the roles of polluter and victim suggest that the prevention of environmental problems must include collective initiatives born of enhancing an informed environmental awareness.

To that end, perhaps the main challenge facing the region's cities in their efforts to reduce pollution is the development of a citizenry that can

generate a social pact on how to manage the quality of the air in large urban areas. It is a matter of defining each actor's responsibilities in the city. Every social actor has different responsibilities in the field of air pollution, and every group represents different interests and values. Someone who owns a car and drives it daily, for example, does not have the same responsibility as someone who uses public transport. Teachers and the media have a different responsibility: to harness knowledge and information as a means of changing collective behaviour. Academic groups and universities, in turn, should monitor the problem and make technical recommendations for solving it. For their part, industrialists should have the capacity and responsibility to mobilize capital and technology for cleaner production purposes. Parliamentarians and local authorities, as the elected representatives of the people, should uphold the common good over private interests.

Citizens, with their different roles and responsibilities, should not solely be objects of public policy-making. They should be proactively involved in reducing pollution through more effective and proposal-orientated mechanisms for citizen participation. To that end municipal and regional governments will have to design social communication strategies that restore citizens' confidence in the State, and thereafter give rise to the shared management of pollution control policy.

In this project, citizen awareness is not treated as something that can replace regulatory and market mechanisms in environmental management. On the contrary, the aim is to explore how such awareness can be used to strengthen and improve the effectiveness of environmental management processes, by providing the public with appropriate information. While it is true that countries increasingly use formal and informal mechanisms in their regulatory institutions and frameworks (so as to promote or facilitate citizen participation in environmental management), there is still a certain hesitancy and excessive formalism in adopting and implementing such instruments.

This book is the fruit of two years of research in a project entitled "Enhancement of citizen awareness for the formulation of air pollution control policies in three metropolitan areas of Latin America". The project was coordinated by ECLAC's Sustainable Development and Human Settlements Division, with support from the Government of Japan.

The book is divided into two parts. The two chapters in Part One establish the links between participation, citizenship and pollution. They recognize the importance of citizen awareness to bring about a reduction in air pollution and traffic congestion, and to transform the behaviour of the public. The second part presents the findings and conclusions of case studies on three cities: Mexico City, Santiago and São Paulo. Finally, the book's conclusions consider some options for future action.

The first chapter presents the general theoretical framework, drawing on current debates about, and conceptions of, citizens' participation in environmental issues. To some extent it complements the project's three case studies on air pollution in Mexico City, São Paulo and Santiago, and uses a social science perspective to locate them in the broader context of theories on how environmental problems have changed. The central thesis is the importance of greater citizen participation as a supplement to traditional forms of environmental policy-making.

The second chapter addresses citizen participation in relation to specific policies to prevent and control air pollution in Latin America and the Caribbean. The linking thread in this chapter concerns popular participation in public management and qualitative changes in relations between the State and civil society. These are pivotal to enhancing public policies.

The five chapters in Part Two are arranged as follows: the first focuses on the methodology of the three case studies (Mexico City, São Paulo and Santiago), including the research variables and the methods used to systematize the information acquired in interviews with key groups and actors. The second, third and fourth chapters describe and analyze the findings of each case study: Mexico City, Santiago and São Paulo, respectively. The final chapter consists of a comparative analysis of each of the case studies, with a series of recommendations and conclusions.

It became clear in the course of the project that in none of these cities does citizen awareness go beyond ill-informed perceptions and basic levels of understanding. A mature and proactive approach to socio-environmental behaviour remains a distant goal. There is no question that citizens should be involved in the implementation of concrete measures to restrict traffic. At the same time, however, they need greater and more transparent access to information that spurs them to participate further in the kind of decision-making processes that prompt the authorities to adopt concrete measures. It is the authorities' responsibility to take such steps but they do so inadequately, precisely because of the lack of public pressure.

Implicit in this latter conclusion is that democracy must be enhanced through a more active form of citizen participation, one that escapes the confines of the representative model and finds expression in participatory models. In that sense the expansion of citizen awareness demands a mutual engagement between the public authorities and individuals, an engagement that is related to rights and responsibilities in a context of new development imperatives. It also implies greater access to information and opening up discussion fora, so as to create and enjoy such "public goods" and "social value goods" as the quality of the air that we breathe every day. This means

that "the public sphere" should be viewed less as "the State sphere" and more as the arena of collective interests, one inhabited by a more mature society. The aim is to institute mechanisms that strengthen the fabric of citizenship in a context of shared problems (ECLAC, 2000).

The main conclusion is that creating citizenship is the key to a new sense of civic-mindedness to the social and environmental responsibilities of companies and the State. The sense of working for a healthy environment is something built in daily routines and in personal and group relationships. For that reason environmental awareness can only give rise to effective action when citizens are organized and ready to learn, to understand, to demand their rights and to exercise their responsibilities (ECLAC, 2000). Critical and aware citizens are those who understand, who take an interest, who stake a claim to their environmental rights and demand them of those in whom they are entrusted, and who are willing to assume their own environmental responsibilities. When they organize and take charge of steering their own lives, these citizens acquire political power and the capacity to bring about collective change.

Part One

- Chapter I

  The importance of citizen awareness in
  controlling air pollution in metropolitan areas of
  Latin America: the theoretical framework

- Chapter II

  Citizens' participation and enhancing their
  active involvement in air pollution control in
  Latin America

Chapter I

The importance of citizen awareness in controlling air pollution in metropolitan areas of Latin America: the theoretical framework

Michiko Iizuka[1]

Introduction

The project "Enhancement of citizen awareness for the formulation of air pollution control policies in three metropolitan areas of Latin America" ("Project CCC", based on its acronym in Spanish) began by posing some very simple questions: What does the public think of air pollution? How environmentally aware are the inhabitants of Latin American cities? How does such awareness affect their behaviour?

A series of extensive studies on pollution in Latin America's big cities —among many others, Mexico City, São Paulo and Santiago— indicate that the main cause is the emission of vehicle exhaust gases, in conjunction with the public's consumption habits (UNEP/WHO, 1992; Sandoval, Préndez and Verksen (comps.), 1993; Elsom, 1996; World Bank, 1998; Faiz, Weaver and Walsh, 1996; Lacy et al., 2001; Iizuka and Nicod, 2000; and Jacobi and Valente de Macedo, 2001).

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The research undertaken during "Project CCC" sought to determine the extent of the awareness and the public's behaviour, and how these related to the promotion of environmental policies geared to reducing air pollution.

In the light of current debates on and conceptions of the issue, this chapter outlines the general theoretical framework so as to facilitate an understanding of the project's approach in its specific context.

Why is environmental awareness important to the analysis of environmental problems?

Environmental policy-making has been in the hands of a small group of legislators or "specialists" with technical expertise. The public's perceptions and awareness have rarely influenced the process, but in both the developed and developing worlds it is increasingly acknowledged that the population should play a more active role in making and implementing environmental polices. Public participation in environmental policy-making is now viewed from this perspective (Keeley and Scoones, 1999; and Holmes and Scoones, 2000).

Policy-making has changed for the following reasons: (i) a recognition that environmental problems are not solely "natural" or "scientific" but, increasingly, the outcome of social phenomena prompted by the population's daily activities; and (ii) a change in the nature of environmental problems, as shown below.

Acknowledgement of the social character of these problems is a significant shift, since it links their "scientific" and "technical" aspects to the social sciences. The change in the nature of environmental problems is connected to that shift to some extent, but it is much more related to what is currently happening in the environmental field, and to a transformation in the roles of the actors involved: the government, industry, and civil society.

The aim of this chapter is to complement the three case studies on air pollution in the big cities, locating them in a broader context that embraces the following issues: (i) a theoretical examination of environmental problems from a social science perspective; (ii) the change in the nature of environmental problems; (iii) greater citizen participation as an alternative to traditional environmental policy-making; and (iv) some conclusions from a regional standpoint.

A.   Recognizing environmental problems as a social issue

1.   How do the social sciences view environmental problems?

Given the scientific nature of studies on the environment, for many years the natural sciences have made a significant contribution to solving environmental problems (Wynne, 1996; Beck, 1992; Yearly, 1997). Until recently, the social sciences[2] played a very limited role in environmental policy-making.

a) Sociology

For all the "godfathers of sociology", such as Durkheim,[3] Weber[4] and Marx,[5] the environment was peripheral to their analysis of society (Woodgate, 2000). For these theorists, the environment was a "non-social factor" and "a given context" within which social phenomena occurred. They believed, moreover, that the link with society and people did not change the environment.

Giddens's structuration theory was one of the first attempts to include the environmental factor in the process of social change (Craib, 1992). The theory links structuralist elements of social theory to more constructivist approaches,[6] and the analysis is based on three concepts:

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[2]   In this context, the term "social sciences" refers to sociology and economics, unless otherwise indicated.

[3]   Durkheim stressed the importance of analyzing "social facts" or the structure of society (structuralism). In his studies he distinguished the social world from the physical, biological and mineral worlds. Nonetheless, he also regarded society as phenomenon of nature, which suggests that nature is separate from, and a precondition for, society. It is thus beyond the realm of sociological studies. In other words, Durkheim did not view the environment as socially produced (Woodgate, 2000).

[4]   Weber, in contrast to Durkheim, rejected the notion of society as an object of study and preferred to make social action the focus of sociological research. He regarded society as the sum of social actions, an approach known as "constructivism". According to Weberian sociology, the environment is not a determining structure (Woodgate, 2000).

[5]   Marx viewed society as a system of social relations and stressed its particular importance in the production process. This involves a relationship between humans and nature, but for Marx this relationship is static and is not a force for systemic change (Woodgate, 2000).

[6]   Giddens establishes this link by stating that while the reproduction of society always represents a specialized achievement of its members, it is important to reconcile this fact with the notion that those who make up a society do not do so merely under conditions of their own choosing. In other words, Giddens proposes that there is a mutual dependence between structure and agency, what he calls "structural duality", in which the structural properties of a social system are simultaneously the medium and the outcome of the practices that constitute that system.

social system, social structure and structuration (CRAIB, 1992). The first of these is a set of permanent social practices; social structures modify norms and resources; and structuration is the set of conditions according to which the members of a system determine the structures' continuity or change, thereby influencing the systems' reproduction. This means that the system comprises the daily activities of the members of society, simultaneously empowered and constrained by a system's norms, resources and structures. The system reproduces itself or changes over time because of the intended or unintended consequences of its actions, which lead either to the reproduction or reformulation of social structures (Woodgate, 2000).

Giddens (1991) sought to examine society from another viewpoint: not as a structure that shapes the behaviour of individuals (structuralism), nor as the sum of those behaviours (constructivism), but as a combination of the two. With this theoretical framework the environment can be viewed as a system whose structures facilitate and constrain human activities, and the way in which such activities alter the environment can be identified. In short, this framework makes it possible to discern, from a much broader sociological perspective, the link between society and nature (Woodgate, 2000). It is important to note that because it distinguishes between the system, the structure and social practices, this theory has facilitated analysis of environmental conduct (social practice) and environmental policies (system and structure) (Spaargaren, 2001).

b) Economics

Environmental factors have formed part of economics since the eighteenth century, which is not the case for sociology. Despite the attention paid to the issue, all the classical economists —among them Malthus,[7] Ricardo[8] and Mill[9] (Malthus, 1798; Ricardo, 1817, and Mill, 1857, cited in Turner, Pearce and Bateman, 1994)— viewed environmental factors as

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[7]   Malthus perceived the environment, the availability of cultivable land, as "absolute limits". His conception of environmental constraint is formulated in terms of a fixed amount of land, which inevitably leads to a reduction in the amount of foods available to each person as the population expands. This spawns famine and war, the "stationary state". He maintained that this was the only way of reducing the population to sustainable levels (Turner, Pearce and Bateman, 1994).

[8]   Ricardo focused on the "relative limits" of economic growth. This concept distinguished between two kinds of resources: superior and inferior. His theory maintained that when better resources are depleted they are replaced by the inferior resources, while the cost of the resources rises as they becomes more scarce (Turner, Pearce and Bateman, 1994).

[9]   John Stuart Mill was one of the first political economics to consider technology's role in the economic model. In his view, technology stabilizes the relationship between the economy and nature. He also argued that economic growth would come to a halt when capital stock and material stock were constant (Turner, Pearce and Bateman, 1994).

"constraints on growth". Nonetheless, it should be kept in mind that eighteenth century economists were still developing some basic principles, such as the link between the environment and economics, population growth, per capita consumption, technological innovation and constant capital (steady state).

Environmental economics emerged as a new branch of the discipline in the 1960s, in tandem with the debate on the environment in developed countries (Potter and Richardson, 2000). Environmental economics is based on neoclassical concepts and views environmental problems as the result of market failures, since the environment is a public good. Environmental economics thus proposes correcting the "public good" features of environmental resources by properly pricing the attendant externalities[10] so that they can be traded in the market. The chief goal is to fix a balance in the meeting of needs, by means of an efficient allocation of scarce resources.[11]

In line with the neoclassical model on which it is based, environmental economics is founded on the premise that markets comprise the best instrument for securing appropriate resource-allocation, and that individual interests can be controlled for the benefit of society and the environment. In short, according to the neoclassical model, human beings express their preferences through what they choose to consume in the market. This approach has been criticized from the standpoint of ecological and institutional economics, whose proponents argue that environmental economics neglects how personal tastes and preferences are shaped among individuals and over time.

Ecological economics views the preferences as an endogenous factor, and contests the neoclassical premise that cost and benefit are the only determinants of those preferences. Institutional economics takes account of the development of social institutions, which allow more actors to take part in the environmental decision-making that complements market mechanisms. Ecological and institutional economic approaches are not predominant, but they are an interesting way of thinking about environmental issues in an economic context.

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[10] Externalities are evident when the activities of an economic agent, such as a firm, have consequences unrelated to prices and that are not offset by other agents.

[11] There are three kinds of diagnosis and their corresponding prescriptions for dealing with externalities: (i) the problem is attributable to incorrect prices, which should be adjusted by means of taxes or subsides; (ii) the problem arises from the absence of a pollution-related market, which should be created by means of tradable permits; and (iii) the problem springs from inadequate property rights, which should be rectified.

Table I.1 presents a summary of some of the main differences between neoclassical and ecological-institutional theory in the following categories: ecosystems, socioeconomic system, methods and tools. From the ecological economics perspective, Daly and Cobb (1989) have mentioned the importance of viewing the human community as part of a broader community that includes beings other than humans. From a sociological perspective, Dunlap and Catton[12] have expressed a similar idea with respect to the argument about "value change". This is addressed in the following section.

The environment has been a feature of economic and social thinking for a long time, but it has been in a subordinate position. Both sociology and economics viewed the environment as "a given context" in which sociological and economic activities unfolded. Sociology regarded this "context" as a neutral factor with no influence on social practices and structures. In economics, the environment was seen as negative because it was judged to be a "constraint" on growth. Both disciplines have changed in recent years. The new structuration theory has arisen in sociology. This regards the environment as an "active" component of social change, one that has significant influence on social practices and structures. In economics there is an effort to integrate environmental factors into the market through prices and valuation, while ecological economics goes further in its efforts to adapt the economic structure to environmental conditions. The growing importance of the environmental dimension of these two disciplines has been evident since the 1980s, and the trend seems to be irreversible.

Table I.1
COMPARISON OF DIFFERENT SCHOOLS OF THOUGHT IN ENVIRONMENTAL
ECONOMICS

Ecological	Neoclassical	Ecological-institutional
Links between the economy and the environment	Mechanicist, static, atomist, reductionist and determinist, Many exogenous variables and preferences, social institutions, ecological limitations.	Dynamic, inter-connected systems that evolve simultaneously. All relations (economic, social, ecological) are endogenous.
Ecological thresholds	Fluid and continual ecological damage. Capital substitution alleviates real constraints Continual environmental damage functions.	Centred on discontinuous, unpredictable and irreversible entropy and change in ecosystems around critical thresholds. Less optimistic about substitution.

Continued

[12] Dunlap and Catton (1979) argue that the human exceptionalism paradigm would be replaced by a new ecological paradigm. These two paradigms are analyzed in detail in the following section.

Table I.1 (conclusion)

Ecological	Neoclassical	Ecological-institutional
Socioeconomic systems		
Human behaviour and the environment	Consumer free will and sovereignty; instrumental exploitation of nature to satisfy individual human preferences.	Prudential approach to meeting human needs; acknowledgement of rights; importance of social norms.
Environmental values	Monetarist and utilitarian values expressed in a willingness to pay "Exogenous" preferences.	Recognizes private and citizen values; biophysical values; endogenous preferences.
Ethics and rights	Inter-generational justice ensured by equal access to the same value of capital stock (natural and constructed).	Assigns rights to future generations; need to retain a critical stock of natural capital.
Social choices and decisions	Consumers' sovereign capacities; decisions facilitated by cost-benefit analysis.	Rejection of cost-benefit analysis as the only option of social choice; social institutions allow greater participation in environmental decisions.
Productive processes and technology	Specialization, cost displacement; technological "optimism" towards the prospect of attenuating resource scarcity and ecological constraints.	Diversification and decentralization as means to attenuate resource scarcity.
Methods and tools		
Academic position	Disciplinary.	Interdisciplinary.
Main tools and methods	Valuation; cost-benefit analysis; policy analysis; tools-focused.	Pluralist approach, based on tools from different disciplines; focused on problems rather than tools.

Source: Graham Woodgate, *Environmental Sociology*, London, Wye College, University of London, 2000.

2.   New concepts that explain the relationship between society and the environment

As a result of the growing attention paid to environmental problems in the social sciences, new concepts have arisen to explain the link between society and the environment. One of these concepts is "co-evolution", which refers to the connections between society and nature (Norgaard, 1994). According to this idea, changes in nature are part of evolution, while changes in society are part of structuration. In sociology, co-evolution is seen as a continuous and interactive synthesis of nature and society; in economics, it is viewed as an alternative to neoclassical theory. Ecological economics highlights the importance of co-evolution as a concept explaining the link between economics and the ecosystem. Box I.1 and figure I.1 describe co-evolution in greater detail.

The theory maintains that rectifying unsustainable development depends not only on applying new technologies to the environment but also on a change in "perception", since the choice and use of technologies is embedded in the social structure, which is an outcome of modern technology (Norgaard, 1994).

Box I.1
THE CONCEPT OF CO-EVOLUTION

Western science facilitated the use of coal and petroleum, but the availability and use of these stock hydrocarbons, in turn, helped determine the directions and intensity of effort of Western Science. The environmental side effects of fossil hydrocarbon-fuelled agriculture and industry co-evolved within modern social order. The pattern of people living in cities, the organization of people to serve multinational industrial enterprise, the centrality of bureaucratic order and the use of Western science for social decision-making have all coevolved around fossil hydrocarbon-fuelled development. This co-evolutionary process resulted in a considerable concentration of power and material wealth in modern industrial societies, which they used to force Westernization of others. Simultaneously, non-westernized peoples sought the same power and material wealth through the adoption of modern knowledge, social organization technology. Correcting the unsustainability of development is not simple a matter of choosing different technologies for intervening in the environment, however. The mechanisms for perceiving, choosing and using technologies are embedded in social structures which are themselves products of modern technologies.

Source: Richard Norgaard *Development Betrayed*, London and New York, Routledge, 1994.

Figure I.1
CO-EVOLUTION: ACTIVE LINKS BETWEEN SOCIETY AND NATURE
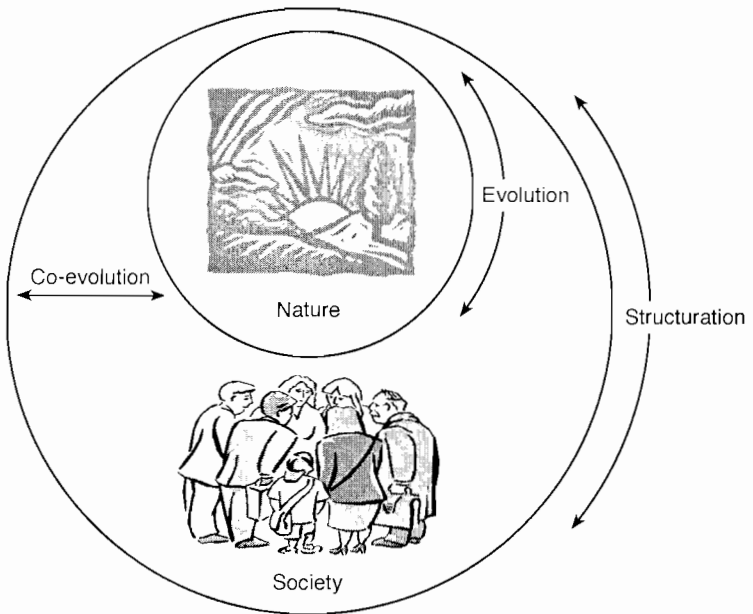
Source: Graham Woodgate, *Environmental Sociology*, London, Wye College, University of London, 2000.

Another new and important concept is ecological modernization. This was developed by Mol (1997), who applies co-evolution to the environment. Ecological modernization centres on the process of constant and conscious change that transforms institutions, companies and consumers, and that leads them to recognize the value of the environment. Taking the chemicals sector as an example, Mol showed that its industrial structure had evolved ecologically and consciously through its interaction with the government and civil society. Viewed in the light of this example, ecological modernization is a concept related to the institutions of modern technology, the (market) economy and State intervention. The concept has continued to be redefined in a enduring debate with exponents of many other theories on environmental reform, such as risk society theory and modernist theory. Mol gives the concept four characteristics.

First, he defines modern science and technology as central institutions of ecological reform, rather than condemning them as causes of ecological and social upheaval. In the age of conscious modernity, the path of scientific and technological development is changing. In this "new age", the use of technology in a sustainable society's development process

is a matter of crucial importance. The contribution that science and technology make to solving environmental problems has ceased to be "curative" and has become "preventative". Additionally, a circular system is materializing in which waste materials are used as inputs. The concept evolved markedly in the industrial sector: from simple systems to curb pollution in the final stages of the process (an idea much criticized in the 1970s), to the clean technology systems of the United Nations Environment Programme (UNEP) and zero emission systems[13] (Suzuki, undated; Capra and Pauli, 1995).

Second, he stresses the importance of market dynamics and the economy for environmental reforms, and the role of innovators and other economic actors as social transmitters of ecological restructuring. This reaffirms the concept of sustainable development, which contends that there is no basic contradiction between economic growth and environmental protection. Improving the environment can be combined with economic development by controlling emissions and waste, but for that there must be a marked change in the nature, substance, pace and geographic distribution of growth. The internalization of external effects through the "economization" of ecology is one of the mechanisms proposed by ecological modernization. It also recommends that insurance companies, lending institutions, consumers (industrialists), certifying organizations, industrial associations and others link environmental norms with economic processes.

Third, while he is highly critical of States with strong bureaucracies, he acknowledges that state participation is essential for environmental management in the form of decentralized and participatory policy-making. Notwithstanding this admission, Mol avers that the State's role in environmental policy is changing or will have to change, so that policy becomes preventative rather than curative and reactive, participatory rather than "closed", decentralized rather than centralized, and orientating rather then suppressive (Mol, 1997).

Moreover, he maintains that some of the incentives, duties and responsibilities of environmental restructuring are ceasing to be part of the State sphere and have been transferred to the market. An example is the private sector's voluntary certification of products and processes (ISO

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[13] The concept of zero emissions was proposed by the United Nations University in Tokyo, Japan. It is based on the full and effective use of the planet's limited resources, and on minimizing the impact of human activity on the environment. Development of an environmentally sound material processing cycle is one of the prime means of minimizing waste and of increasing the resulting revenues by means of innovative and productive ideas (Suzuki, undated).

14000 among others), through environmental audits, competitions for environmental performance and the creation of niche markets. This becomes a new form of regulation adopted by the private sector. It leaves fewer (but essential) things for the central State to do in environmental policy-making, and it changes the State's relationship with society and the economy.

Finally, the reorientation of the State and the market in ecological modernization theory has also changed civil society's circumstances and its role in environmental transformation. In an initial stage, civil society acted as a driving force and channel for proposals on environmental reorganization. Its original role was to ensure that the environment was included on the public policy agenda, and to raise questions about the limited rationale behind technical-economic development. Because of the institutionalization of the environmental issue, however (which came about in response to changes in the State, the market, and science and technology), civil society's role has slowly begun to shift from that of a critical and independent participant, one devoted to ecological transformation, to that of a collaborator. In view of civil society's power and capacity to spawn ideas, mobilize consumers and organize public support or resistance, it is important that the other actors, including the State and the private sector, secure its support in environmental policy-making (Mol, 1997).

This explains the upsurge of interest in the environment in the social sciences, and provides a basic frame of reference for viewing the issue in future, in line with new concepts that facilitate understanding of the mounting importance of interactions between the environment and society. Doubtless the transition heightens the importance of the various actors and their opinions.

The chief cause of the changes evident in the social sciences was the transformation of citizens' value systems, although it can also be attributed to the change in the nature of environmental problems. This issue is examined in the following section.

3.   Change in value systems: is the environment accorded greater value?

All human beings are part of a social structure, and thus their decisions are determined by their values and their worldview (Stern, Dietz and Guagnano, 1995; Inglehart 1990). Worcester (1996) defines "value" as "the strong waves of public opinion, which change slowly but have great force". It is said that a human's value system or worldview is fundamental, that it rarely changes, and that it has a great influence on perception and individual preferences, which are expressed in behaviour. This is because

the value system acts as a "filter" for information (Kempton, Boster and Hartley, 1995) and determines attitudes and future actions.

The various studies of value systems and the environment all agree that there has been a change in values. Studies by Ronaldo Inglehart (1977, 1990 and 1997), author of one of the earliest and most extensive analyses of the issue, centres on a society that increasingly questions the benefits of modernity and material well-being. Ingelhart developed the theory of "post-materialist societies", according to which a society's culture —its members' basic values and beliefs— is closely linked to the economic and political system, and the heightened interest in the environment is a feature of the transition from "materialist" to "post-materialist" values (Inglehart, 1990 and 1997). This shift is interpreted as a renouncement of the interest in material well-being and security prevalent over a long period, and its replacement by greater interest in quality of life, including a healthy environment. Later, Ingelhart expanded his thesis on materialism and post-materialism, and focused on "modernization" and "post-modernization". He defined the latter as a selective reappraisal of the transition or the emergence of new values and lifestyles. In contrast to his previous work, his 1997 study also examined the process of democratization and citizens' political participation, which he viewed as symptoms of post-modernization.

Beck (1992 and 1996) posited a modernity that is reflected in various realms and that poses risks. This is similar to Ingelhart's approach in its assessment of society's characteristics and their advantages. According to Beck, in the early days of industrial society, science freed societies from traditional constraints through a process of "simple modernization" and promised them greater control and management capacity. In older societies, people spent much time producing "wealth", but when the struggle for daily bread lost its urgency, the notion spread in many countries that the sources of wealth were "polluted". This has increasingly severe "dangerous secondary effects", and aroused awareness of the dangers of modernity. According to Beck, "risks, as opposed to older dangers, are consequences that relate to the threatening force of modernization and to its globalization of doubt. They are politically reflexive" (Beck, 1992). Beck argues that there is a transition from an industrial society to what he terms a "risk society". This change is happening at least in developed countries, and the negative consequences of "wealth" are subject to greater attention. In the "new age", which Beck identifies as reflexive modernity, science does not offer the prospect of control and foresight. Rather, it creates risks and uncertainty, secondary effects of the processes of scientific discovery and technological change (Beck, 1992).

By contrast, Dunlap and Catton (1979) focus on the relationship between society and nature from a sociological standpoint. In their view,

sociological thinking should undergo a paradigm shift, since traditional sociology is unable to solve environmental problems. This is because such problems respond to a particular worldview, the "paradigm of human exceptionalism", that takes account of neither the environment nor biophysical perspectives. Hence they deem necessary a new ecological paradigm that, unlike the preceding one, regards humans as part of nature. Advocates of this new paradigm believe that if this worldview were to become widespread it would facilitate an improvement in environmental conditions (Buttel, 1996; Taniguchi, 1998; Buttel, 2001 and Dunlap, 2001). Box I.2 outlines the differences between these two paradigms.

Box I.2
MAIN CHARACTERISTICS OF THE PARADIGM OF HUMAN EXCEPTIONALISM
AND THE NEW ECOLOGICAL PARADIGM

The paradigm of human exceptionalism

1. Human beings occupy an exceptional place in society because they have developed a culture.

2. Cultural diversity is limitless and culture changes much faster than biological characteristics.

3. The difference between humans and nature lie in their socialization to adapt to the environment.

4. Thus the accumulation of culture makes it possible to solve social problems and guarantees unlimited progress.

The new ecological paradigm

1. Humans are only one of the species that depend on the life of the community.

2. The natural fabric is marked by complex relationships between factors, outcomes and information. Human activities in this fabric can have unexpected outcomes.

3. The world is finite and there are physical and biological limits on economic growth.

Source: Yoshimitu Taniguchi, "American environmental sociology and the paradigmatic debate", *Kankyo Shakaigaku Kenkyu*, vol. 4, N° 4. 1998.

These concepts highlight the way that the value system has changed in recent years. They show that society in general is at the dawn of a new age because it is approaching the threshold of "wealth" or "material well-being". People have begun to place a higher value on non-material well-being, including the quality of the environment. These ideas are based on the experiences of developed European countries, and thus it is dangerous to regard them as universal. Nonetheless, some studies find that (albeit in

a different way), this tendency to accord a higher priority to the quality of the environment than to economic growth is apparent in developing countries (Fujisaki et al., 1997; Dunlap, Gallup and Gallup, 1993). The trend might become clearer as countries democratize, as information is made available, and as the population becomes aware of the environment and adverse risks.

This line of reasoning underscores various important points. First, quality of life is basically determined by the way people regard their circumstances in subjective terms. Second, and in line with the same principle, the environmental "problem" is determined by the population's perception. For people, the environmental "phenomenon" does not become a problem until it is perceived as such. The current tendency to change values reveals a preference for environmental values, which take primacy over economic growth. These notions of a value shift are based on what has happened in developed countries, and thus they cannot be applied automatically to developing countries. Nevertheless, they do reveal a significant trend that calls for detailed research in the social and economic context of the developing world.

4.   Analysis of the tendency to become environmentally aware

Opinion surveys on the environment comprise one of the first attempts to analyze its interaction with society. Many studies of environmental awareness use the findings of these surveys as indicators of attitudes to the environment and to society. Trends in the public's opinion of the environment were regarded as a measure of awareness from the 1970s to the early-1990s. Dunlap's extensive study of environmental awareness in the United States (Dunlap et al., 1992) reveals a sustained increase in environmental awareness despite the meagre availability of information on global threats (Glaeser, 2001). Studies of the European Union[14] and Japan[15] reach similar conclusions. Using the available data on environmental awareness, which correspond to chronological series, it seems plain that concern for the environmental will not easily wane.[16]

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[14]   Questions on the environment have been included in the European Union opinion surveys known as "Eurobarometer" since 1989. The surveys monitor Europeans' attitudes.

[15]   The Japanese Government carried out a series of surveys on the environment in the 1960s and 1970s, when industrial pollution was having serious effects on the population.

[16]   These studies have some shortcomings. First, public interest in the environment fluctuates in line with the level of media attention to the issue. Second, the surveys used different methodologies, thereby hampering simple comparisons. In general, however, there is a sustained increase in environmental awareness, with some differences depending upon the issue considered (Iizuka, 2000).

Moreover, a number of international studies of environmental awareness (Louis Harris and Associates, 1989; Dunlap, Gallup and Gallup, 1993, and Dunlap and Metig, 1995)[17] also reveal substantial public interest in environmental problems. Additionally, and surprisingly, there is no great difference between levels of environmental awareness in developing and developed countries. This might be an indication of a "value shift" at the global level, similar to that mentioned above (Inglehart, 1990; Beck, 1992; Dunlap and Catton, 1979).

Despite the general tendency to accord a higher priority to the environment than to economic growth, in both developed and developing countries it is apparent that perceptions of the problem vary. The question "what causes environmental problems?" elicits different responses in the two groups of countries. In the developed countries, people usually ascribe environmental deterioration to consumption patterns. Those in developing countries usually attribute it to population growth and lack of education (Mistuda, 1992, and Dunlap, Gallup and Gallup, 1993). This difference is evident in surveys conducted in four Asian countries (China, Japan, Thailand and Vietnam) (Rambo, 2001). In China, "noise", "broken toilets in public bathrooms" and "dirty streets" are regarded as the most serious environmental problems. In Vietnam and Thailand, deforestation is mentioned as the main cause of climate change. These findings show that perceptions of the environment change constantly, as does the social and economic structure. Environmental problems therefore "adapt" to local circumstances. Consequently, local policy-making demands specific adaptations that take account of local perceptions of nature, which are constantly influenced by the geographic, cultural, social and economic features of their context.

The perception of the "crisis" is the chief factor to be considered in deciding how to solve environmental problems. There have been various responses to public concern, such as projects, strategies and laws. Much of the policy debate has centred on the tools to be used to tackle the problem, rather than on whether the questions have been posed correctly. The policy-making process nonetheless has certain intrinsic features, and hence the policies always turn out to be similar. Technical analysis of them, therefore, can be limited. There could be demands, among other things, for a broader assessment of the policy-making process. Important in this regard are studies of environmental awareness and public perceptions of environmental policies, since an understanding of how the situation is framed normally

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[17]   The extensive international Harris poll on public environmental attitudes and leadership in the five continents (1989) and the Gallup poll on the health of the planet (1992). For more information see Iizuka (2000).

determines the kinds of problems identified and the measures required to solve them. Such studies also facilitate an understanding and assessment of the amount of information the public has on the environment. The data that the public provides can then be used to "frame" the problem properly, by disseminating information better and by mounting public education programmes.

A study of the literature on surveys of environmental awareness (Iizuka, 2000) reveals that concern for environmental degradation is on the rise, although such concern does not necessarily focus on the same issues. The study shows that definitions of "environmental problems" vary widely, which confirms the proposition that such problems are firmly rooted in each country's cultural, social and economic context. Hence they should be tackled using more local and regional approaches.

Opinion surveys conducted to date highlight some important considerations, but they suffer from two limitations: (i) they do not explain the causes of environmental awareness; and (ii) they do not make plain whether such awareness is connected to decision-making or particular ways of acting. The following section examines some studies on this issue.

5.   Some reflections on environmental awareness

a) Basic causes

To identify the underlying determinants of environmental awareness, several sociologists have sought to discern the link between the level of awareness and socio-demographic characteristics such as age, social circumstances and political ideology. The studies seek a link between socio-demographic characteristics and concern for the environment.

These studies have shed light on some of the links between the two variables, but they have not demonstrated that there are concrete connections between them (Van Liere and Dunlap, 1981; Mohai and Twight, 1987; Buttel, 1979, cited in Mohai and Twight, 1987; Furman, Diamong and Orenstain, 1990, cited in Mohai and Twight, 1987; Stern, Dietz and Kalof, 1993; Inglehart, 1990; and Andrews and Stephan, 1978). The difficulty of doing this can be ascribed to the changing nature of socio-demographic factors and their cultural dimension. Women's role in society, for example, changed substantially and in various ways during the last 40 years of the twentieth century. The scale of the change, however, depended on the cultural and social context. This circumstance makes it hard to draw up chronological series and to make comparisons between countries, with a view to developing hypotheses about the link between the change in women's role and environmental awareness (Iizuka, 2000). Moreover, it is

important to note that most of these studies are based on what happened in the context of western culture, and thus their premises cannot be applied to countries with other cultures.

b) Reflecting environmental awareness in practice

Environmental awareness is not automatically translated into action. Several studies have revealed the discrepancies between a pro-environmental attitude and actual behaviour; they have shown, in other words, the absence of a link (Buttel, 1996; Van Liere and Dunlap, 1981; Mainieri et al., 1997). Indeed, although the opinion survey showed that the highest level of environmental concern arose in the 1990s (Dunlap and Scarce, 1991), such concern found only faint echo in actual pro-environmental conduct. The findings of some studies, based on empirical observation, are as follows: (i) a modest correlation between pro-environmental forms of behaviour; (ii) different degrees of specificity in measuring attitudes and behaviour; (iii) the effects of exogenous variables; and (iv) the reliability and validity of the measurements is limited (Mainieri et al., 1997).

c) Socio-psychological frameworks

A number of sociologists have sought to establish a link between environmental awareness and actions to protect the environment (Blamey, 1998; Hirose, 1995; Stern, Dietz and Guagnano, 1995). They all base their research on the reasoned action theory of Ajzen and Fishbein (Ajzen and Fishbein, 1997, cited by Stern, Dietz and Guagnano, 1995),which explains how society's expectations influence individual choices. Applied to a pro-environmental attitude,[18] specifically the preservation of water resources (Hirose, 1995), this premise explained a particular form of environmental protection —limits on watering gardens in periods of drought. The study found that there was much greater influence on behaviour in this case than in others, because watering was an activity open to public pressure.

Another sociological model used to explain the link between attitude and behaviour is Schwartz's norm-activation model (Schwartz, 1977, cited in Widegren, 1998). Also known as the "theory of altruistic norm-activation", this model makes it possible to analyze behaviour arising from assumptions about the consequences of a given action, and from the norms governing personal responsibility that, in turn, are reflected in behaviour. The theory was devised to explain the purpose of altruistic "assistance attitudes". In simplified terms, Schwartz's theory is that norms on "assistance" activities are more feasibly activated when the actors involved

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[18]   Environmentally friendly behavior is defined as an expression of environmental awareness, such as buying "green" products, recycling and car-pooling.

are aware of the "positive consequences" of providing help, and of the target object or person that the actors feel "responsible" for "helping".[19] Schwartz's expanded model also takes account of cooperation with and trust in "others" as a means of attaining the desired environmental outcomes. This is because collective action or cooperation are essential in this field, and such action is much more feasible when the actions of others can be more easily controlled. Studies show that people feel a stronger obligation to cooperate when others do the same. Blamey (1998) argues that "trust" among actors has a substantial influence on how the needs criteria, as well as the costs and benefits of offering help, are defined. Braithwaite et al. (1994), cited in Blamey (1998), argues that those responsible for implementing regulations and those subject to them must have a "shared social understanding" of goals if the rules are to be followed properly. They also argue that the tendency to abide by the rules is reinforced by repetition, because that creates a record of cooperation or of more "trust". If environmental policy is to be satisfactorily implemented, therefore, there must be "trust" between the "regulators" and the "regulated", which can only come about through the sustained application of clear and acceptable norms, and by disseminating information on the policies applied.

d) Criticisms of the socio-psychological approach

Although the socio-psychological approach takes due account of the significant factor of "trust" and the collaboration to which it gives rise, the attitude-behaviour model has been criticized as a fragmentary analysis of a single form of conduct and the resulting attitude. It has been judged "insufficient" to formulate an efficient policy (Spaargaren, 2001). Spaargaren argues that the socio-psychological approach serves only to explain a single action but, since environmental problems entail more extensive actions, the explanation does not aid a search for solutions. He also argues that all attitudes consist of a variety of elements that serve as indicators of a broader environmental awareness. In his view, the social practice model based on Gidden's structuration theory (Spaargaren, 1997, Spaargaren and Van Vliet, 2000) is more suited to studies of the environment and to environmental policy-making, for the following reasons: i) the model is not based on an individual attitude or norm, but on the concrete attitudes than an individual shares with others in a specific time and place; ii) the model is not based on specific, isolated forms of behaviour that are supposedly reliable indicators of environmental awareness, but on the prospect that certain groups of actors will reduce the environmental effects of their daily activities; and iii) reducing the environmental impact of consumption in

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[19]   Iizuka (2000) offers a detailed description of this theory.

certain areas of social life is seen as an achievement of well-informed and able actors who exploit their potential in the context of a specific system of provision (Spaargaren, 2001).

Spaargaren's argument has two key components: the provision of information and the establishment of an alternative social system. He stresses the importance of communication, and the participation of "citizens and consumers" and the private sector in environmental policy-making. As an example he cites the Netherlands, which has begun to use solar energy; he compares two pilot projects. One project reported on the efficiency of solar energy and its environmental benefits; the other did not. Although the two projects used the same level of technology, the group that received information evinced a higher degree of acceptance of the new system. By contrast, the group that was not informed revealed a slight resistance to the project and "unease"[20] at its implementation, precisely because it was not given any information. This example highlights the importance of informing the population of the policies adopted, so as to build a consensus that motivates citizens (consumers) to collaborate in their implementation. Spaargaren (2001) concludes that "information and citizen participation in the project was the only factor that created the sense of responsibility through which the project had a satisfactory outcome". Although he criticizes the attitude-behaviour model of environmental awareness as "insufficient" to improve the situation, he acknowledges the importance of awareness and, viewing it as an internal function, uses it as a necessary indicator of behaviour.

The need for an alternative social and economic system is described in more specific terms by the concept of "industrial metabolism". This refers to the "set of physio-chemical transformations and the conversion of raw materials (biomass, fuels, minerals, metals) to manufactured products and structures" ("articles and waste") (Ayres and Simonis, 1994). This is an extension of the ecological material flow model to industrial structure, according to which natural ecosystems are populated by actors that serve as producers, consumers and "disintegrators" or recyclers. In terms of material flows, therefore, natural ecosystems can be described as closed systems. By contrast, human society is an open system, in which nobody acts as a "disintegrator" or recycler. According to this reasoning, industrial metabolism demands, first, substantial innovations that increase efficiency from the ecological standpoint and, second, lifestyles and consumption patterns that involve a lower environmental cost (Opschoor, 1997).

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[20]   According to Spaargaren, this disquiet was prompted by various regulations: the ban on planting trees in gardens, and on roof work that might affect the proper functioning of solar panels (Spaargaren, 2001).

As has been said on various occasions, what is needed is a new and informed relationship between the actors, and a system that facilitates collaborative participation in policy-making, so that the population starts behaving in line with the criteria of environmental sustainability.

B.   Changes in the nature of environmental problems

In the twenty-first century, society is confronted by increasingly complex environmental problems. There are a number of reasons for this: (i) the causes of environmental problems are no longer rooted in production but in consumption; (ii) the change in the role of the actors involved creates a need for participatory and collaborative mechanisms; and (iii) scientific and technical solutions are not enough. To complement the theoretical debate in the preceding section, there follows a description of recent changes in environmental problems.

1.   From industry-derived pollution to consumption-derived pollution

Changes in environmental problems in recent years have made it ever more necessary to involve the population in environmental policy-making (Keeley and Scoones, 1999; Iizuka, 2000). The UNDP's 1998 Human Development Report shows that individuals' consumption patterns are exerting unprecedented pressure on the environment. This is corroborated by the three case studies in the project on enhancing citizen awareness for the formulation of air pollution control policies in some Latin American metropolitan areas. The three studies show that the main source of pollution is vehicle emissions, and thus it is caused by the consumption patterns of those cities' inhabitants. This kind of pollution is markedly different from that affecting the developed countries in the 1960s and 1970s, when factories (the production process) were the main source. This change calls for a reconsideration of the methods used to formulate and implement environmental policies.

2.   Changes in the role of the actors involved

In parallel to the foregoing, there has been a change in the role of the actors involved. That circumstance demands a "paradigm shift" in environmental policy-making (see figure I.2). As mentioned earlier, changes in the causes of environmental problems call for a change in the search for

solutions to them, and in the roles assigned to the members of society. When productive processes are the prime source of environmental problems, relations between civil society, businesses and the government are troubled: civil society play the role of the victim, while the companies are held responsible for pollution because they are negligent in their pursuit of economic gain. In its relationship with the government, too, civil society acts as a victim, while the government play the part of polluter because it fails to enact the regulations needed to control pollution and protect public health. The government and the companies, respectively, act as the regulator and the target of environmental regulation (type 1 relationship in figure I.2). This contentious relationship arises when the cause of the problem, industry, is plain and identifiable, and when the search for solutions has involved only the adoption of public regulations and their application to the private sector —that is, to the polluting industry.

When the main cause of environmental problems is consumption, the conflict between the actors fades. The proliferation of environmental problems spawned by consumption gives rise to ambiguity in the relationship between the victim and the beneficiary (Funabashi, 1989) (see table I.2). According to Funabashi's concept of a zone of benefit and harm, in the "new age" many environmental problems cover broader areas, which hampers a search for solutions.[21] This is because, in the "new age", the consumer-polluter is the victim of his own actions. As Beck points out in his theory on reflexive modernity, the relationship is reflexive (Beck 1992).

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[21]   Funabashi (1989) maintains that the difference between beneficiaries and victims would give rise to disparities in people's acceptance of collective measures. Looking at the relationship between the two, he makes a distinction between what he terms "zones of benefit and harm". First, he divides the relationship into two categories: (A) duplication of beneficiary and victim, and (B) separation of beneficiary and victim. Second, he divides each of these into four categories according to the sizes of the zones: (i) limited benefit and harm zone; (ii) expanded benefit zone and limited harm zone; (iii), limited benefit zone and expanded harm zone; and (iv) expanded benefit and harm zone. He maintains that Harding's pasture example belongs to category (A) (i) since the shepherds are simultaneously beneficiaries and victims in a relatively small area. By contrast, air pollution caused by vehicle exhausts is an example of category (A) (iv), since the victim and the beneficiary are the same but the area is bigger. The problem of locating a dumpsite for solid waste falls into category (B) (ii), since the beneficiary and victim are separate and the "victim" is concentrated in a small area near the site.

Figure I.2
ENVIRONMENTAL PROBLEMS: CHANGES IN THE ACTORS' ROLES

1. Conflictive relations in the past
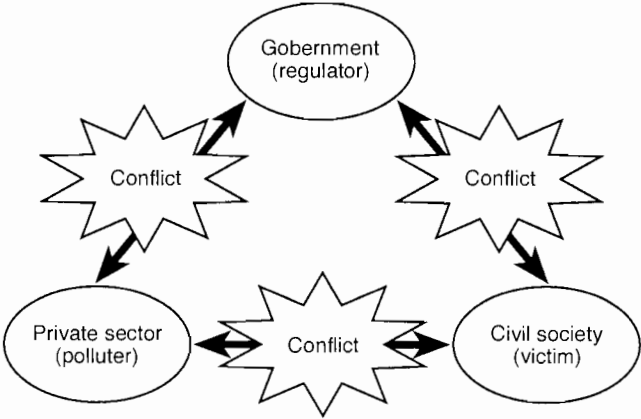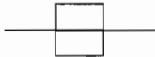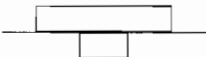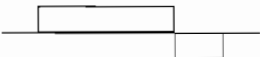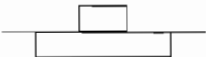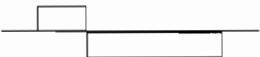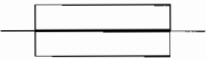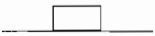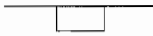
2. Collaborative relations in the "new age"
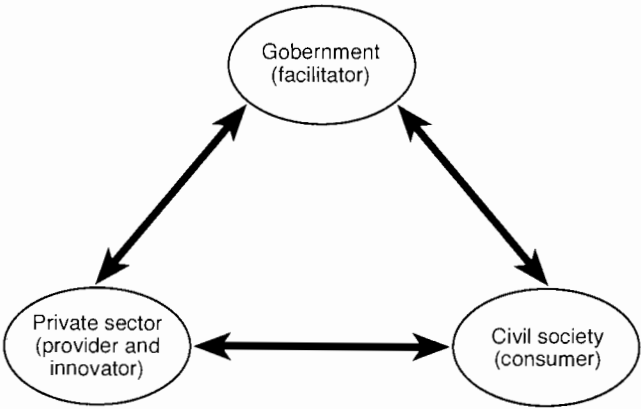
Source: Michiko Iizuka *Role of Environmental Awareness in Achieving Sustainable Development* (LC/
R.1961), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2000.

Table I.2
ENVIRONMENTAL PROBLEMS: CATEGORIZATION OF ZONES
OF BENEFIT AND HARM

	Duplication of benefits and harm	Separation of benefits and harm
Limited benefit zone		
Limited harm zone	Example: over-fishing in a lake ("tragedy of the commons")	Example: irrigation disputes between upstream and downstream farmers
Expanded benefit zone		
Limited harm zone	Example: building of a road (the victims of noise pollution are only those living near to the road)	Example: building of a dumpsite outside the city (the victims are those who live in the surrounding area)
Limited benefit zone		
Expanded harm zone	Example: industries that cause air pollution but that also suffer its effects	Example: industries pollute rivers and harm others
Expanded benefit zone		
Expanded harm zone	Example: traffic congestion (drivers are simultaneously victims and beneficiaries)	Example: warming of the atmosphere (the victims are future generations)
	Benefit zone	Harm zone

Source: Harutoshi Funabashi, "Environmental problem as social dilemma", *Syakai roudou kenkyu*, vol. 35, N 4. Tokyo, 1989.

In this new relationship between polluter and victim, moreover, the former has absolutely no control over the pollution he produces. That fact that one person stops driving does not alleviate his children's asthma. If pollution is to be controlled, and if the control is to have a real impact, collective and concerted endeavours involving a range of actors are essential. Hence the mutually contentious relationship of the past has to give ground to one based on mutual cooperation (type 2 relationship in

figure I.2). In other words, environmental policy-making needs collaboration to mobilize the public and to solve current problems. A "social pact" has two preconditions: first, all the actors involved must identify the problem and share the same position on it; second, they must all take part in the efforts made, so that nobody benefits without assuming responsibilities. There is growing acknowledgement that this is the only way that those involved can accept their responsibilities, and assumption of those responsibilities is conducive to satisfactory policy outcomes.

3.   Changes in the role of science and technology in environmental policy-making

The role of science and technology in environmental policy-making is also changing. It is still believed that the process is governed by scientific knowledge, and that scientists are the only people who define environmental conditions and suggest related policies. This positivist view of the link between science and policies is normally applied to the analysis of technical policies. The disputes over pollution in Japan in the 1960s and 1970s highlighted this traditional link between science and environmental policy. The scientific proof of the connection between cause (pollution, industries) and effect (health problems among the population of the area) led to victory in a legal battle, one that that attracted a great deal of public attention (Iijima et al., 1996; Iijima, 2000), over Minamata,[22] Itai Itai[23] and Yokkaichi asthma.[24] Only because of the scientific proof, and the attention that these cases aroused, could the government impose certain regulations on companies that provided the "engine" of economic growth.

The ascendancy of science has also been apparent in risk assessment, which has always been one of the biggest obstacles to solving environmental problems. Years ago, people did not acknowledge that environmental policy is always based on an in-depth risk analysis, or were even unaware that this was the case; the person who decided on the risk was a "specialist". A simple example: an acceptable pollution level is established by determining an appropriate balance between the cost ("lost" or "invested" resources)

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[22]   Caused by a high concentration of mercury in the water discharged by the Chisso company. Those who ate fish from the contaminated water suffered health problems because of the levels of mercury in their bodies. Scientific proof of the connection was crucial in the dispute because those affected did not necessarily work in the plant but lived nearby.

[23]   Caused by a high concentration of cadmium in the water. Those who ate fish from the contaminated water became sick because of the high level of cadmium in the bladder.

[24]   This kind of asthma appeared in the Yokkaichi area, where there was a substantial number of petrochemical plants producing atmospheric pollution.

of pollution control and its effects - that is, the lowering of health risks and the cost of that process (Oka, 1999). A more complex example is provided by the use of resources, as described in Hotelling's rule on natural resource endowments, which dates from 1931.[25] The author (Devarajan and Fisher, 1981 and Solow, 1974) argues that the price of resources rises at the same pace as the discount rate, a process determined by the buyers of the relevant non-renewable resources. The "expert" buyer calculates the future value of such resources, mindful of the probability of depletion, and of technical innovations that lead to the discovery of alternative products. In the realm of policy-making, this specialization of the "new age's" scientists and technical experts is viewed as excessively technocratic, since it makes science a matter of paramount importance by regarding non-specialists as "ignorant" or "unable to deal with scientific complexities" (Beck, 1992).

Today, because of changes in the nature of environmental problems, risk assessment should be undertaken by ordinary people working in two ways: with the traditional method (the scientific definition of probability or safety levels) and with the new method. The norm is accepted subjectively by citizens or consumers (Beck 1992). These have a marked influence on the degree of "trust" between the actors involved (the government, companies and civil society) and within each of these sectors. A good example is bovine spongiform encephalopathy, commonly known as "mad cow disease". When the disease broke out in the United Kingdom in the 1990s and in Japan in 2001, the government and the private sector made joint declarations to assure consumers that it was not dangerous to eat meat. Despite that, consumer behaviour did not change because the public was sceptical about the pronouncements. Hence a change in citizens' conduct depends on the trust they have in institutions.   .

Besides this factor (trust in the government), citizens are starting to realize that swift technological change is not attenuating environmental risk but increasing it (Beck, 1992). In many countries there is mounting unease at the new connections between the environment and lifestyles. This is matched by a diversification of the actors involved and the emergence of new coalitions of interests that break down traditional barriers. This change gives rise to new forms of identification and understanding, in which the main concerns are quality of life, environmental change, and technological

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[25]   Hotelling's rule states that the price of a non-renewable resource must rise at the same pace as the interest rate, in line with both efficient extraction and the competitive equilibrium of the industry in question. It shows that the factors affecting the price of a resource are supply and demand, technological innovation and the discount rate, which all depend on the estimation of the value of the non-renewable resource in question. Estimation of the risk of depletion influences the discovery of new resources, technological innovation, and the exploration of new mines.

risks. The provision of information, however, and the mechanisms allowing citizens' opinions to be taken into account in policy-making, are still deficient. Hence the need for alternative methods of formulating policies, so as to build trust and secure the public's collaborative participation.

C.   What kind of system is possible?

For the purposes of ensuring sustainable development there have been calls for mechanisms that foster and facilitate pro-environmental activities in which all actors participate. The preceding section explained that, as the nature of environmental problems changed, consumption habits began to have a strong impact on the environment. This situation calls for collective measures. Although there is an acknowledged need to heed the opinion of the population and of other actors involved in policy-making, effective steps have still not been taken to raise public awareness.[26] In both developed and developing countries, efforts have begun to be made to take account of public opinion in policy-making. In general, it is the government, and especially local government, that makes participation possible.

This section briefly analyzes the constraints on citizens' adoption of environmentally sustainable behaviour and the measures taken to alter the conduct of the population. It also describes some recent attempts to change how policies are made and implemented.

1.   Constraints on the adoption of environmentally sustainable attitudes

Despite the great interest in environmental protection, most of the population find it hard to espouse environmentally sustainable attitudes. This can be ascribed to three factors: (i) lack of information on the environment, or the provision of inadequate information because of the issue's subjectivity; (ii) the dilemmas attendant on choices between a

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[26] According to Gaventa and Robinson (1999, cited in Holms and Scoones), there are basically four ways that non-elite citizens can participate in policy-making: (i) through subtle and covert resistance; (ii) through community groups, trade unions, non-governmental organizations (NGOs) and social movements; (iii) by political means, through representatives of the people and elections, and through more revolutionary and confrontational action; and (iv) by means of a deliberative and inclusive process. Holms and Scoones argue that first three alternatives come "from below", while the fourth is imposed "from above" as the result of growing changes and trends in environmental policy-making.

comfortable life and the preservation of the environment; and (iii) the difficulty of maintaining the right attitude because of the lack of alternatives in the social system.

a) The subjective nature of the environment

The discrepancy between concern and conduct is attributable to the absence of a clear link between the general interest in the environment (in terms of concrete actions) and the lack of any sense of how the environment affects individuals. Two kinds of environmental information are available to the public: descriptive and prescriptive (Hirose, 1995). The former describes the causes and effects of a phenomenon, and the latter consists of instructions on how to ensure or avert a particular effect. Most information on the environment is descriptive. For example, people know in general terms that excessive paper consumption can lead to the destruction of forests, but they receive no practical information on what kind of paper can be recycled and how it could be collected for recycling.

Another obstacle to a change in conduct is that the link between personal conduct and its environmental impact is unclear. As mentioned earlier, for example, consumption exerts more pressure than ever on the environment; but an explanation of how calls for a description of a long process, which makes it hard for people to feel responsible for the damage wrought by their individual actions. This is yet more apparent when environmental degradation is global. It is very difficult, for example, to explain clearly why the consumption of hamburgers in the United States could damage tropical forests in Brazil if information on the entire process is unavailable.

There is a substantial difference between concern for the environment and proper behaviour. This section addresses the limits of current environmental knowledge and the need for appropriate information that is conducive to concrete measures to protect the environment and underpin pro-environmental attitudes. If the link between environmental conditions and behaviour is unclear, it can hardly be expected that measures will be taken to protect the environment, or that such measures will prove enduring. When environmental problems are analyzed from an inter-generational perspective, moreover, the situation is even more complex.

b) The dilemma between a comfortable life and the preservation of the environment

This dilemma is described in Garret Hardin's *Tragedy of Commons* (1968), wherein the author distinguishes between individual and collective benefits in the use of common goods such as the environment. He takes the example of a group of shepherds who try to maximize their profits by

making rational decisions, with the condition that each of them can let the greatest possible number of animals graze on common land. Profit maximization has positive and negative effects. Each shepherd makes a profit close to 1 if he decides to let more animals graze, but he loses a fraction of 1 because of the over-exploitation of the pasture that all the shepherds share, irrespective of whether he decides to let more animals graze. As a rational being, the shepherd decides to put another animal out to pasture so as to maximize his personal profit, but if all the shepherds do the same the pasture will be over-exploited and, over the long term, they all lose, which is a "tragedy" (Hardin, 1968).

The dilemma between a comfortable life and the preservation of the environment is imagined as that between having another animal or losing the productivity of the land. A key feature of common goods is non-exclusion: those providing the good cannot avoid its consumption by others. Everybody can use such goods, even if they have not helped provide them. There is a temptation for individuals to use these goods free of charge and to let others contribute. From the individual perspective, changes in attitude to the common good depends on collective action, and on enough people making a contribution rather than using it freely.

The extent and nature of the "social dilemma" depends on environmental degradation. The problems afflicting the environment are normally classified, according to their scope, as local, national, regional and global. This is consistent with the idea that the closer people are to the place affected by the degradation, the faster they acquire the awareness that leads to collective action, because there is a stronger sense of responsibility in small areas than in larger areas. In his classification of zones of benefit and harm, Funabashi shows that people are more likely to act when they directly benefit from or are affected by collective action.[27] Nonetheless, this requires information on the advantages and disadvantages of joint action to protect the environment, because not all forms of environmental decline are visible. The provision of information is even more complex when the actors are geographically dispersed and spread out over time.

c) The difficulties of acting properly

Even when someone decides to act to protect the environment, the lack of information and appropriate technologies makes it hard to put the decision into practice. Some studies have shown that while many people say they have done something to preserve the environment, in many cases their concept of protection was mistaken because it was ineffectual (Hirose,

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[27]   See table I.2.

1995). It is hard to take effective measures when the damage to the environment is unwitting. Additionally, it is difficult to change behaviour when such behaviour is deeply rooted in a daily routine.

In these contexts, the contrary circumstance also arises. It is true that views of the environment are deeply ingrained in the traditions, customs, and local or ancestral culture that form part of people's routine. Some activities, commonly defined as "festivals" and "customs", are not explicitly viewed as protective of the environment, and it is quite possible that they will disappear with the advent of modernization. An example is the use of forest resources in Kumano (Japan), where wooden tools are manufactured on particular dates according to custom or tradition. This, in fact, has a scientific basis: using certain species at particular times yields positive results because of the texture and resistance of the material (Nomoto, 2001). These customs will soon disappear if their ecological meaning is not studied. The developed countries, in the course of their own economic development, have lost many cultures and customs that responded to local characteristics, because in many cases there was an effort to replace the "old" (non-western or traditional) with the "new" (western and modern). In the development process, therefore, it is useful to reassess how local cultures and traditions are analyzed (Redclift, 1987).

It is also important to set up a system that fosters the adoption of environmentally-friendly "social practices". The provision of accurate information is common to all the factors related to protection activities. Information can have a decisive influence by connecting the population's actions to environmental risk and individual responsibility. It can also show what exactly should be done to avoid such risk, thereby involving people in collective activities. A system should be set up that heeds and channels the population's awareness of the situation, so as to make the process sustainable.

2.   Measures that could alter behaviour

A basic goal of environmental policy should be to alter the population's behaviour and induce adoption of an environmentally sustainable attitude. The above analysis of constraints highlights the most obvious problems to be considered when efforts are made to encourage and change certain kinds of behaviour.

These measures can be classified in various ways. Tietenberg, for example, groups them into three categories according to the method used: command and control measures, market-based measures, and an information strategy (Tietenberg, 1997). De Young, by contrast, groups them

according to the techniques used: i) informative; ii) positive motivation; and iii) coercive (De Young, 1993). Both authors refer to the most common measures. According to Tietenberg, command and control measures are essentially based on regulations such as standards, fines or sanctions. Market-based measures are more liberal and are geared in particular to the economic arena; examples include tradable permits and emissions charges. It is a matter of inducing environmentally-friendly attitudes using economic incentives that internalize the environmental cost in the market mechanism. The information strategy concerns consumers' right to know what they are consuming, for example by means of eco-labelling and environmental audits. This strategy is basically designed to protect consumers, using voluntary measures and the pressure of public opinion. While the first two approaches are based on the public sector's capacity to adopt concrete measures, with the information strategy the population is left more to its own initiative.

De Young (1993) maintains that the goal of the information approach is to help citizens understand the nature of the environmental problem they face, what they should do to solve it, and what the necessary steps are. This approach aims to alter behaviour and beliefs so that appropriate steps are taken, and to provide information that promotes certain desirable forms of conduct. In this sense, De Young's technique more actively helps change the population's behaviour than Tietenberg's. Positive motivation is a form of intervention that encourages people to alter their conduct by providing economic and social support. Examples include the structure of charges for drinking water, which rewards lower consumption levels, and social recognition. Coercive measures seek to alter behaviour by means of economic and social disincentives, such as fines on polluting industries or social pressure against dumping garbage.

Analyzing the effectiveness of each of these measures, De Young argues that they should be assessed from various angles, including the duration of the effect, the speed of the change, the cost effectiveness, and the period for which measures to protect the environment prevail. Table I.3 presents a hypothetical assessment of these factors in line with the foregoing categories.

Table I.3
MEASURES GEARED TO ALTERING BEHAVIOUR TO PROTECT
THE ENVIRONMENT

	Effect	Techniques	Aims	Duration of the effect	Speed of change	Cost	Duration of measure
Legal	Coercion	Prohibition, norms, legislation	Material disincentives, social pressure, legal directives	Short	Medium	High	Limited
Economic	Positive motivation	Taxes, subsidies, etc.	Material incentives	Medium	Fast	Medium	Relatively limited
Informative	Awareness Knowledge	Education, publication, media	Creation of social norms	Prolonged	Slow	Slow	Broad
Social system	Provision of mechanisms	Collaboration between the government, the private sector and civil society	Creation of a sustainable social structure	Prolonged	Slow	Slow	Broad

Source: Raymond De Young, "Changing behaviour and making it stick: the conceptualization and management of conservation behaviour", *Environment and Behavior*, N° 25, 1993; Tom Tietenberg, "Information Strategies for Pollution Control", document presented in the eighth Annual Conference of the European Association of Environmental and Resource Economists, Tilburg, University of Tilburg, June 26-28, 1997; Gert Spaagaren, "Theory and Politics of Sustainable Consumption; outline of a research program", document presented in the Kyoto Environmental Sociology Conference (KESC), Kyoto, University of Bukkyo, October 20-23, 2001.

To Tietenberg's and De Young's classifications has been added the development of a system, one that seeks to make environmentally-friendly behaviour part of the population's daily routine. Spaargaren (2000) proposes the development of systems that facilitate environmentally sustainable activities, such as providing a mechanism for recycling and for'producing goods without causing environmental damage. The aim is to expand consumers' options and offer a social and material infrastructure that allows them to undertake environmentally-friendly activities.

Spaagaren's argument for considering systems as another means of changing consumption habits is based on structuration theory and the social practice model, in which the population's social practices are assessed and an effort is made to devise an efficient system. He maintains that a person's lifestyle consists of a series of basic elements in daily life (Spaargaren, 2001). His system, like Mol's ecological modernization theory, covers all the measures mentioned in the above paragraphs. An examination of the measures used to change the population's behaviour reveals the need for

a system or arena in which such measures are combined and applied more efficiently and effectively, and in line with current needs.

Creating such a system through policy-making is an issued raised with growing frequency. Many countries in both the North and the South use this set of approaches, generally known as an inclusive, deliberative process (Holmes and Scoones, 2000). The aim is to make the policy-making process open to the population, so as to spark a broader debate on policies and practices by involving a greater number of actors and groups in consultation and decision-making. Interest in such processes has been growing, especially in environmental planning at the local level, as a result of the adoption of Local Agenda 21 in 1996 (Healy, 1998, cited in Holmes and Scoones, 2000).[28]

According to Holmes and Scoones (2000), the inclusive and deliberative process has a series of advantages and disadvantages. The main advantages are that it helps: (i) improve policy effectiveness by taking note of the opinions of all the actors involved; (ii) attenuate resistance before the policies are implemented, building trust among those involved by reducing uncertainty; (iii) educate the population by disseminating information and prompting dialogue between experts; and (iv) develop new means of policy-making to offset constraints on the State's role and resources. Obviously, the disadvantages relate to uncertainty about the adequate representation of the actors involved; the high cost in terms of human resources, time and financing; the difficulty of reaching consensus; and the prospect that the process will not end in an agreement (Holmes and Scoones, 2000).

This method makes it possible to engage various social actors in solutions to environmental problems, but that and the attention paid to different variables prolongs the search. Analysis of the experience to date shows that the inclusive and deliberative process is sharply confined to each region and, according to some authors (Rippe and Schaber, 1999, cited in Holmes and Scoones, 2000), it can only be applied to exceptional and highly controversial problems.

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[28] Chapter 28 of Agenda 21 stipulates that by 1996 local authorities must have developed a Local Agenda 21 through consultation and consensus with local people and institutions. The progress made has been reviewed on several occasions, including the extraordinary period of sessions of the United Nations General Assembly, known as Rio + 5 (1997), and the examination of the programme in 2001. In Latin America and the Caribbean, ECLAC and the Regional Meeting of Ministries and High-level Authorities for Housing and Urban Development (MINURVI) led the effort, which gave rise to the Regional Plan of Action for Human Settlements (CEPAL, 2001 and MacDonald and Simioni, 1999).

Concern for the relationship between the environment and people's habits is on the rise throughout the world. This has led to an expansion of the range of actors, who are forging new alliances and breaking down traditional barriers and categories. In this changing context, a new form of policy-making, one that involves the development of a system open to all actors, will become a crucial requirement. Given the new ways of identifying problems, ways in which interest in quality of life and environmental change and risk are of paramount importance, this shift is inevitable. Both the government and the public have made efforts to create such systems, but those efforts are at an early stage and further research in this field is essential.

D. What to do in future at the metropolitan level

In the social sciences it is important to observe phenomena from the "micro" perspective in order to be able to make general assertions. Project CCC included three case studies on air pollution. On the basis of detailed empirical analysis, the authors address the significance of citizen awareness and the importance of how the actors involved behave in devising and implementing policies.

These contributions could shed significant light on environmental policy in developing countries, since the theoretical studies are based for the most part on what has happened in developed countries. The issue of the environment, however, is essentially local because it depends on the geographical and natural features of the area in question and the perceptions of its residents. Thus it is difficult to apply other countries' experiences without adapting them, especially countries whose geographic, economic, cultural and historical contexts are very different. Environmental policy should be formulated from the perspective of the regional and local contexts that it has to accommodate. These case studies of Latin American cities serve that purpose, and they offer a basis for new forms of policy-making in the region.

Citizens' awareness and environmentally-friendly behaviour play a crucial role in the success of environmental policies. Studies on attitudes and behaviour have stressed that the adoption of pro-environmental forms of conduct are influenced not only by personal outlooks but also by others' attitudes and reactions. Hence the importance of mobilizing people *en masse*, with a view to making the policies more efficient. Against that background, the instruments and information strategy identified by Tietenberg (1997) and De Young (1993) could prove to be highly significant in the following areas:

-       general information on environmental problems to foster
        citizen awareness;

-       information explaining the causes and effects of environmental
        damage and what people can do;

-       information on what others have done;

-       information on government policies to show that both the
        public and private sectors are taking part in the process of
        change.

This kind of information can help imbue citizens with greater awareness of needs and responsibilities, promote trust among people, and foster collective actions that give impetus to environmental initiatives. The provision of environmental information should be geared to the appropriate social sector, and should be qualitatively and quantitatively relevant. Accurate information helps citizens make the right consumption choices and leads them to sanction, socially and economically, those who do not. The authorities' role in this area is to decide on the kind of information to be provided, and to report on current regulations and market incentives. In this regard it is crucial to understand the level of environmental information that citizens have, its quality and quantity, because that determines their degree of awareness of the need for environmentally-friendly behaviour. Prominent in that regard is greater participation in defining, implementing, and monitoring policies on the environment.

The participatory method of environmental policy-making continues to pose problems (Holmes and Scoones, 2000). First, it is still a process of trial and error, even in developed countries, although the trend towards the greater inclusion of the social dimension and a higher level of participation is irreversible. Whatever the form of participation that the Latin American countries use, therefore, both the population and its awareness are important sources of dynamism. In that respect, the case studies on air pollution in three cities of the region are valuable, because they indicate future trends in environmental policy on the basis of empirical observations.

Given the diversity of regional and local circumstances, there is no single solution to environmental problems. As co-evolution theory maintains, the environment constantly influences and is influenced by the population of a given area. For that reason, more attention should be paid to the link between environmental awareness and participation in environmental policy-making, and further studies of the issue should be carried out. This is particularly true in developing countries, first because

they must urgently deal with environmental problems with a view to the future, and second because their peculiar characteristics and their economic and social patterns are essentially different from and more vulnerable than those of the developed countries.

The motto of the World Summit on Sustainable Development in Rio de Janeiro was "… think globally; act locally". That motto is reflected in all the activities noted in the case studies, which prepares the ground for a dynamic future transition at the global level.

Chapter II

Citizens' participation and enhancing their active involvement in air pollution control in Latin America

Pedro Jacobi[1]

The aim of this chapter is to reflect on the scale of citizen participation in air pollution policies in Latin America.

The focus is on citizen participation in public management and on qualitative changes in relations between the State and civil society, as a frame of reference for ways to enhance public policies.

This focus is determined by the need to think about an issue whose very immediacy calls for analysis of its scope and boundaries, and in particular of its capacity to spur active social participation, one that triggers a real behavioural change among people in the non-State public sphere. Such a change is brought about by creating institutions that are beyond the control of the State but that induce, monitor and control public policy-making and policy reform.

The goal here is two-fold: first, to analyze how participation, arising from a collective expression of concern, can give rise to a new form of citizenship in which citizens create the kind of rights that enable them to open up new channels for sociopolitical engagement; and second, to

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examine the barriers to initiatives that help forge a real interaction between complexity and democracy.

Most analyses of participation highlight an interpretation that swings between justification and voluntarism on the one hand, and indifference and underestimation on the other. This interpretation helps little in overcoming the problems attendant on the complex and diverse processes under way.

Hence the increasing need to understand the ambiguities and limits of social processes and potential instruments. Such an understanding can be arrived at by means of a qualitative analysis of the social practices and attitudes of the various actors involved, both when they are innovative in public policy-making and when traditional practices prevail.

This chapter is arranged in such a way as to introduce the reader to issues that, despite their wide variety, all centre on the links between citizenship, participatory democracy, governability and sustainability.

The analysis focuses on how to enhance channels for collaboration, how to enable civil society to participate in public policy-making, and the always complex and contradictory institutionalization of innovative forms of participation that break with prevailing patterns by going beyond utilitarian or clientelist activities.

The analysis herein serves as the basis for some concluding reflections on the scope and limits of participation. It is grounded in the findings of studies on policy-making as a whole, as expressed in the opinions of those who take part in the process. Particular attention is paid to the impact of innovative institutional engineering, and to the meaning of qualitative changes in the Latin American political scene.

A.   Characteristics of participation

In Latin America, the struggle for public channels that help increase social participation is undoubtedly a key issue in analysis of the extent of democracy in relations between local government and the population.

In the 1990s, participation in its various forms was protected and institutionalized by representative democracies in Latin America. From the perspective of developing civil society and strengthening democratic mechanisms, citizen participation became a frame of reference for expanding the popular sectors' access. It was also a guarantee that social security programmes would be implemented efficiently at a time of

structural adjustment, economic liberalization, and the privatization of State assets. In the meantime it is evident that proposals on participation remain more a matter of rhetoric than actual practice.

The minimal level of citizen engagement reflects a lack of participation and a shortage of prominent actors, circumstances that could nurture a crisis of governance and legitimacy. Absent effective channels for its expression, dissatisfaction with the decline (or non-improvement) in quality of life can erode the legitimacy of prominent actors. This might become apparent in electoral volatility or in a waning of proposals for policy-making that are based on intensifying democratic participation.

Analysis of current processes is conditioned by the norms of Latin America's political culture, which are characterized by statist, centralizing and paternalistic traditions, and therefore by relationships based on clientelism, meritocracy and the interests created between society and the State. Such norms, however, have not hampered the emergence of various forms of popular sector participation. Many of these are often characterized by the kind of practices evident in the above-mentioned traditions, while others overtly contravene them.

The prospect of changing the framework of public institutions is related to the demands that society makes. The public sphere is where society's influence on public decisions is made viable, and where the State has an obligation to announce what it is doing. There is a need to upgrade democracy's ethical and political principles in such a way that greater associativity helps strengthen democracy in the other spheres of social life. According to Putnam, Leonardi and Nanetti (1994), inherent to the social practices that give rise to citizenship is the prospect that they can become a preferential means of developing personal responsibility, mutual obligation and voluntary cooperation. Citizenship's social practices are related to solidarity and the convergence of rights and duties. The expansion of the public sphere demands that society constrain and exert greater influence over the State, since social autonomy means transcending the asymmetries of social representation and altering social relationships in the interests of greater social self-organization (Cunill Grau, 1998, p. 151).

The concept of participation is pervaded by contradictions, not only because of its link to social power but also because of its conceptual breadth. The differences between citizen participation, social or community participation, and popular participation are not always clear. In conceptual terms, the main goal of participation is to facilitate contacts between citizens and State institutions, to make such contacts more direct and routine, and to ensure that the institutions pay more heed to citizens' interests and opinions before they make decisions and put them into practice.

Participation is a "method of government" that assumes prior or simultaneous fulfilment of a series of conditions related to the rules of the democratic game and the growing consolidation of political and administrative decentralization. It finds expression in an overhaul of the distribution of powers, functions and resources (Jacobi and Teixeira, 1996). Consultative participation can be considered, but it does not directly affect the decision-making process; it can arise at the planning stage or when public policies are devised and applied. Participation in decision-making and participation in oversight involve intervention in public activities, and thus entail a form of involvement in policy-making that directly affects how the public administration operates (Jacobi and Teixeira, 1996).

The social actors that emerged in Latin American civil society after the 1970s promoted the creation of new channels for participating in public policies and for relating to the State. Those channels were created by the popular movements and civil society institutions that made demands, built coalitions of popular resistance, and struggled for civil and social rights. That the channels emerged was directly related to a greater tendency to question the role of the State as the chief instigator of public policies. Participation through these mechanisms allowed more direct, flexible and transparent relationships to be institutionalized, and fostered the democratization of public policy-making (Jacobi, 2001).

Civil society institutions are not monolithic. They reflect society's growing complexity, and they highlight the differences between civil society movements and interest groups. Relations between these movements and public agencies became more complex in the 1970s, and greater importance was accorded to specialized and proficient advice and to inter-institutional links, The mounting politicization of the private sphere spawned the emergence of new scales of values, which often shaped an ideological and political linkage between need and its structural determinants. As a result of citizen participation, increasingly frequent State responses to public demands, and the engagement of professionals and social or advisory liaison actors, knowledge of the demands made was amassed. Those demands were linked to institutionalized social norms, creating the conditions needed to make demands of public institutions (Jacobi, 1990, pp. 226-228).

On the basis of the community's new position, many movements have sought to distinguish their participation in public policy-making. This is a realm in which not all organized efforts are represented, but is part of the process in which the population creates the conditions necessary to influence how a State institution works. The movements thus declare an identity that finds concrete expression in the collective construction of a notion of rights. This effort, being closely linked to the expansion of

citizenship, gives rise to public acknowledgement of existing deficiencies (Jacobi, 1990, pp. 228-229).

The urban civil association movement underwent changes in the late 1980s. Its growing importance in the political process were reflected, in Brazil for example, in the victory of various progressive candidates in large capital cities and municipalities of varying importance. The movements expanded their operating space and sometimes managed to influence the programmes of progressive administrations. This is apparent in their greater participation in tripartite councils, planning committees and other representative bodies.

Apart from the innovative and increasingly institutionalized forms of participation, new movements emerged in the 1990s, based on supportive initiatives that focused on ethical issues or the reassessment of human life.

The building of citizenship is a process replete with paradoxes. Three related tendencies are apparent: i) recognizing and building the identity of the various local actors involved; ii) the context in which the stated needs of the various local actors are heeded; and iii) defining new policy-making programmes, especially in the area of extending benefits to broad sectors of the population.

Social conditions at the start of this century form a chaotic mosaic that includes all the countries of Latin America. Citizenship is closely tied to participation in public life. This involves active participation in the public process (the responsibilities of citizenship) and in the symbolic and ethical dimensions founded on subjective factors that confer a sense of identity and belonging.

Pressure exerted by the more active and organized sectors of civil society has given rise to new public channels for interaction and, especially, for negotiation. In that context, citizen participation serves mainly as a reference point of division and tension, and the participatory practices associated with a qualitative change in policy-making become publicly visible and affect society.

Political and institutional changes, and the broadening of channels to represent the initiatives of organized sectors (a victory for civil society's organized movements), reveal the potential of creating social actors that are identifiable by their pursuit of common goals: the transformation of the ways in which public affairs are managed, and the establishment of a new institutional framework. Any discussion of "citizen participation" should stress that it is a socially-motivated form of intervention in public life; it is exercised directly, and is based on a certain degree of institutionalization of State-society relations (Jacobi, 1990, p. 132).

The emergence of public policies with a participatory component is related to changes in the socio-political fabric, which find expression in a greater questioning of the role of the State as the main instigator of social policies. Participation is chiefly conceived from the perspective of interested groups, and not solely from the viewpoint of overall interests as defined by the State. The biggest problem is to institute a social order based on a linkage between political democracy and social participation, as represented by the expansion of policy-making capacity to the various social and political actors. This approach makes it possible to envisage a link between decentralization and an institutional apparatus that reconciles participation and diversity by means of more active forms of representation that underpin reciprocity in the face of a society's diffuse organization.

The most frequent approach is to deepen the democratic process and its effects by enhancing the capacity to influence decision-making at all levels of social activity and social institutions. In that sense, social participation is an important means of strengthening civil society, especially the most excluded sectors, since overcoming current deficiencies largely depends on an interaction between public and private actors in a context of strategic, socio-institutional agreements. Social participation is part of a process of redefining the public and private spheres, and of redistributing power in a way that favours social actors normally excluded from it. It is a matter of conceiving the arrangement of differences in a context wherein questions are being raised about the State's role as a regulator of society.

On the one hand, participation is identified with arguments about democratization that take as their reference more robust socialization mechanisms, the decentralization of power, and the growing autonomy of decision-making. Hence it is important that social actors be more independent. On the other, one approach defines participation as the forging of bonds between the State and social actors, creating a means of socializing politics and strengthening it role in such a way as to induce respect for those interests and rights that require public action (Cunill Grau, 1991, pp. 39-40).

The creation of incentives to participate has raised the prospect of a real democratization of the procedures used to manage public affairs. Participation becomes a crucial means of institutionalizing more direct, adaptable and transparent relationships that recognize citizens' rights. It is also a way of strengthening solidarity in a context of social pressure and political polarization, a context geared to an active citizenry that is endowed with the instruments required to question the established order on a permanent basis.

For that to happen, and without the State's demanding any kind of administrative or financial dependence, civil society must produce common

interlocutors, community groups, social movements and, to the extent possible, social actors that are independent but motivated to play an active role in participatory processes. Such actors are conducive to vigorous and representative participation. This is the way to break away from traditional practices: populism, authoritarianism, clientelism, "welfarism", "bossism", paternalism and the privatization of politics in its various forms. Participation in public policy management, as a means of offsetting the constraints on representative democracy, facilitates (at least theoretically) civil society's active intervention in policy-making and its exercise of control over government actions and public affairs.

Participation's importance resides largely in the potential integration of social groups and sociocultural values that differ from those obtaining in public institutions. Not to be ignored, however, are the contradictions that can arise in the process, either as regards the creation of a dual power or the usurpation of decision-making bodies by the more active and consolidated groups. That could run counter to the interests of the more excluded sectors, for which the mechanisms of direct participation are a key means of ensuring that their interests are heeded (Jacobi, 1990, p. 136).

With a few exceptions, the implementation of proposals for participation has faced a series of obstacles. Prominent among these are the lack of care in decision-making, public officials' meagre engagement and, above all, the absence of criteria for representation and administrative channels that guarantee institutional support for interaction with the more organized groups and the popular sectors.

Citizen participation has a wide range of connotations, which vary according to citizens' involvement in the different stages of policy-making and policy implementation. Participation in problem-solving is not the same as helping to propose options or taking part in decisions of public interest. Hence the importance of institutionalizing such practices. Institutionalization makes it possible to assess the true influence of social actors in the various channels for citizen participation. It is also important to learn more about institutionalization processes and how they can affect the quality of the mechanisms used to represent interests. This is a question of the quantitative significance of the representation of social interests, mediation in the choice of representatives, the diversity of the interests represented, and the way that the different institutions work, their level of independence, and the general functions assigned to them.

The main challenge is to break away from the clientelist thinking that pervades State-society relations. To that end the State should institute democratic and pluralist public channels for collaboration and participation, wherein conflicts are visible and differences are addressed. These would serve to legitimate the various interests in play. They would also offer space

for participation in decision-making and guarantee interaction between the groups involved and the public authorities (although this could run counter to the thinking that often governs the management of services and its purported rationale). It is also to be stressed that in the debate on public policies and participation strategies there is always the risk of creating an automatic and utilitarian link between discourse and action.

Participation offers a real chance of creating conditions conducive to greater fairness in the distribution of public resources. It also facilitates the introduction of rules on reciprocity and sociocultural transformation in asymmetrical State-society relations. The goal is to strengthen the presence of actors-citizens who demand that their overall interests be politically addressed and that they directly influence policy-making.

The consolidation of participation represents the strengthening and expansion of community practices, by creating and activating a series of institutional instruments acknowledging rights that can really be exercised and that foster strategies of active intervention and co-responsibility. One of the main challenges of enlarged participation is to define the criteria for representation. Those criteria should obviate the danger of manipulation by groups driven by sectoral interests, and the prospect that the representation will be exploited by the public administration.

Analysis of the experience to date underscores the difficulty of guaranteeing the effectiveness and endurance of democratic policies, of strengthening the media so that they attract and retain public interest, and of reaching institutional agreements of sufficient scope. What is needed is a collective strategy to strengthen the organization of civil society, a shift in the correlation of forces, a qualitative change in policy-making procedures and, in short, a real democratization of the State and the way it is run. This transformation calls for what Arato and Cohen (1994) define as an organized civil society, distinct and duly protected, able to influence the State, capable of guaranteeing the protection of fundamental rights, and equipped to monitor and influence processes governed by systemic thinking. These are slow processes, however, and they are not always one-way.

Building citizenship in a context of widening inequalities is a complex process. It requires the elimination of the underpinnings of the various forms of domination, and of a political culture expressed as tutelage, clientelism and political paternalism.

Civil society's participation in public policy-making involves a qualitative change, because levels of power other than the State are involved. This is defined as a right to development, an achievable goal in a participatory society that helps create a competent citizenry.

Because participation has different dimensions, certain sociopolitical and cultural conditions must either be overcome or borne. This is because the qualitative change begins in the various institutional mechanisms that denote the gradual acceptance by the public administration of public forms of negotiation, thereby revitalizing democratic potential.

The complex and unequal progress made thus far reveals that such mechanisms arise when information asymmetries are overcome and a new, rights-based culture is established. They emerge when conditions are conducive to the spread of participatory management experiences that support the extension of decision-making, and to the consolidation of democratic public arenas. These innovative experiences use education and information activities based on engagement with the population to enhance the low-income sectors' capacity to criticize and intervene. They also strengthen the capacity to expand and exploit citizens' potential to take part in decision-making processes that are marked by non-associative thinking. Certain conditions, in short, are conducive to "citizenizing" politics, to shifting its centre of gravity from the State sphere to the citizen.

The challenges of expanding participation are intrinsically linked to local governments' predisposition to create public and pluralist channels for collaboration and participation, wherein conflicts are visible and differences are addressed. These would serve to legitimate the various interests in play. Hence the need for an institutional framework that the public deems legitimate, one that guarantees transparent and pluralist channels for participation, that seeks equity and social justice, and that links administrative complexity to democracy.

It is important to note the differences between the various forms of participation. The prevailing model is "formal" because it constitutes a legal requirement. "Effective" participation is the next step. It calls for the mobilization of organized citizens, their collaboration with the government, and the strengthening of community and associative initiatives marked by shared responsibility.

The effective participation of citizens in decision-making, as in the cases of the Participatory Budget exercises in over 100 Brazilian municipalities of varying sizes, is becoming an expanded mechanism for society's active intervention in policy-making. Such participation calls for a greater effort to institutionalize way of meeting demands on agreed bases. Demands and pressure must be processed, and formal mechanisms must be created that include both the organized and mobilized sectors (fostering their adaptation to the institutional framework and respecting their independence and self-management) and those sectors that are unorganized. This is happening in a context of immediacy and utilitarian thinking, and of a radicalization of democracy that (by expanding citizens'

political and social rights) creates new links between governors and governed. This policy-making process, which involves organized citizens in the State apparatus, facilitates understanding of its own operation and constraints, thereby fostering a relationship of shared responsibility and debate geared to building an ever more functional consensus.

Policy-making is truly democratized by breaking down socio-institutional barriers, a process that stimulates a sense of co-responsibility in defence of the common good. To increase active citizenship —one instituted by the citizen as the bearer of rights and duties, and particularly as a source of the right to new channels for participation— it is crucial to educate the population. Education facilitates a constant transformation of prominent actors' capacity for active sociopolitical intervention.

Thus it is a matter of creating the necessary conditions for a new form of sociability based on education for participation. This will take shape largely through the growing presence of a plurality of actors who realize their potential for participation, and thus who are ever better equipped to intervene (coherently, and without tutelage) in public decision-making. That process legitimates and consolidates policy-making based on guaranteed access to information and stronger channels for participation. The latter are crucial preconditions for the institutionalization of social control. It is not enough to guarantee the public's legal right to take part in environmental policy-making through councils, public hearings, fora, and bureaucratic procedures and initiatives. People's frequent indifference to participation has become widespread because their citizenship is under-developed and because politicians and institutions are not held in high esteem.

These considerations can only be put into practice by means of a learning process, one that involves a reorientation of the relations between the private sector, the government and civil society. The process also entails changes in the system whereby public and private administrators account to society, as well as cultural and behavioural shifts. This will only be possible when every individual feels that he or she should collaborate to improve the environment and to enhance quality of life in society as a whole.

If people are really to exercise their citizenship and participate more, and if sustainable development is to be promoted, there must be a paradigm shift. This should serve to guarantee that the needs of present generations are met without compromising the capacity of future generations to meet their own.

Councils are public arenas in which differences and values are expressed, arguments are advanced, and opinions are formed. They define the parameters of public policy-making, a process that often sparks a debate about what is fair and what is unfair. They are the bodies that, more than

any other, should uphold the public interest and act transparently. They could be real "schools of democracy" allowing society to learn to negotiate, participate and, in short, to demand respect for its rights through a process of trial and error. When the councils are democratic channels for negotiating and determining parameters, they can issue guidelines for the paradigm shift proposed by sustainable development theorists.

Participation is important in pointing out the contradictions between public and private interests, between public and private goods, between a short-termist culture, one that seeks immediate gain and neglects the future, and the creation of an environmental citizenship that overcomes the crisis of values and identity and that proposes a new culture based on sustainability. Such a process helps raise environmental awareness and promotes its embodiment in real action, undertaken by an organized and informed public that is willing to understand and demand its rights and to assume its responsibilities. Critical and aware citizens are those who understand, who take an interest, who stake a claim to their environmental rights and demand them of the corresponding social sector, and who are also willing to assume their own environmental responsibilities. Members of organized civil society steer the direction of their own lives, allowing them to acquire political power and the capacity to bring about a collective change. Hence the need to identify the various actors' environmental roles and responsibilities, and to reach consensus on them, especially in the area of air pollution. To the extent that the State is ever more responsive to the needs of sustainable development, citizens should be part of a common and long-term vision.

Various international treaties mention public participation as a precondition of sustainable development. One example is Agenda 21, approved in the 1992 United Nations Conference on the Environment and Development in Rio de Janeiro, which was the fruit of a higher level of maturity in the international debate on sustainable development. That debate contemplated expanded public participation in decision-making, mainly through the active intervention of NGOs and all other pertinent groups.

The 1998 Fourth Ministerial Conference in the "Environment for Europe" series in Denmark, also known as the Aarhus Conference, approved the "Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters". This is one of the most complete current agreements on public participation in environmental policy-making. It reflects an extensive debate sponsored by the United Nations and its Article 1 establishes a fundamental law: guaranteed access to information, public participation in decision-making processes, and environmental justice.

B.   Social participation and air pollution.
Relations between civil society and the State

1.   Brazil: São Paulo metropolitan region

The São Paulo metropolitan region (SPMR) has a population of over 17,000,000, of which more than 10,000,000 live in the city of São Paulo. The SPMR has about 6,600,000 vehicles and in 2001 there were more than 5,000,000 in the municipality of São Paulo. This is an exceptionally high number of vehicles: there are almost two inhabitants per vehicle and private transport's share of all journeys by vehicle surpasses 50%.

The population of the SPMR is exposed to high levels of air pollution, especially in winter, when carbon monoxide and breathable particulates routinely reach very high levels. Vehicles cause almost 90% of this pollution. Diesel vehicles, as well as those using gasoline and alcohol, produce toxic gases and particulates. Ozone is currently the pollutant that most exceeds safety limits.

The State of São Paulo is responsible for controlling the quality of the environment through the Secretariat for the Environment, and for effecting environmental control through the Environmental Sanitation Technology Company (CETESB). Until 1994 the state government took a series of preventative and corrective measures (for these purposes it had 22 air quality monitoring stations), although these were of limited scope in controlling carbon monoxide. The Brazilian Traffic Code, in force since 1998, made provision for vehicle inspections as of 2001; this has not yet been put into effect.

In 1995 the Secretariat of State broke the vicious circle in air quality management and set up a controversial traffic rota programme known as Operation Rodizio in the SPMR. Part of an air quality management policy and implemented as an emergency and preventative measure, this programme limited vehicle traffic during the day in the city of São Paulo and nine municipalities of the metropolitan region with a large numbers of cars. It was a precautionary programme to avert pollution emergencies. A permanent programme, set up in the Prefecture of São Paulo in 1999, limited traffic in the area deemed most at risk. The measure was geared solely to reducing congestion in rush hours, and Operation Rodizio was cancelled at the state level.

The programme addressed the issue of air pollution and linked it to health and transport. The aim was to coordinate the activities of all government agencies working on air quality; the government undertook the task of coordination. It took the initiative to communicate with the

public on the matter through the press, appealed to the public, and called for social organization on the issue so as to encourage participation. The Prefecture's "Rush Hour Programme" confused the public. What earlier had sought mainly to improve air quality became a traffic question; the process deteriorated. Despite the attendant mobilization of society, the government was unable to ensure that the debate endured. Apart from the general lack of collaboration between the secretariats, problems of coordination between the Secretariat for the Environment and the Prefecture made continued cooperation difficult. The allocation of functions proved particularly problematic.

An important aspect of Operation Rodizio at the state level (1995-1998) was that it raised public awareness of the link between air quality and the use of public transport. It also aroused pressure for the government to invest in expanding and upgrading the public transport system as a means of reducing air pollution. It was understood by those who supported it as an enlightened, disciplinary, social and community-focused initiative.

Broadly speaking, the population is unfamiliar with the outcomes of government policies, and the government has done very little to improve the dialogue; its communications strategy has made little impact on the public.

In Brazil, and especially in São Paulo, the city most affected by pollution, there has been little or almost no mobilization of citizens concerned with air pollution. The issue is ever more present in society (the media have played a prominent role in this regard), but it is not a priority for citizens because they are unaware of its seriousness.

The increased presence of environmental NGOs, the media and even, in some cases, severe climatic conditions have given rise to endeavours with a long-range focus. The main problem is arousing individual awareness and gearing it towards a common goal. An obligatory programme, Operation Rodizio placed all motorists on the same footing, but compliance with it was regarded as a coerced sacrifice, one made solely because of the fines. There was no internal motivation to cooperate (although some doubts have been raised about this). Citizens are unwilling to make sacrifices, and few are prepared to forego car use because cars, increasingly, are status symbols.

The struggle against pollution made no progress and the problem of air quality, involving neither votes nor prestige, is not a government priority. The notion persists that respect for certain environmental quality standards runs counter to development, and thus many levels of the public administration continue to believe that development is constrained by air quality management.

Business has become more sensitive to environmental issues, and its espousal of less reactionary positions has improved its image. Businesses

with environmentally-friendly practices become more competitive; some of them are taking account of the quality of the environment in their business strategies, which is a step forward. The community sector's participation is practically nil; to the extent that it exists, it is confined to the middle classes.

The NGOs are generally inactive in the area of air pollution and their activities in the field of the urban environment have been few. Their significance lies in their role of monitoring, criticizing and proposing specific projects. The activities of the environmentalist institutions are generally well defined, such as preserving ecosystems, improving the quality of the environment (air, water, solid residues), environmental education, broadening access to information, and sustainable agriculture. These movements are ever more ready to influence those state institutions concerned with environmental issues, the legislature, the academic community, and the private sector. The questions now posed by environmentalism are closely linked to the need to create a sense of citizenship among the poor, to social rights, to the decline in living standards attendant on socio-environmental degradation (especially in large urban areas), and to the need to expand and reinforce society's adoption of practices that are conducive to ecological sustainability.

Air quality has featured on the work programmes of few organizations, and when it has appeared it has given rise to only temporary initiatives. The little mobilization that is apparent is spurred by the media: the press, radio and television. There has been progress nonetheless, notably the intensification of the debate sparked by environmentalist NGOs and the enhanced role of the media. In some cases, severe climatic conditions have given rise to long-range initiatives.

The population participates little and makes few demands, because citizens are beset by more pressing matters such as violence, the scant provision of public transport, and problems of housing and environmental sanitation. Citizens' values and behaviour have to change, a matter closely connected to the role of the media, the channels for communication and publicity in general. These have not induced change. In the meantime there is a widespread lack of responsibility towards air pollution.

The importance of the environment has risen substantially, and is now almost part of the media's routine vocabulary. Except when there is a severe outbreak, however, media references to the issue are few and far between. Some media have placed greater emphasis on such incidents in recent years, but even when it is reported prominently (and especially during periods of thermal inversion), air pollution is not a priority for citizens because they are unaware of its seriousness.

There are few mechanisms for participation and the existing channels are deficient. While they have increased in the past ten years, they still make no major difference. They are more democratic but the public (as in the case of public hearings) makes little use of them. Citizens, their vision focused on the short term, use the channels for participation in a somewhat contradictory manner because most people are unfamiliar with the existing mechanisms and do not know how to use them to pressure the government.

There are other ways of participating but, because of an abiding lack of credibility and administrative continuity, the public has failed to grasp the consistency and scope of the policies adopted. The mechanisms for participation have made some progress and have been institutionalized, but some decision-making authority must be guaranteed because otherwise there is no real participation. The population actively intervenes but in practice it has nothing to do.

Moreover, the public makes little or no use of the available channels for participation. It must participate if air quality is to be improved, but needs to be encouraged to take part. The obstacles to participation are related to the lack of information on the instruments for participating. People are generally unaware that they can take part in public hearings.

The mechanisms for participation are barely formal and there is no interest in making them work better. There are few mechanisms for more effective participation and the government has shown little or no willingness to foster participation. Problems with the existing mechanisms —the State Environment Council (CONSEMA) and the Sustainable Development Council (CADES)— are plain. The public makes no use of them.

2.   Chile: Santiago metropolitan region

In Santiago, the problem of air pollution was placed on the public agenda in the early-1990s. Control and monitoring activities predominated. Transport is the main source of pollution, which consists largely of particulate material, carbon monoxide and nitrogen oxide. The Metropolitan Region has a population of 6,000,000 and almost 600,000 vehicles. The institutional framework for regulation was consolidated in 1994: limits on vehicles and technical inspection of them, and other means of reducing fixed-source pollutant emissions. In 1996 the Santiago Metropolitan Region was declared an area saturated by carbon monoxide, suspended particulates, particulate material and ozone. Restrictive measures improved air quality but did not bring about a change in conduct. There is deficit in communication and participation. An improvement nonetheless became

evident in 2000. The authorities began to upgrade social communication and to acknowledge the need for more effective means of participation.

The measures adopted caused a decline in the number of emergencies and pre-emergencies, and the authorities came to understand that pursuit of a pollution-free city demanded measures to promote more active public involvement. To that end, and since pollution is the city's fifth biggest problem, between September and November 2001 the government conducted an investigation of citizen participation as part of the Plan to Reduce Air Pollution in the Metropolitan Region (PDARM). Public consultations revealed that citizens want cleaner technologies, ceilings on industrial emissions, the reduction of suspended particulates in public areas, and control of vehicle pollution. There has been substantial scepticism about the prospect of putting in place real mechanisms for participation. The main challenge is to devise and apply a policy of communication and citizen awareness-raising, particularly through initiatives that help citizens understand that air quality depends on individual daily conduct, and that such conduct can be altered if there is a need to change a situation that affects the population as a whole.

Environmental management in the Metropolitan Region falls under the aegis of the National Environmental Commission (CONAMA-Metropolitan Santiago). This is responsible for the "Clean Santiago" programme, which includes measures such as traffic restrictions by license plate number throughout the day between March and December, technical inspections of vehicles that do not have catalytic converters, and other preventative initiatives. Communication strategies do not seem to be well organized or coordinated, which allows other actors (who do not share the government's perspective) to intrude. Studies have shown that the information provided by the local government is fragmented, ambiguous and diffuse, and doubts have been raised about its reliability and precision. The State has made practically no progress in strengthening citizen awareness, having failed to convince people of the importance of collective endeavours to improve the region's air quality.

In general, and despite the seriousness of air pollution, the various sectors have participated very little. There are two reactions in the business sector: the industrial sector plays a role, while the passenger and cargo transport sectors are more reticent.

Community sector participation is confined to a small group of actors who are prominent in efforts to protect the environment. Air pollution is regarded as a problem that arises in certain months, and thus it is assumed that there is no need to take preventative action or to alter behaviour in a way that involves using the car less. The NGOs are a driving force of initiatives geared to fostering coordination among the various sectors,

finding solutions, and reporting on the issue, but there are operational constraints on the scope of their activities. The media, for their part, have been prominent in reporting environmental problems.

The environment is not a priority, and although the public has access to more information it is generally unaware of State efforts to control air pollution.

"Formal" participation is more frequent, especially in environmental impact assessments, an area in which the actors' interests are well defined. There are few instruments to foster "effective" participation. Analysts have pointed out that there is still a shortage of tools to raise public awareness in such a way that citizens take account of environmental considerations in their daily lives. There is still little environmental education and training.

3.   Mexico: Mexico Valley metropolitan area

Mexico City has a population of 20,000,000 and 4,000,000 vehicles. Some 82% of transport is public and 18% is private. Mobile sources produce most of the pollution: 85% of all pollutants and 99% of the carbon monoxide. It is estimated that 45% of the vehicles are more than ten years old. Five pollutants have been monitored in Mexico City in the past decade. Ozone, still one of the main problems, is present on eight out of every ten days of the year, a level that is beyond the permitted range. As part of national environmental policy, a traffic restriction campaign in the metropolitan area, known as "Don't Drive Today", originated in an institutional reform that put in place a significant framework for environmental policy-making in Mexico: the four-year plan to reduce air pollution in the Mexico Valley metropolitan area. At the time, vehicles in the Federal District were held responsible for almost 80% of emissions.

The public transport system in Mexico City depended manly on the Metro, opened in 1969 with 12 kilometres of line. Its 200 kilometre network carried over 5 million passengers a day. In 1988 the authorities set up a metropolitan index to monitor air quality. This was calculated on the bases of pollutant concentrations and expressed in points. Systematic measuring, which had begun in 1985, revealed the scale of a problem whose main cause was vehicles emissions. The air quality audits of 1989 and 1994 gave rise to national pollution control programmes: the Comprehensive Programme against Air pollution in the Mexico Valley (PICCA) and the Programme to Improve Air Quality in the Mexico Valley (PROAIRE 1995-2000), respectively published in 1990 and 1996. The two audits disclosed that transport is the main source of air pollution, accounting for over 75% of

emissions. Within the transport sector, private cars emit more pollutants than any other form of transport. Although they account for just 15% of all daily journeys, in 1998 they were responsible for 50% of air pollution.

The improvement in air quality in recent years can be ascribed to a series of emergency measures adopted as part of PROAIRE. Ozone levels, however, have remained high.

The "Don't Drive Today" scheme, originally introduced as an emergency environmental measure in 1980, consisted of restricting the most polluting vehicles and thereby encouraging a gradual renewal of the cars on the road.

By the end of 2000 the strategy had two stages. The permanent "Don't Drive Today" programme operated on alternate days; all vehicles were identified by coloured stickers; the restrictions even applied to filling stations and non-essential public services. The vehicle inspection programme was applied every six months and the government set increasingly stringent and precise criteria for vehicles on the roads. Testing of the quality of emissions has been pivotal in reducing vehicle pollution; 2 million vehicles are inspected every six months.

Environmental contingency programmes are only effected when pollution levels are critical and during emergencies; they are not used as preventative measures. The government determines the need to upgrade the technology of the system used to monitor Mexico City's air quality. Depending on the nature and concentration of the emissions it increases the number of gases taken as indicators of pollution levels, adopts preventative measures, and improves public information on emissions and the measures needed to tackle them.

The adoption of a broader approach to air pollution represents substantial progress. The "Don't Drive Today" programme has been enhanced and is better integrated into the set of policies geared to improving air quality.

There is practically no "effective" citizen participation in environmental policy-making, although the government's 2001 planning report proposes that civil society be induced to participate in agreements, consultations and assessments. It is vital that participation is not interpreted solely as voicing opinions and making proposals, but as active intervention in decision-making and as monitoring compliance with decisions made. The aims are to reach consensus between the authorities and social groups on how strategies and policies are designed; to ensure that the public's priorities and perceptions are heeded; to inform society constantly and transparently on environmental conditions and the state of environmental resources; to make citizens and their organizations play a part in the search for solutions to environmental

problems; and, for the purposes of policy planning and assessment, to take account of the information, knowledge, and experience of organized groups concerned with the issue.

4.   Other cities in Latin America

In other Latin American cities, government initiatives have sought to increase the number of programmes that coordinate mechanisms and regulations geared to improving air quality.

In Lima, which has 7,500,000 inhabitants and 700,000 vehicles, the population is substantially affected by poor air, which has made it one of the most polluted cities in Latin America. The chief initiatives centre on a monitoring network, the rationalization of transport routes, vehicle inspection and maintenance programmes, and devising appropriate air quality standards. These measures are needed in the face of a range of serious problems, such as the age of the vehicles on the roads (about 18 years old), the general lack of vehicle maintenance, the absence of regulation, and the inefficiency of much public transport. A high proportion of leaded gasoline is still sold for price reasons. There is a delay in implementing the most important measures, such as the installation of a network to monitor air quality (this is deemed essential) and the vehicle inspection programme. The delay impedes real changes in air quality.

In Buenos Aires, with a population of over 12,000,000 in the metropolitan region, effective measures to control air pollution have still not been taken, despite the urgent need for them. Some proposed policies to improve air quality involve a great deal of participation, such as setting up a monitoring network similar to those in São Paulo, Mexico, Santiago and Bogotá.

Bogotá has a population of 6,000,000 and 850,000 cars that transport 20% of the city's inhabitants; some 72% of residents travel by bus. The city has monitoring stations, and the authorities have adopted some restrictive measures to reduce pollution and increase mobility and speed. The steps taken are largely confined to efforts to promote the Transmilenio public transport system, which consists of corridors for buses and the reorganization of public transport; the aim is to increase bus speeds to 25 kilometres an hour. Other measures seek to discourage the use of private vehicles in the city's most congested areas, to which end there has been a substantial increase in the cost of parking. The "*Pico y Placa*" ("Peak and License Plate") vehicle restriction programme was introduced to reduce the number of private vehicles on the roads at peak times. Gasoline taxes also rose. Additionally, some 300 kilometres of bicycle lanes will be built to

encourage cycling in the city centre. In this case, therefore, efforts are geared to reducing air pollution through technology, which to some extent fosters more direct citizen participation in a search for solutions.

C.   Future trends

The experiences recounted here show that overcoming the predisposition to individualism requires the firm intervention of the government authorities in order to protect diffuse interest. Restrictive measures do not please everybody, but people will only be convinced and become more aware over the long term by means of education and transparency. The restrictions will have to be extended as the number of vehicles increases, and the challenge facing the authorities is to offer alternatives. They must stimulate social practices that motivate people to become aware of pollution. This is part of a process of burgeoning maturity, whose attainment is necessarily a long term goal. It will arise from a conception of sustainability that involves society as a whole, and that finds expression in the actions, values and institutions that society represents.

Knowledge of environmental issues is generally limited, especially in the area of air quality management. When such knowledge is present, the lack of faith in the government undermines the latter's credibility. This is largely because citizens are uninterested, irresponsible and powerless, and because the government lacks prestige. That circumstance in turn springs from the marked absence of dialogue between the government and the citizens, and from a grave shortage of information. The information must be translated into everyday language to make it comprehensible. The available information lacks clarity, transparency and credibility, and the citizen's role in the management of air pollution is unknown.

It is interesting that the population of São Paulo assessed Operation Rodizio positively, which suggests that citizens are willing to take part in initiatives to improve the city's quality of life. At the same time, opinion surveys show that the population supported Operation Rodizio more because of its effects on traffic conditions than its environmental impact. Hence the population still lacks an anti-pollution awareness, and does not see results in terms of the environmental effects.

The transport system influences development patterns and the use of the land affects behaviour. Increases in life expectancy and the growing mobility of people and goods give rise to physical and territorial dispersion. Current land use and transport patterns are unsustainable from every point of view: economically, because of the costs involved (congestion and

externalities); socially, because of the marginalization of those without cars and the decline in services that cannot compete with planned facilities to meet the needs of car users; and politically, because in the end nobody is satisfied.

The link between land use, transport and sustainability is a recent one, and a sustainable transport policy involves inter-modal networks, improved services and fair prices, as well as technological development and incentives to public and non-motorized transport.

Decision-making processes should heed the need for social and environmental outcomes. They should not be determined by market mechanisms that tend to confer direct individual benefits, because the market cannot shape policies geared to sustainability. Transport, the environment and development must be addressed as a complex and inter-related system that calls for a comprehensive political approach.

One challenge is to convince people to take account of air quality in their daily routines. Car owners can exercise their citizenship by becoming aware of the need to make an individual contribution to the common good through action, criticism and demands.

In that regard, citizen education raises the prospect of motivating people and heightening their awareness. The aim of such an undertaking is to convert the various forms of participation into means of revitalizing society and expanding social control over public affairs. Such control must extend to the least mobilized sectors. It is a matter of creating the necessary conditions to break with the prevailing political culture and devise a new form of sociability based on education for participation.

Improved access to information and social participation should foster changes in attitude that are conducive to the creation of a collective environmental awareness. This is a significant step towards strengthening citizenship. Individual freedom cannot take primacy over the interests of the community. As regards the use of private transport, this is a more complex matter since cars are a potent status symbol, doubtless the most important icon of contemporary culture. In Latin American cities, moreover, they are a necessity born of patterns of land use and occupation, and of the inadequate state of public transport.

The key challenge of participation is to strengthen active citizenship, acquire information, demand that information be provided, and know which institution is responsible, who intervened, and whether an inspection was properly carried out. As far as environmental damage is concerned, the residents of a neighbourhood can go with the inspector to scrutinize an industrial plant in the pursuit of collective interests. The population must break the bonds of dependency and tutelage, participate more and make more demands.

There is also the challenge of overcoming the excessive segmentation of public policies and of guaranteeing inter-sectoral integration, in line with the recommendations of Agenda 21.

With respect to strengthening the mechanisms for shared responsibility, the challenge to the population consists of consolidating a link between environmental conditions, health, and the subjectivity of citizens' perceptions and postures. The reason for this is that the sectors that safeguard only individual prerogatives are estranged from social endeavours geared to the common good.

There is a need for a consistent education campaign at the institutional level, so that the public is induced to play an active role in air quality management. The population has displayed a general interest in taking part in public policy-making, but there are few or no opportunities to do so. The mechanisms for participation are generally inadequate. Hence it is crucial that communities have access to accurate information that facilitates informed debate, thereby creating a permanent channel for dialogue. It is vital that this dialogue be permanently nurtured.

Participation is necessary because the public is a key actor. When the public legitimates restrictions on car use, air quality can be improved. The population must sever the bonds of tutelage that run counter to a sense of responsibility. Awareness must be raised so as to spur demands for effective public policies on air quality. The public's role in solving environmental problems is to be stressed. The steps taken to that end should include a process of mobilization and motivation, effected through prevention-orientated education campaigns. Improved access to information and social participation should foster changes in attitude that are conducive to the creation of a collective environmental awareness. This is a significant step towards strengthening citizenship.

Sustainability calls for an upsurge in social practices that entail an expansion of the right to wide-ranging environmental information and education. Easier access to information and greater transparency in environmental policy-making will facilitate the reorganization of power and authority.

The findings set out herein suggest that access to information must be widened and that the State should provide it. Questions arise about what determines processes that enhance the prospect of counteracting environmental degradation.

Complex socio-institutional engineering is needed to upgrade existing instruments. That engineering rests on education programmes that guarantee that the various social actors', especially the most vulnerable groups, have access to information on public services and environmental problems.

Sustainability should be understood as a wide-ranging process of change, and it can be broken down into several components: the ecological, the environmental, the demographic, the cultural, the social, the political and the institutional. The exclusively economic vision of sustainable development should be discarded (Guimarães, 1998).

Sustainability should be conceived as a way of strengthening socio-environmental policies that are connected to other spheres of government, and that facilitate horizontal linkages. Environmental policies should be geared to the metropolitan level, thereby underpinning the contribution of environmental initiatives to polices on employment, income and economic development. It is important that the public space and the quality of urban life be managed jointly in a spirit of co-responsibility.

It is also important to consider the importance of the State as an agent that instigates, regulates and monitors partnerships with various social and economic actors. A sustainability-based policy is needed to promote preventative initiatives. Corrective measures are also needed, geared to changing social practices through clearer coordination among the municipalities.

Today's main challenge is to create urban conditions that guarantee an acceptable quality of life and to do that without harming the urban environment, while acting preventatively so as to halt degradation, especially in areas that are home to the poorest inhabitants.

Given the worsening problems, the increasing sensation of paralysis, and the mounting sense that the urban crisis is insoluble, efforts should focus on activities that heighten citizens' environmental awareness and pave the way for development policies based on sustainable behaviour.

A policy to strengthen the roles of the various actors should include a programme of socio-environmental sustainability, one that facilitates access to information that hereto has usually been dispersed and hard to understand.

Against the background of increasing difficulties in fostering social inclusion, society should be given more incentives to mobilize and make proposals, and to question governments' lack of initiative in implementing dual sustainability-development polices.

There have been several successes, mainly at the municipal level. These show that with political will, governments can undertake viable action that is geared to environmental sustainability and that can be combined with the results of economic and social development.

The fact that the public still puts most of the emphasis on State solutions does not imply dependence and lack of responsibility. More often

it reflects a shortage of information, a lack of environmental awareness, and an absence of community behaviour. The latter derives from the participation and intervention of citizens who propose a new culture of rights based on motivation and on their right to share in the administration of the city.

Adopting measure entails not only sociopolitical coordination but also agreement on the procedures for reporting to the population. This can be done using information campaigns and mechanisms that help consolidate efficient and coherent participation. To that end it is crucial to encourage the various social actors that are motivated, so as to increase the information available, decipher it, and overcome the public's lack of interest and awareness by implementing policies marked by a sense of shared responsibility.

Part Two

- Chapter III

  Methodology of the project "Enhancement of citizen awareness for the formulation of air pollution control policies in three metropolitan areas of Latin America: Mexico City, Santiago and São Paulo"

- Chapter IV

  Citizen awareness and air pollution: the case of Mexico City

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Chapter III

Methodology of the project "Enhancement of citizen awareness for the formulation of air pollution control policies in three metropolitan areas of Latin America: Mexico City, Santiago and São Paulo" [1]

This chapter outlines the project "Enhancement of citizen awareness for the formulation of air pollution control policies in three metropolitan areas of Latin America: Mexico City, Santiago and São Paulo", which was carried out by ECLAC with the support of the Government of Japan.

Project CCC (based on its acronym in Spanish) sought to add to the meagre empirical literature in the so-called developing countries on citizen awareness and environmental issues; in this case, the analysis focused on air pollution. The three metropolitan areas chosen for the project are the three cities in the region that are most affected by air pollution.

Citizen awareness plays a crucial role in the acceptance and success of environmental policies, since it is a prerequisite of environmentally-friendly activity.

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[1] The final version of this chapter was prepared by Daniela Simioni, Environmental Affairs Officer of ECLAC's Sustainable Development and Human Settlements Division, on the basis of documents from the project "Enhancement of citizen awareness for the formulation of air pollution control policies in three metropolitan areas of Latin America: Mexico City, Santiago and São Paulo", prepared by the consultants Cecilia Dooner, Michiko Iizuka, Cecilia Montero, Chantal Nicod and Constanza Parra.

The background to that assertion is the meaning of awareness in this context: whether it is simply a matter of persuasion that leads people to adopt environmentally-friendly lifestyles; or whether it is something more complex, such as an understanding of the causes and effects of the problem. In the latter case, citizens can be equipped to take part in decision-making on measures to secure socially acceptable air quality.

It is important to discuss briefly what is meant by environmental awareness in this project, in the light of its theoretical framework.[2] That framework sought to show the importance of viewing environmental awareness as a new policy tool to complement legal and economic mechanisms. Environmental awareness is a pre-condition of environmentally-friendly behaviour or, as mentioned, of ensuring that such behaviour is conducive to participation in policy-making.

This reasoning can be illustrated as follows:
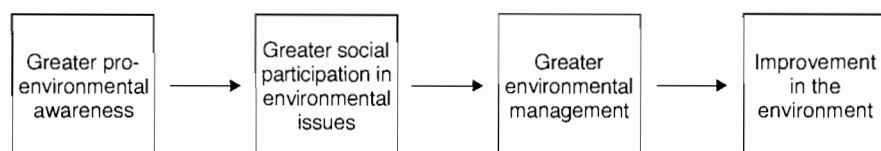
There is a tacit assumption in this diagram: greater social involvement in environmental matters will enhance environmental management, which in turn will lead to an improvement in the environment. There is also a premise: the higher the level of pro-environmental awareness, the greater the participation in environmental matters.

Social awareness is a concept with a long tradition in sociology, nourished by inputs from various schools of thought and regarded as a condition of social change. In this project, attention focused on its link to the concept of participation.

In the area of environmental management, many developing countries have environmental policies, legal frameworks and economic instruments that seem highly sophisticated by international environmental management standards. Belying the conventional wisdom, however, their environmental circumstances are still deteriorating (see Chapter I). Because of recent large-scale changes in the sources of environmental problems, which have shifted from production processes to consumption processes,

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2   See Chapter I by Michiko Iizuka.

the UNDP's 1998 Human Development Report points out that consumption growth and the unbalanced models to which such growth gives rise are exerting unprecedented pressure on the environment. In that light, it is a matter of urgency for environmental protection purposes that the general public adopt environmentally-friendly attitudes and sustainable lifestyles. While the need for involvement is plain, it is unclear what induces civil society to participate in or be indifferent to pro-environmental measures. This is the core of the project.

More aware environmental conduct by all members of civil society is not just a matter of limiting how one affects the environment oneself, nor of making one's own efforts to improve it, but rather of assuming the role of a citizen. This means that citizens, while in no way neglecting these responsibilities, must use all the means at their disposal to participate in decision-making.

A complementary perspective in this project was to regard citizen awareness as a sensitization of individuals' attitudes towards a particular public policy issue, and as the consequent readiness to act on the basis of the information available, fully aware that each activity makes only a marginal contribution to the matter at hand (Dooner, Parra and Montero, 2001).

The use of the information is particularly significant for raising awareness, inasmuch as: (i) it makes citizens aware of environmental problems; (ii) it explains and relates the causes and effects of environmental degradation, and spells out what individuals can do to curb it; (iii) it recounts what the various actors are doing in the field of environmental management; and (iv) it fosters a widespread awareness of environmental policy and of the presence of discussion fora that public and private sectors can use for their joint participation in a process of change.

The analysis in the first part of each case study —drawing largely on secondary sources— addresses the issue of air pollution in each of the three metropolitan areas. These first sections describe the problems and their causes (in each case, vehicle transport is the most immediate cause), and analyze the policies deployed to solve or attenuate those problems.

The second part of the each study draws wholly on interviews with a series of qualified sources. In all three cities the same methodology was used to gather information on pollution and citizens' responses to it from key actors. The results of the interviews in each city were summarized in successive stages as they were processed. To share and validate the findings, the summaries were discussed at workshops in each city.

Additionally, a comparative study of the three cities sought to determine the prospect of improving the air quality in each of them.

This chapter is divided into four parts. The first explains the analytical variables deemed crucial to enhancing citizen awareness; the second outlines the factors that led to the identification and selection of the interviewees; the third describes the factors that facilitated a comparison of the results of the interviews in the three case studies; and the fourth offers a systematic overview of the interviews, disaggregated by case-specific variables. The comparative assessment and the recommendations are presented in Chapter VII.

A.   The research variables

When the project's methodology was being defined, three variables were judged to be pivotal to enhancing citizen awareness: individual and collective behaviour; the State's social communication strategies; and the mechanisms for citizen participation.

It was posited that urban air pollution stems from the interaction of this set of variables, and that a change in any of them would affect the others.

Figure III.1
THE APPROACH OF PROJECT CCC [a]
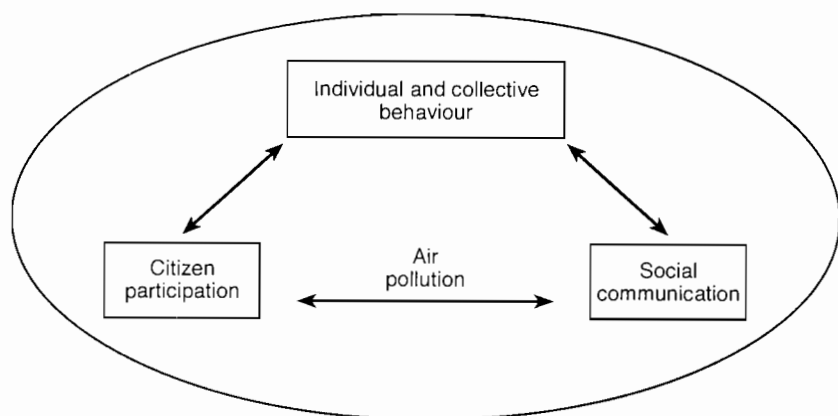
Source: Cecilia Dooner, Constanza Parra and Cecilia Montero, "Contaminación atmosférica y conciencia ciudadana. El caso de la ciudad de Santiago", Environment and development series, N° 32 (LC/L.1532-P), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC). United Nations publication, Sales N°DS.01.II.G.77, 2001.

[a] "Enhancing citizen awareness for the formulation of policies to control air pollution in three metropolitan areas of Latin America".

1. Individual and collective behaviour

Use of this variable makes it possible to determine the levels of citizens' awareness, the extent of their engagement with the issue, and their attitude to the management of air quality. It also makes it possible to ascertain the degree of citizen mobilization on air pollution and future trends in that regard.

As regards individual behaviour, the aim was to identify the factors that constrain or favour a change in conduct towards air pollution, so as to ascertain if they were external to citizens' will or if they originated in internal sources. The latter largely determine levels of individual awareness and commitment.

A parallel aspect of the research was to highlight the main ways in which the actors mobilized collectively around the issue of air pollution. This endeavour made it possible to ascertain the tendencies of social movements in this field, they ways that citizens mobilize (and how those ways change over time), the leading figures in the mobilization (the actors involved, the groups that are engaged and so on), as well as these movements' proposals and demands.

It was largely a question of analyzing the following:

- What fosters collective and individual mobilization against air pollution?

- What are the obstacles to collective and individual mobilization?

- How can collective and individual mobilization be enhanced?

2. Social communication

This variable centres on social communication strategy. The efficiency and effectiveness of environmental policies depends on the quality of the dialogue between the State, intermediate organizations and citizens. Regulations determine how people act, but compliance requires good information and enough flexibility to improve it. Hence the importance of a strategy that can build consensus on how the problems should be defined, on the responsibilities of all the actors, and on a joint pursuit of solutions. To date there has been fairly meagre communication between the State and civil society, and distorted images of what is done about pollution persist. Some mistakenly believe, for example, that air quality has declined in recent years. There is a quite limited awareness of the institutions and public policies involved in solving the problem.

In the course of this project it became evident that the State is beginning to recognize the importance of using information properly, so that it induces and helps secure citizens' participation in finding a sustainable way of solving the problem.

This variable was used to identify and analyze:

- The obstacles to more fluid communication between the government and the population; the reasons why messages and proposals are poorly understood and absorbed by the general public.

- Effective social communication strategies.

- How the government perceives the importance of being understood by citizens.

- How civil society can be made to understand and accept the messages emanating from public institutions.

- Recommendations and proposals for enhancing the authorities' social communication strategies on the issue of air pollution.

3.   Citizen participation

Today, citizen participation is a multifaceted phenomenon. The value of citizens' responses to environmental problems is determined by the contribution they make to the design, implementation, monitoring and assessment of public policies on air quality. Such participation reveals the nature of State-civil society relations.

To specify how participation developed, the instruments used to promote it (such as consultations, participatory budgeting) were identified, along with the existing channels for citizen participation (such as State-organized committees for citizen participation, organized citizen groups and so on).

The analysis of participation focused on three levels:

- the informative level, in which the citizen receives information from the State but can neither opine on nor influence the decision-making process;

- the consultative level, in which citizens can speak their minds on the information they receive. The extent to which an expression of opinion influences decision-making, however, is unknown; and

-       collaboration, in which the citizen and the State manage things jointly through deliberation and negotiation. In this case, decisions are not taken before the various interests involved have been reconciled.

The following factors were analyzed:

-       The actors' perceptions of the usefulness and relevance of the existing channels and instruments for participation.

-       Given the existing channels for consolation and collaboration, what are the barriers (in civil society and the State) to a degree of participation that surpasses the information level?

-       What factors (in civil society and the State) make possible an improvement in the level of citizen participation?

These three variables have been separated for the purposes of analysis, but they are clearly inter-related. The proposal on how to improve participation has an all-encompassing perspective and is closely connected to the three variables. Doubtless this is why many of the measures recommended to enhance one variable directly affect the other two (or at least one of them).

B.   The interviews

In contrast to huge surveys of a number of individuals judged to be a representative sample of the population according to statistical criteria, an interview with key actors comprises a dialogue with a chosen person on the basis of guidelines (largely open-ended questions) set out in an interview guide. The main difference between the two kinds of survey is how open and flexible the interviewer is during the discussion. A massive survey confines itself to reporting the answers to questions specified on the questionnaire. In an interview with a key actor, the discussion can trigger ideas that do not feature in the interview guide but that aid understanding of the issue, and that are noted by the interviewer and taken into consideration when the information is collated.

The interview guides were the same for all three cities. Thus at the outset they contained no specific reference to the city or to the characteristics of the interviewee. In each case, such considerations were included during the interviews themselves.

The actors had been pre-categorized as: (i) structural actors (because of their direct engagement with the measures adopted); these were

essentially the various State bodies and the different components of civil society; and (ii) functional actors (which facilitate linkages between the structural actors); these included the press, universities, NGOs and political parties. All interviewees were invited to give their views of the different actors and how they behaved, the quality of the air in their city, and the processes of social communication and participation.

1.   The key actors

As defined in the Project CCC methodology, structural actors are those linked directly to trends in and the results of pollution, and their behaviour is important in explaining appreciable improvements. They are divided into State actors and civil society actors.

The basic role of functional actors is to serve as a link between the structural spheres and structural actors. The versatility, independence, and ability to change the way they respond to the problem make them valuable in ensuring that there is some engagement between other actors that might have excessively rigid or stereotypical attitudes towards each other.

In certain circumstances, a functional actor can be part of the State or civil society; structural actors cannot.

Figure III.2
KEY ACTORS' ATTITUDES TO POLLUTION
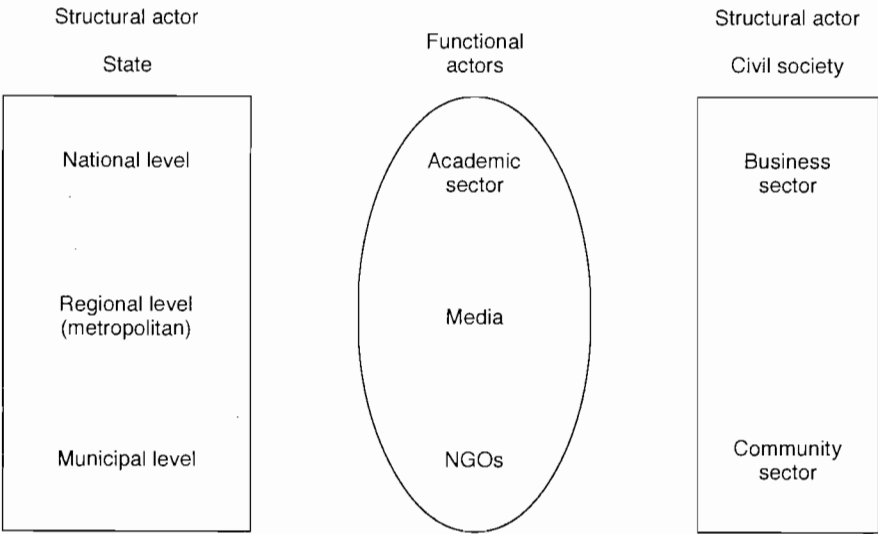
Source: Prepared by the author.

2. Structural actors

a) The State

Environmental management in general, and the management of air quality in particular, exceeds the capacities of a single administrative or political institution of government. Thus it is essential to acknowledge that tackling it efficiently demands a substantial effort at vertical and horizontal coordination among various State bodies.

The example of the success that each of the thousands of Latin American municipalities could enjoy relative to the others suggests that the right way of designing and implementing public policies to improve air quality is to make an immense effort to put in place a variety of institutional cooperation programmes, and to take a new territorial approach to the issue of the environment and development.

These cooperation programmes vary by country. They take the form of institutions that, from differing perspectives, come to acknowledge the cross-cutting nature of the problem and thus the institutional coordination needed to tackle it. One such scheme could be put in place among the municipalities themselves (federations, associations of municipalities and so on), without compromising the authority of institutions at a higher level; or one could be set up at a middle level (between the local/municipal and national levels). The national sphere is another level, in which the State applies policies that can help control pollution. This is closely related to the scale of the problem and the importance of large urban areas (such as metropolitan regions) in pressure for solutions. One risk of this national approach to particular problems is that (because of the large number of cities, which are normally capitals or metropolitan areas) national policies are devised and implemented to solve problems that are area-specific.

The high concentration of institutions also poses a challenge to effective coordination, since each institution has different interests in and outlooks on pollution in general and air quality in particular.

b) Civil society

Since tackling environmental problems requires more than a single sectoral or fragmented effort, it is plain that State endeavours alone are insufficient to deal with an issue in which the quality of a public good (air quality) is at stake.

It should be acknowledged, moreover, that the efficiency of public policies is greater if State action is complemented by private sector and civil society initiatives.

The reaction of the population, both individual and collective, is a key factor in that regard. The level of support for policies that have a real impact is crucial in efforts to secure a degree of engagement that looks beyond immediate circumstances, and that gives public policies a long-term perspective in the context of the State rather than of a particular government.

All civil society actors respond according to their degree of engagement with the problem, which depends on how they perceive it, the interest they have in how it is dealt with, and their management capacity in terms of their contribution and their level of responsibility.

In that light, two groups of civil society actors can be discerned: those in the business sector, and those in the community sector. The former is responsible for economic growth by producing goods and providing services. The latter sector includes citizen groups that fulfil social, sporting, representative and response functions by virtue of their community activities (neighbours' associations, sports clubs, cultural groups, mothers' groups and so on).

The actors in both sectors are many and varied, and in each city there is evidence of their importance in productive and social life. In the business sector, particular attention has been paid to micro, small, medium and large enterprises. The actors in each sector display different levels of civic-mindedness. The level depends on their perceptions of the problem and of what they do, and on how they assess the effect they have en environmental damage or air quality.

3.   Functional actors

The other group of actors that can de considered key, according environmental circumstances or air quality, play a particularly important role as opinion-formers and knowledge-providers, or as channels for information.

In this groups there are three kinds of actors: the media, the universities and the NGOs.

The media comprise a powerful means of creating conditions that spawn civic responses to environmental problems. They can help create a citizen awareness that is grounded in reasoned, responsible, enlightened and timely information, and that is conducive to engagement.

The media can also give citizens information produced by the State and can convey the population's views on environmental issues to the State. The media has an interest in using the right sources to deliver the

information needed to create citizen awareness because members of the press also have a position, an engagement with the issue, and they are striving to encourage the public to think about the major issues of the day.

The universities are important in fostering public-private sector engagement and in encouraging reactions among young people, who serve to spread civic-mindedness and citizen awareness in the family and academia.

Finally, the NGOs are valuable as opinion-formers for both civil society and the State. Their working relationships with business, community and State actors make them important in disseminating, storing, and processing information in a manner consistent with the nature of environmental problems. As sources of valuable technical and professional services, these institutions are important in the distribution of accurate information.

4.   Representativeness and choice of key actors

Gathering information through key actors requires an understanding of the diversity of each situation and area, and therefore of the need for flexibility in the interviews.

The most important thing is to identify actors who are able to command public attention and who are substantially representative, so that they are accepted as valid interlocutors for the provision of information. An examination of the features of each social context serves to reveal the actors' legitimacy and their contribution to the debate on the issue. Acknowledgement that institutional actors (such as neighbours' associations) might not be locally representative (relative to mothers' groups, for example) aids selection of the right sources.

The main criteria for choosing key actors is the extent to which they are representative, their capacity, and leadership. This is true for both individual and collective actors.

All interviewees were invited to give their views of the different actors and how they behaved, the state of the air in their city, and the processes of social communication and participation, all on the basis of enquiries determined by the three key variables.

An effort was made to discern the main actors' perceptions of those variables. Analysis of how each variable featured in the discourse of the different actors gave rise to a status report on how the problem is currently viewed, strengths and weaknesses, and the challenges to be faced by the population as a whole.

Box III.1
GUIDE FOR INTERVIEWS WITH KEY ACTORS

Variables	Indicators
1. Individual and collective behaviour	Perception of individual behaviour Awareness level Real behaviour Social mobilization (collective behaviour) and how it evolves Bases and development of the degree of citizens' collective mobilization Bases and development of the kind of citizenship mobilized Behaviour of collective movements (demands/ proposals)
2. Social communication strategies and level of information	Perception and assessment of: The importance accorded to social communication policies and the transmission of information in the State Obstacles and aids to an improvement in social communication strategies Perception and assessment of civil society Degree of knowledge and approval of public policies Suggestions to improve the State's social communication
3. Citizen participation mechanisms	Perception of the usefulness and relevance of citizen participation Assessment of the usefulness of the mechanisms for citizen participation Assessment of the degree of citizen participation thus far secured (information/ consultation/collaboration) Identification of the obstacles and aids to greater citizen participation Suggestions for upgrading the level of citizen participation

Source: Prepared by the author.

C.   Systematizing the interviews

The results of the interviews in each city were summarized in successive stages as they were processed. The summaries were discussed at workshops in each city in late-2000.

Following an exhaustive review of the work produced, the procedure consisted of drawing the relevant conclusions and recommendations from each study in light of a large number of questions drawn up using the project's methodological instruments.

The questions in whose light the studies of São Paulo (Brazil), Santiago (Chile) and Mexico City were revised comprise a disaggregation of the three variables: 1) role and responsibilities of the actors involved; 2) social communication; and 3) citizen participation. The questions were as follows:

Individual and collective behaviour

- What levels of citizen awareness have been reached?

- How engaged are the different actors with the management of air quality (level of awareness, real behaviour)?

- What is the attitude of the different actors to the management of air quality (level of awareness, real behaviour)?

- What are the constraints on a change in the behaviour of the individual actors towards air pollution? Are they external to the actors or do they spring from the level of individual awareness and commitment?

- Which factors are conducive to a change in the behaviour of the individual actors towards air pollution? Are they external to the actors or do they spring from the level of individual awareness and engagement?

- With regard to air pollution, what are the trends in collective movements (developments over time)?

- What are the prime movers among the collective movements in this regard (actors involved, engaged groups)?

- What are the proposals of the collective movements in this area (demands, recommendations)?

- In short, what is the extent of citizen mobilization on air pollution, and what are the future trends?

- Suggestions.

Social communication strategies

- How knowledgeable are the various civil society actors about air pollution?

- How knowledgeable are the various civil society actors about the institutions and public policies involved in air pollution control?

-   What are the changes (outcomes) in the State's strategies to communicate with civil society?

-   How and at what pace have the State's strategies to communicate with civil society changed?

-   What efforts were needed to bring about changes in the State's strategies to communicate with civil society?

-   What hampered change in the State's strategies to communicate with civil society?

-   What, then, is the level of communication between the State and civil society actors?

-   Suggestions

Mechanisms for citizen participation

-   What are the channels for citizen participation in measures to combat air pollution (among others, for example, State-organized committees for citizen participation)?

-   What instruments are used to foster citizen participation in measures to combat air pollution (among others, for example, consultation and participatory budgeting)?

-   Which of these instruments are informative?

-   Which of these instruments are consultative?

-   Which of these instruments are collaborative?

-   Suggestions

1.   The validation workshop

A one-day meeting was held in each city to validate the results of the research and to systematize the interviews. Each working group in the case study cities brought together some of the interviewees, as well as representatives of the government and civil society, to discuss the questions arising from the interviews. The participants were chosen according to the same criteria used for the interviews with key actors.

The workshops were divided into three parts:

i)   Presentation of the analytical report and proposals to enhance levels of citizen awareness in air quality management.

ii)   Work in groups to draw up suggestions for changes, with a set of questions designed to identify new components for the proposal:

- On what points do you concur with or diverge from the analytical study presented by the research team on each of the variables?

- What comments do you have, and what changes do you suggest?

- To what extent do you agree or disagree with the proposals made?

- What comments do you have, and what changes do you suggest?

- What other proposals would you make to broaden discussion of and reflection on citizen awareness in the area of air quality management?

(iii)   A plenary session to reach agreement on a final proposal.

It was intended that these working groups should validate the results of the survey. The next section summarizes the results of the workshop in each city.

The case studies are presented in separate chapters. Chapter VII contains the comparative study.

D.   Results of the workshops

Table III.1
SANTIAGO: CONDUCT OF THE STRUCTURAL ACTORS TOWARDS
AIR POLLUTION

	Strengths	Weaknesses
State	- has spearheaded the management of the problem and created a specific institutional structure for that purpose - some State institutions have senior experts (SESMA,[a] CONAMA RM,[b] CENMA[c]) - participation was included in the Environmental Framework Law	- has not undertaken systematic and long-term management of the problem - inadequate links and coordination between the various levels of the State - an absence of leadership above the sectoral authorities - excessive concentration of power in the central government

Continued

Table III.1 (conclusion)

	Strengths	Weaknesses
	- proven results in changing specific behaviour by means of norms and decrees (industrial sector, private vehicles)	- CONAMA: an institution with meagre power and resources - lack of political will to regulate some sectors (cargo and passenger transport) - lack of enforcement capacity - deficient communication of results - the presence of experts in State institutions is unacknowledged - insufficient resources devoted to pollution control - the municipal level is not included n the management of the problem
Entrepreneurs	- swift compliance with the norms imposed in some sectors - interest in dialogue with the public sector and in taking part in drafting proposals - high level of economic and organizational resources - achievements: Clean Production Agreement (ASIQUIM,[d] ASIMET[e])	- diverse sector that has to be dealt with in specific ways - negative perception of public management - mostly reactive (compliance with norms) - automatic rejection of new regulations - poorly receptive to citizen participation - participation determined by self-interest
Community sector	- citizen concern in the critical months - discipline to acquire habits - abides by coercive regulations - legalist and respectful of regulations	- irresponsible and reactive conduct (abide by the regulations) - complies only with coercive regulations - limited knowledge of public management and undemanding - has not viewed the environment as a priority - little and poorly informed of the objective conditions of air quality - pollution seen as a problem only in certain months - unaware of own contribution to pollution - lack of civic and associative culture - evinces individualism, short-termism and a lack of historical memory

Source: Cecilia Dooner, Constanza Parra and Cecilia Montero, "Contaminación atmosférica y conciencia ciudadana. El caso de la ciudad de Santiago", Environment and development series, N°□32 (LC/L.1532-P), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC). United Nations publication, Sales N°□S.01.II.G.77, 2001.
[a] Environmental Health Service.
[b] National Environmental Commission, Metropolitan Region.
[c] National Centre on the Environment.
[d] Association of Chemicals Industrialists of Chile.
[e] Association of Chilean Metallurgical and Metal-mechanics Industries.

Table III.2
SANTIAGO: SOCIAL COMMUNICATION AND AIR POLLUTION

	Strengths	**Weaknesses**
How the information is issued	- good technical information - the information has ceased to be seasonal	- lack of a unified State communications strategy - the communications strategy is not precisely and clearly related to the Pollution Reduction Plan - achievements not clearly communicated - fragmented, ambiguous and scattered information - measures implemented have little grounding - in the State, a public relations policy takes primacy over a serious communications strategy - crisis of credibility: excessive information and submission of data, coexistence of parallel and contradictory discourses - the information is not translated into a language that citizens can understand - dysfunctional mechanisms for delivering information - lack of citizen training or incentives - no causal link established between pollution and health - the State still fails to grasp the urgency of forging a strategic bond with the population; it should display greater consistency between what it says and what it does, should be more transparent, and should use a clearer and more focused language that reveals more than it hides
How the information is received	- citizens have basic differences on the issue - people have a positive image of environmental matters - younger generations are more receptive - the environment is indeed a priority for people; the figures are masked in the health statistics (this is a problem of interpretation)	- people do not receive instructions on how to act and change their intentions towards the environment - reactive attitudes to coercive measures that demand changes to some specific forms of behaviour but not to values - tendency to blame third parties - citizens are unaware of the environmental consequences of their actions
Intermediate actors	PRESS - has kept the issue in the public eye and therefore aids awareness-raising - capacity to provide information on a mass scale - critical outlook	PRESS - deals with the matter superficially - lack of media independence - lack of pluralism - non-specialist journalists - no educational role

Continued

Table III.2 (conclusion)

Strengths	Weaknesses
NGOs [a] - good public image - train and organizes citizens - contribute to the debate, report and criticize	NGOs - lack of independence (sources of financing, political leadership) - lack of engagement with civil society - seen as delegitimized by public and business institutions
POLITICAL PARTIES - some individuals have addressed the issue - personal leadership rather than political strategies	POLITICAL PARTIES - citizens view them as lacking in credibility and legitimacy - issue does not feature on their agenda
UNIVERSITIES - source of corroborated expertise	UNIVERSITIES - interdisciplinary division of knowledge - very academic contribution, overlooking educational and training functions

Source: Cecilia Dooner, Constanza Parra and Cecilia Montero, "Contaminación atmosférica y conciencia ciudadana. El caso de la ciudad de Santiago", Environment and development series, N°□32 (LC/L.1532-P), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC). United Nations publication, Sales N°□S.01.II.G.77, 2001.
[a] Non-governmental organizations.

Table III.3
SANTIAGO: CITIZEN PARTICIPATION AND AIR POLLUTION

	Strengths	Weaknesses
Public sector	- beginning to be valued as a management instrument: the State acknowledges that it needs the citizen to make further progress - the environment is one of the few areas managed with citizen participation - there has been an effort to apply different participation mechanisms	- lack of consensus and little clarity on the concept of participation, as well as on its role and usefulness for the citizenry - people seen as passive agents that abide by regulations and are unfamiliar with the facts - the expressed goals of environmental policy have not been translated into adequate and efficient participation mechanisms - little involvement of the municipalities as local organizations for coordinating participation - there are no programs allowing participation to become a basic element of sustainable development - lack of harmonization of pro-environmental participatory practices

Table III.3 (conclusion)

	Strengths	Weaknesses
Mechanisms for participation	- success of the appeal to the public to take part in setting up the Plan to Prevent and Reduce Atmospheric Pollution (PPDA) (example: "Santiago cleans Santiago's air")	- the existing mechanisms are not binding - often, experts from different sectors are convened, rather than ordinary citizens; this calls into question the representativeness of the process. There is social and political exclusion and lack of pluralism in the appeals to the public - civil society has lost trust in participatory mechanisms: they are seen as another State convention
Civil society	- mounting awareness of the issue, limited to certain groups of individuals - signs of budding participation through local leaders and some organizations - some NGOs, entrepreneurs and universities are interested in participating with the public sector - "every citizen knows something": people have certain skills to participate in environmental management	- trust in public institutions has declined - some actors do not regard citizen participation as a priority in reducing pollution - there is a lack of technical expertise, civic culture and experience in public-private partnership - the lack of civic and associative culture between people hampers the mobilization and organization of the community - citizens' individualism and short-termism constrain the assumption of responsibility for a collective issue - there is an evident difficulty in mobilizing people around problems when it is hard to discern who is responsible for them and how to solve them - paternalism and "welfarism": "the other", especially the State, is expected to do something

Table III.4
SÃO PAULO: INDIVIDUAL AND COLLECTIVE BEHAVIOUR TOWARDS
AIR POLLUTION

Positive factors	Weaknesses	Contradictory factors
Small changes are apparent in behaviour towards the environment in general	Little or almost no mobilization around the issue of air pollution	Ambiguities in Operation Rodizio fines: people obey because it is obligatory, not because of conviction
People tend to change their conduct if encouraged to do so	Air quality being a diffuse good, there is little awareness of the importance of controlling it	Urban dwellers are aware of congestion problems but do not necessarily associate the with air pollution. More ways of tackling congestion are needed
Businesses are more concerned with abiding by the law, for two reasons: to avoid fines, and to market themselves as environmentally aware from a sustainability standpoint	Citizens view the government as lacking in credibility	People are unwilling to change their behaviour even though they want a better environment. Reactive rather than proactive attitudes prevail
The firms have made only a modest effort to change citizens' behaviour	Little of no willingness to make sacrifices such as foregoing car use	People see no personal gain in changing their behaviour and do not think of collective benefits. "The other" is expected to solve the problem
Increasingly, some NGOs have been making proposals	Little or no government initiative in facing the problem; Operation Rodizio (1995-1998) was an exception, and was discontinued	
In Operation Rodizio (1995-1998) the government created a reference value that prioritized public transport, connecting it to congestion and its effects on health	In general, the agendas of NGOs and environmental movements do not focus on the urban environment	
	Lack of short-term alternatives; the absence of compensation shapes behaviour	
	Lack of effective and lasting policies on air quality management	
	No appreciable stimuli to induce people to change their behaviour	

Source: Pedro Jacobi and Laura Valente de Mercado (2001), "Consciência dos cidadãos e poluicão atmosférica na região metropolitana de São Paulo-RMSP" (LC/L.1543-P), Environment and development series, N° □36 (LC/L.1532-P), Santiago, Chile, Economic Commission for LatinAmerica and the Caribbean (ECLAC), May 2001.

Table III.5
SÃO PAULO: SOCIAL COMMUNICATION AND AIR POLLUTION

Positive factors	Weaknesses	Contradictory factors
In the SPMR[a], and specifically in the municipality, Operation Rodizio put the issue of health- and transport-related air pollution on the public agenda. It mobilized those active in environmental education and fostered the assumption of joint responsibility, thereby creating social capital When the government takes charge of convening the actors, it furthers its role as a link between them (NGOs, universities, entrepreneurs, communities, movements) and cultivates initiatives that broaden the base of support for the policies	In general there is a lack of intersectoral linkages; the problems of coordination between the Secretariat for the Environment and the Prefecture of the Municipality of São Paulo hamper cooperation. Circumstances in the past eight years have been particularly inauspicious in this regard People are wrongly and poorly informed of the quality of the air The lack of a communications policy hinders dialogue between the State and civil society, and between State bodies at the various levels of intervention There is little information on air pollution There is quite limited knowledge of public institutions and their management of air quality Functional actors (NGOs, businesses and universities) are aware of their role but also of the scope and limits of their activities The information provided by the government is lacking in credibility	Technical data is available but there is a serious problem of translating it to ensure that the general public can use it. The available information lacks clarity, transparency and credibility Users of public transport do not receive positive feedback on the environmental advantages of using it and of policies to limit car use The media often have an ambiguous role in reporting the issue, spurring resistance to initiatives that demand some form of sacrifice Business associations create animosity by often resorting to sensationalist and manipulative arguments to question policies that seek to benefit the whole population

Source: Pedro Jacobi and Laura Valente de Mercado (2001), "Consciência dos cidadãos e poluicão atmosférica na região metropolitana de São Paulo-RMSP" (LC/L.1543-P), Environment series, N°36 (LC/L.1532-P), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), May 2001.
[a] São Paulo Metropolitan Region.

Table III.6
SÃO PAULO: CITIZEN PARTICIPATION AND AIR POLLUTION

Positive factors	Weaknesses	Contradictory factors
The mechanisms for participation have improved somewhat, notably in terms of their degree of institutionalization, but some decision-making authority must be guaranteed or there is no real participation	In decision-making, the dearth of information from the outset impairs participation	The population evinces no interest in acquiring information on participation and existing mechanisms
	In general the instruments are ineffective; the authorities should adopt participatory models at all stages so that the population can take part in monitoring and can influence decisions and programme implementation	NGOs are not seen to be effectively represented on official committees and other bodies
	People take little advantage of the existing opportunities to participate, because in general they are poorly - informed of them	
	It is difficult to induce the joint assumption of responsibility	
	There is no democratization of environmental information, and more environmental education is needed in schools, businesses and communities	
	Public hearings are poorly attended	

Source: Pedro Jacobi and Laura Valente de Mercado (2001), "Consciência dos cidadãos e poluição atmosférica na região metropolitana de São Paulo-RMSP" (LC/L.1543-P), Environment and development series, N°□36 (LC/L.1532-P), Santiago, Chile, Economic Commission for LatinAmerica and the Caribbean (ECLAC), May 2001.

Table III.7
MEXICO CITY: BEHAVIOUR OF THE STRUCTURAL ACTORS TOWARDS AIR
POLLUTION. STRENGTHS AND WEAKNESSES

Structural actors	Weaknesses	Strengths
State (federal, metropolitan, state and municipal levels)	- Unpopular and misguided measures - Industrial interest in promoting economic development in metropolitan areas - The powers of the three branches of government should be more clearly defined - Regulation should be instituted without difficulty and should be overseen - Inadequate economic resources - Frequent changes in the government's specialized technical teams. Experts are lost. Actions overlap. - Lack of specific legal instruments, incentives for private initiative, and human, financial and material resources to apply the regulations efficiently - Private interests affected by the implementation of such policies	- PROAIRE[a] (Mexico Valley) is a successful example of sectoral policies and of the assessment of their impact on air quality - Advantage taken of the experience of specialists, such as academics - Framework legislation has been enacted and human resources have been trained for environmental management - Environmental culture: the population exerts pressure by means of the State's improved communication and information policy
Entrepreneurs	- Members, especially small and microenterprises, take little part in the chambers of commerce - Locally, the industrial sector's chief obstacle is the quality of the fuel available - Transport is unclean and disorganized - Corruption among the transport and traffic authorities - Budgetary and labour constraints	- The authorities have approved the participation of representatives of the industrial sector, who can influence public policies on emissions, regulations and norms - Supply of carburated LP gas [b] by authorized and safe filling stations - Presence of approved and efficient equipment to carburate petroleum liquid gas - Norms and pressure of PROFEPA,[b] as well as public pressure against the companies
Community sector	- Inadequate outcomes and a lack of information from the authorities - Non-compliance with provisions and regulations (land use, polluting businesses and services)	- Participation of small groups in the environmental management of municipalities and neighbourhoods or small sections of the city
Non-governmental organizations	- Lack of leadership and a shortage of consistent short-medium- and long-term proposals	- Channel for communication between the various sectors involved - Detailed knowledge of the problems

Table III.7 (conclusion)

Structural actors	Weaknesses	Strengths
Press	- Reporters working on the issue are untrained; lack of truthful and timely information - Policy of the media: the owners usually prefer sensationalism	- The posture of the newspaper or medium in question. The interest that the management has in the issue - They give space to the issue of the environment - Increased awareness among the population, not only at times of natural disasters; in-depth analysis of the effects on the population - Participation of the scientific community and NGOs - Public officials working on environmental and health issues provide inside information
Political parties	- The issues are politicized and become the object of political competition rather than of the kind of dispassionate analysis that gives rise to collective initiatives. Politicians' keenness to take centre stage and the need to find "fighting causes" can be highly damaging - SEMARNAT fails to respond - The TV says that air quality (and in general everything related to the environment) is not a commercial matter. Sponsors must be found or these issues will not be broadcast - Mainly other political priorities	- Communication with the executive (SEMARNAT) [c] and local governments; there is an exchange of information and there are mechanisms for coordination; (most) data are published freely; there is an open discussion of legislative initiatives; end of "madrugete" tactics in the making of laws, rules and regulations (holding the vote earlier than scheduled and not informing dissident delegates) - The possibility of undertaking effective programmes with the new president - Television programmes and radio messages raise awareness, and sanctions are applied - Press and radio depend less on sponsorship and deal with the issue when it is news; in other words, it has to be news for all media to report it. Cultural television programming, when not commercial, also deals with the issue from time to time - Mounting social concern with the issue

Source: Teresa Saavedra, "Ciudad de México: 2 Fase", prepared for the project "Air Pollution and Citizen Awareness", Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2001.
[a] Programme to Improve Air Quality in the Mexico Valley.
[b] Federal Ombudsman for the Environment.
[c] Secretariat for the Environment and Natural Resources.

Table III.8
MEXICO CITY: COMMUNICATION BETWEEN THE STATE AND CIVIL SOCIETY ON AIR
POLLUTION. STRENGTHS AND WEAKNESSES

	Weaknesses	Strengths
How the information is issued	- The information is largely conveyed by the mass media, especially television and radio - More detailed information on damage to health is needed - The general public does not understand the meaning of the IMECA in great detail - The information provided is still too technical for many people - The different health effects of different pollutants are not reported - The authorities' coercive measures have not prompted an evident change in attitudes and values - The information does not reach all social sectors because it remains specialized	- Official bulletin on the "Don't Drive Today" Programme and vehicle inspections - Information campaigns helped raise awareness of the problem - Daily publication of the Metropolitan Index of Air Quality (IMECA) - The documents and data from RAMA [a] SIMA [b] and the Inter-governmental Panel on Climate Change contain qualified technical information - People accept the issue
	PRESS - Policy of the media; the owners usually prefer sensationalism - Lack of interest in the training and skills upgrading courses on the role of the media in environmental management	PRESS - Give space to the issue of the environment - Increased awareness among the population, not only at times of natural disasters; in-depth analysis of the effects on the population - Participation of the scientific community and NGOs
Intermediate actors	NGOs - Lack of leadership and financial independence - Lack of engagement with the various social groups POLITICAL PARTIES - The platform and agenda of the Mexican Green Ecologist Party is weak - In several parties the issues lacks legitimacy and is diffuse	NGOs - Offer citizens information and channels for participation and communication - Become spokespersons for the population
	UNIVERSITIES - Lack of engagement with civil society - Deficient channels of information and dissemination - Affected and technical language	UNIVERSITIES - Sound, high-quality information

Source: Teresa Saavedra, "Ciudad de México: 2 Fase", prepared for the project "Air Pollution and Citizen Awareness", Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2001.
[a] Automatic Atmospheric Monitoring Network
[b] Environmental Information System.

Table III.9
MEXICO CITY: CITIZEN PARTICIPATION AND AIR POLLUTION.
STRENGTHS AND WEAKNESSES

	Weaknesses	Strengths
Public sector	- Does not deem it essential that it participate in order to legitimate the authorities' actions and secure public trust - Sub-optimal. Sometimes difficult to activate, but it is worth trying. Another possibility is to use the ever-growing Internet	- It is not solely a job for the government; citizens bear the greatest responsibility - There is a need for research on the most representative groups, and to convene them for dialogue and consultation
Mechanisms for participation	- Consultations only with small, representative groups - There has been no follow-up or widespread dissemination of the outcome of discussions with these groups, so as to make them broader and more inclusive	- Consultation on projects in committees and commissions - The Metropolitan Environmental Commission (CAM) is clearly the right body - The forum with organized groups, the referendum, public consultation through the mass media - SEMARNAT[a] invites citizens to take part in public policy-making through the Consultative Councils for Sustainable Development; these are a sounding board for the concerns of the public, which thus influences environmental decision-making
Civil society	- Citizen "representatives" take part in the CAM, but have no real voice - Citizens usually believe it is the authorities' responsibility to deal with these problems, and are reluctant to take part	- Participation in some projects proposed by government secretariats - Interested in participating with clear goals - Thus far take part in compulsory activities

Source: Teresa Saavedra, "Ciudad de México: 2 Fase", prepared for the project "Air Pollution and Citizen Awareness", Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2001.
[a] Secretariat for the Environment and Natural Resources.

Chapter IV

Citizen awareness and air pollution: the case of Mexico City[1]

Introduction

In cities with a high demographic density like Mexico City and its metropolitan area, air pollution is easy to see. Seeing it, however, is not enough. The dispersion and resilience of harmful pollutants must also be assessed qualitatively.

Mexico City has the basic infrastructure to implement air quality programmes, norms and other legal provisions, and mechanisms for inspecting and overseeing mobile and fixed sources of air pollution.

For the purposes of attenuating air pollution in Mexico City it is important for the authorities to have an extensive and appropriate infrastructure. To that end it is helpful that they have an Automatic Network of Atmospheric Monitoring (RAMA), control systems, databases and specialized technical personnel. They also need specific inspection and oversight programmes and an *ad hoc* legal and regulatory framework.

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[1]   The final version of this chapter was prepared by Daniela Simioni, Environmental Affairs Officer of ECLAC's Sustainable Development and Human Settlements Division on the basis of the documents of the project "Enhancement of citizen awareness for the formulation of air pollution control policies in three metropolitan areas of Latin America: Mexico City, Santiago and São Paulo", prepared by the consultants Fernando Brunstein, Rodolfo Lacy, Mónica López, José Antonio Ortega and Teresa Saavedra.

Responsibility for dealing with environmental issues, and for implementing environmental policies and programmes in general, falls to the Secretariat for the Environment and Natural Resources (SEMARNAT), previously the Secretariat for the Environment, Natural Resources and Fisheries (SEMARNAP). This is the federal agency in charge of the issue. According to the organizational and legal structure of the Federal District government, an agency known as the Secretariat for the Environment is responsible for environmental policy in Mexico City and the extensive region comprising the Mexico Valley metropolitan area (MVMA).

This megalopolis includes Mexico State, which also has a state agency for environmental matters. These circumstances call for inter-institutional coordination, for which purpose the Metropolitan Environmental Commission (CAM) was set up.

Changes in the federal government's environmental sector with the creation of SEMARNAP, especially in the powers and structure of the National Ecology Institute (INE), led to a reorganization of the latter's duties and its approaches to managing the quality of the country's air. Consequently, the federal administration (1994-2000) and the Federal District government (1998-2000) took two main approaches to the priorities established at the start of the period: first, developing programmes to improve air quality in the priority metropolitan areas and the border cities, in coordination with local authorities; and second, continuing to set standards for productive activities and motor vehicles so as to prevent and control pollutant emissions.

Notwithstanding the existence of an institution to coordinate the participation of the various social sectors, however, the lack of coordination and in some cases the overlapping of initiatives have hampered the search for an effective solution to the problem of air pollution.

Most of the initiatives relate to mobile sources, since the private car sector is judged to have made the greatest contribution to the decline in Mexico City's pollution indices.

Today, the metropolitan population is demanding that air pollution in the Mexico Valley be curbed. This demand, reiterated daily by all social sectors in both public and private, is constantly nourished by the spread of new information on the health effects of some levels of pollutants. Hence the response of the federal, state and local governments involved cannot be delayed and must meet the highest social expectations.

Far-reaching solutions, however, spring from a deep and lasting cultural change that fundamentally alters the population's relationship with the city and the environment. Since the proposed solutions are not cost-free, and since the resolve to pursue them necessarily entails sharing the

costs of their implementation among all the sectors that contribute to the problem, each of those sectors must display a minimum willingness to accept their share of the burden. It goes without saying that the burden-sharing must conform to criteria that ensure the fairest possible outcome.

That said, it is plain that adjusting the force with which the proposed measures are applied will depend essentially on the metropolitan population's readiness to assume co-responsibility and on it willingness to change. This is to say that society and the federal and local governments, will have to make a joint decision on the force and timeframe of measures to reduce air pollution, on the understanding that such a serious and pressing matter (one that has been incubating slowly for decades) cannot be solved immediately or through recurrent resort to palliative measures. The health of present and future generations can only be safeguarded if the metropolitan population can be persuaded of its co-responsibility for finding far-reaching solutions.

A. Socio-spatial and geographic characteristics of the Mexico Valley metropolitan area

The Mexico Valley metropolitan area (MVMA) occupies 0.3% of the national territory and is home to 18.4% of the country's population. It accounts for a third (33%) of gross domestic product (GDP) and requires about 65 m^3 of water a second. There are about 3,500,000 vehicles on the MVMA's roads. These use about 18,000,000 litres of gasoline and 5,500,000 litres of diesel oil a day. The upshot is 4,000,000 tonnes of air pollution a year.

Table IV.1
MEXICO VALLEY METROPOLITAN AREA: ECONOMIC INDICATORS

Indicator	MVMA [a]
Population	18 000 000
Vehicle fleet	3 500 000
Heavy industry	1 750
Small and medium industry	33 250
Monitoring stations	33
Emissions inventory (tonnes/year)	4 200 000

Source: National Ecology Institute (INE), *Sistema nacional de información de la calidad del aire*, Mexico City, 1998.
[a] Mexico Valley metropolitan area.

A combination of physical and meteorological factors in the Mexico Valley directly affect pollution levels in the city. The dispersal of pollutants produced daily is hampered by the MVMA's physical environment. This is largely because the city is surrounded by mountains that impede the free movement of the wind. Additionally, there are anticyclonic systems in large parts of the national territory, including the Mexico Valley, which immobilize various strata of the troposphere and hinder dispersal.

Thermal inversions and moderate surface winds (see figure IV.1) also constrain ventilation and the dispersion of pollutants, causing them to remain in the atmosphere. Intense solar radiation fosters the creation of ozone and other photochemical pollutants. The altitude of the city, at 2,240 metres above sea level, makes combustion difficult and thus pollutant emissions tend to increase.

Figure IV.1
MAVM[a]: STAGNATION OF POLLUTANTS AND OZONE FORMATION
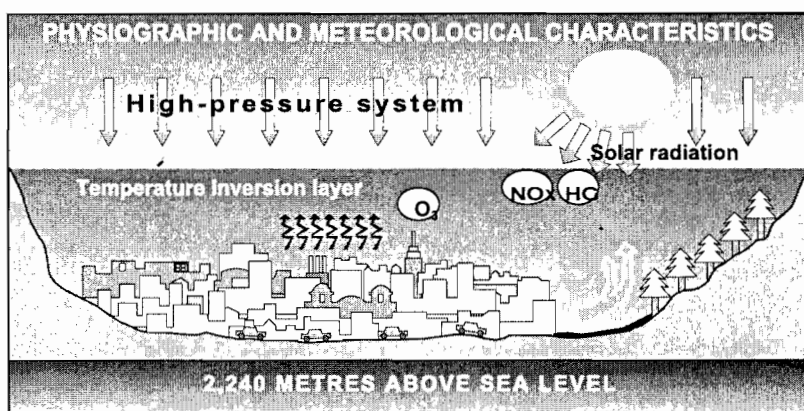
Source: Rodolfo Lacy and others (2001), *Conciencia ciudadana y contaminación atmosférica: estado de situación en la Ciudad de México* (LC/R.1987), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC).
[a] Metropolitan area of the Valley of Mexico.

In conjunction with the valley's natural features, a high level of demographic growth (annual average rates of up to 5.6% from the 1950s to the 1970s) has made the MVMA one of the world's biggest urban conurbations.

The city has grown from 576 km² in 1940 to 4,902 km² today because it now includes the 16 delegations of the Federal District and 34 municipalities of Mexico State. The MVMA's current urban growth trends point to a

recovery in its growth and to a further concentration of people and economic activity.

Between 1990 and 1995 the MVMA's population increased by 1,600,000; an average of 329,000 people joined the total every year (INEGI, 1999). Within the MVMA, the 3.7% annual growth of the neighbouring municipalities of Mexico State is striking relative to the 0.6% annual growth in the Federal District.

The population has tended abandon the central parts of the city and to relocate in residential areas in the neighbouring municipalities of Mexico State. The central parts are metamorphosing into services and mixed industrial areas with under-used urban areas, despite their high level of infrastructure.

B.   Motor vehicles and transport

As in other cities throughout the world, the transport sector makes a substantial contribution to environmental pollution. The MVMA's 1996 emissions inventory reveals that the transport sector is responsible for 80% of polluting emissions. That is because the sector has the greatest energy consumption in the Mexico Valley. It is crucial for a wide array of productive, service and recreational activities, and provides valuable personal satisfaction (social status).

It has been estimated that there are 3,500,000 vehicles in the MVMA; 1,200,000 (34%) are registered in Mexico State and 2,300,000 (66%) in the Federal District. This is not proportional to the distribution of the population and stems solely from the administrative advantages of owning a car with Federal District plates (the bureaucratic procedures are simpler and it is easier to pay the road tax). Public transport accounts for 161,825 (4.6%) of all vehicles.

Taxis account for just 3% of all vehicles but they emit twice the level of pollutants per passenger/kilometre as private cars. The system's inefficiency and impracticability is characterized by its scant capacity for passenger transport, obsolete technology and long trips, which increase congestion. A public transport system based on minibuses and *"combis"*, together with private transport on the scale apparent in the MVMA, is conducive to congestion and low speeds. Hence the chances of reducing emissions and securing sustainable transport lie in changing the transport structure (Céspedes, Canacintra, 1998).

The following table shows that 29,450,000 trips are made in the MVMA every day, of which public passenger transport accounts for about 75%. Of the total, about 20% are metropolitan (between Mexico State and the Federal District) and some 23% are within the municipalities of Mexico State.

Table IV.2
MODAL STRUCTURE OF URBAN TRANSPORT IN THE MVMA [a]

| Means of transport	Trips person/day	Percentage of trips
Private cars	4 400 000	15
Public transport, free and fixed routes	10 020 000	34
Route 100 State public transport	4 200 000	14
Suburban buses and private bus lines ("chimecos")	5 500 00	19
Metro	4 800 000	16
Trolleybus and light train	535 000	2
Total	29 450 000	100

Source: National Ecology Institute (INE), *Sistema nacional de información de la calidad del aire*, Mexico City, 1998.
[a] Mexico Valley metropolitan area.

C.   Managing air quality in Mexico City and its metropolitan area

Activities and programmes related to air quality have been undertaken in Mexico City since 1966, when the Secretariat of Health and Welfare's Directorate of Industrial Hygiene was set up. Later, among the most significant measures, the first steps were taken to create a manual network for atmospheric monitoring and, in 1975, to set up the first two vehicle testing centres.

From 1988 to 1994, more representative progress was made on air quality management. The General Law on Ecological Balance and Environmental Protection (LGEEPA) was enacted, regulations on air pollution were implemented, mandatory vehicle testing was introduced, and the Programme for Environmental Contingencies was set up.

The following significant steps were also taken in this period:

-       Introduction of the "Don't Drive Today" programme for all cars according to their license plate number (1989).

-       Creation of the Comprehensive Programme against Air Pollution in the Mexico Valley (PICCA).

-       Unleaded gasoline was made available (1990).

-       Closure of the "18 March" Refinery in Mexico City.

Against that background, the environmental authorities believe that in the last decade there has been a substantial improvement in Mexico City's air quality, largely because of the slow upgrading of fuels (the elimination of lead and the significant decline in sulphur in industrial and vehicle diesel) and the use of modern vehicle technologies (electronic fuel injection and three-way catalytic converters).

Despite this, people in Mexico City, more than in any other city in the country, often ask if the air quality has improved or worsened. Perhaps because government programmes have lacked credibility, the occasional application of the contingency plan, retention of the unpopular "Don't Drive Today" programme and the daily experience of not seeing blue sky, many believe that the situation is worsening and that none of the past control measures and programmes have worked.

1.   Environmental planning programmes and instruments, 1995-2000

A large number of effective complementary measures were needed to ensure that the vital processes that keep the MVMA working, and that generate its economic growth, do not continue to degrade the quality of its air. These measures were to cover all social sectors and sought mainly to yield clear and permanent benefits; they were brought together in the Programme to Improve Air Quality in the Mexico Valley, 1995-2000 (PROAIRE).

The programme's main aim is to protect the health of those living in the MVMA by gradually and permanently lowering the levels of air pollution. It was hoped that by 2000 the programme would eliminate 50% of hydrocarbons emissions, 40% of nitrogen emissions and 45% of suspended anthropogenic particulates. The programme also covered some neglected aspects of urbanization. PROAIRE's basic organization is grounded in a conceptual framework that takes a systemic and all-embracing approach to air pollution, and that exploits the level of available expertise on environmental problems, relevant technologies, and experiences in the area and in other cities throughout the world. When it was designed, moreover, provision was made for a timeframe that, in line with known standards, would facilitate a realistic resolution of the complex problem of air pollution, starting with its root causes.

PROAIRE was devised to meet the following four goals:

a)   Clean industry: reduction of emissions per value added unit in industry and service establishments.

b)   Clean vehicles: reduction of emissions per kilometre travelled.

c)   A new form of urban organization and clean transport: regulation of the total number of kilometres travelled by motor vehicles.

d)   Ecological recovery: reducing erosion.

The combination of strategies and goals gave rise to 94 instruments, measures and projects. Although some control measures are not properly applied (such as strict enforcement of vehicle testing), and others are not applied at all (such as the installation of low nitrogen oxide burners in thermoelectric plants), five years of PROAIRE I have curbed the decline in the quality of the MVMA's air.

The growth of some pollutants (such as lead, sulphur dioxide and carbon monoxide) has been checked, and Mexican gasoline now meets international standards. Unleaded gasoline is available and the lead content of Nova gasoline has been reduced by 92%. Ceilings have been placed on the content of olefins, aromatics, benzene and vapour pressure, as a result of which gasoline in the metropolitan area is of a higher quality than that of the average in the United States and most European countries. The sulphur content of diesel has fallen by 95%, and fuel-oil has largely been replaced by natural gas and, to a lesser extent, industrial gas-oil with a lower sulphur content.

Some pollutants have nonetheless reached unacceptable levels from every point of view, since their health effects are as worrying as their impact on ecosystems. This is true for photochemical oxidants, especially ozone, because in recent years they have reached levels that surpass air quality standards for about 90% of the year.

Suspended particulates less than 10 micrometers in aerodynamic diameter (PM10) pose another serious problem, since it has been noted world-wide that there are positive and significant correlations between breathable fraction particulates and morbidity and mortality. The situation is serious, and the scale of the processes that determine the problem must be accepted. The problem is far from being solved and, if it is not tackled at the roots, over time it could become yet more complicated.

It is worth noting that one common denominator is that it has been easier to apply traditional regulatory measures of a technological nature —such as inspecting industries or reducing vehicle emissions— than

structural measures that require the participation of other sectors. To date it has been very difficult to coordinate and combine the environmental agenda with the agendas of urban development, energy generation, tax and transport. Experience has shown, moreover, that it is easier to coordinate air quality policies among the different sectors.

Perhaps one of the main reasons why integration is lacking is that the actors involved and the causes of pollution remain unclear. Above all, the obstacles arising from group interests that are politically difficult to change are often ignored.

To make further progress on this issue the PROAIRE III programme has been developed for the MVMA, with projections up to 2010.

The institutional framework for managing these programmes and other measures is handled jointly by the Federation, the state and the municipalities. By law the Federation, through SEMARNAT and in coordination with the federal executive, is responsible for implementing programmes to reduce emissions from industries under federal jurisdiction and in-plant vehicles. The local authorities are responsible for developing programmes to improve air quality in conjunction with SEMARNAT, and for setting up systems to check vehicle emissions.

Additionally, compliance with air quality norms in the interests of public health must be monitored in coordination with the three levels of government.

2.   Actors involved in environmental management

Through its three levels, the government fosters the participation of other groups in air quality management: chambers of industry, ecology groups, academic and research institutions, truckers, politicians, the media and independent opinion-formers.

Institutional coordination of environmental management began in the late-1970s but synchronization problems have persisted to this day. More robust coordination mechanisms are needed, not only for collaboration between the environmental authorities but also between them and the many institutions concerned with improving air quality. Mechanisms for social participation are also needed, so as to secure the involvement of representatives of social organizations, the academic community, and the private sector.

The SEMARNAT, founded in 1994, is the federal environmental authority. Its mission is to exploit natural resources and protect the environment in the interests of sustainable development.

The governing body for environmental policy in Mexico, SEMARNAT can grant emissions licenses and has plants to treat dangerous residues. Through INE it establishes Mexico's official standards, emissions limits for fixed and mobile sources, vehicle emission norms and operating criteria for the air quality monitoring systems. INE's duties include promoting the development and implementation of air quality programmes in the country's cities. The Federal Ombudsman for Environmental Protection (PROFEPA) is responsible for ensuring that industrial regulations are enforced through inspections, oversight and environmental auditing (SEMARNAP, 1997).

The State decision-making authorities involved in reducing air pollution in the MVMA are represented by the Federal District's Secretariat for the Environment and Mexico State's Secretariat for Ecology.

There is now greater collaboration between federal, state and local authorities, but economic and human resource constraints persist. A recently-established decentralization programme, which seeks to transfer responsibilities from the federal level to state and municipal authorities, has given rise to greater social participation. This latter has served to revitalize policy-making and has helped nurture broader coordination between the government and the private sector, the academic and scientific community, social movements and ecology groups.

In most municipalities, a legal-regulatory framework is either absent or inadequate. Additionally, the municipal and regional governments lack instruments to plan and implement environmental policy in such a way as to make it sustainable. Hence it can be said that the municipal government level is the most backward in defining and consolidating environmental management in Mexico City. It is therefore crucial to build consensus and secure agreements that strengthen municipal autonomy in air quality management.

At the same time, environmental management in the MVMA is not solely the responsibility of government agencies. Mechanisms have been put in place to further inter-institutional coordination, and thus to foster citizen participation. State and municipal councils and committees have been set up. Educational institutions, organized civic groups, NGOs, civil associations and the private sector also participate in environmental management. Non-governmental groups, which have representatives on the CAM and the regulatory councils, have been crucial in inspiring measures to control air pollution in the Mexico Valley.

Since the MVMA covers the Federal District and the neighbouring municipalities of Mexico State, it was essential to tackle the issue from a metropolitan standpoint. This made it necessary to strengthen the

coordination mechanisms and to forge closer links with the local authorities. As a result of all this, 1992 saw the establishment of the Metropolitan Commission for the Prevention and Control of Environmental Pollution in the Mexico Valley (CPCCAVM).

In 1996 the CPCCAVM became the current Metropolitan Environmental Commission (CAM). The CAM's main goal is simultaneously to define, coordinate and follow up on policies, programmes, projects and measures to protect the environment, and to preserve and restore ecological balance in the Federal District and its neighbouring area.

The prime task of the CAM Consultative Council is to help foster social participation in environmental management. The Council comprises delegates from the scientific community, renowned experts in ecology and representatives of the social and private sectors, federal senators and deputies, and members of the Federal District's Assembly and Mexico State's legislature.

The private sector has also contributed to environmental policy through the chambers of industry, which are represented in the CAM. Its participation has been modest, however, because industry has particular sectoral interests that do not necessarily coincide with all of the CAM's agenda. For that reason the government has used economic incentives to induce the private sector to invest in "clean" technology.

Resources to study citizen participation in environmental policy have been provided by academic institutions and research centres, such as the University Environment Programme (PUMA) in conjunction with the National Autonomous University (UNAM) and the National Centre of Environmental Health (CENSA), as well as the non-profit groups and civic associations that have sprung up in the past 20 years. They have also contributed to the policy through studies, projects and research geared to providing the information that underlies air pollution control and prevention measures.

The social sector's participation in the management of air quality in the MVMA has conferred greater legitimacy on political decisions and has helped make them more responsive to real public needs. Hence the need to institutionalize the mechanisms for social participation in environmental policy-making. In this regard the NGOs continue to promote linkages for coordination between the social sector and the government.

The authorities generally take the proposals of the sectors on the CAM's Consultative Council as simply recommendations.

D.   Citizen mobilization

In the 1970s, just after the 1972 United Nations Conference on the Human Environment in Stockholm, Mexico's first environmental laws and regulations were enacted. The first government institutions responsible for environmental protection were also set up. At the end of that decade, environmental NGOs began to gain strength through their involvement in public consultations. In this period the first steps were taken against the destruction of green areas in the urban core brought about by the construction of thoroughfares through Mexico City. This led to the disappearance of a large number of traffic islands, pavements, squares and parks, removed to make way for an intense flow of traffic.

The first demonstration against environmental decline took place at the beginning of the 1980s, and in the middle of that decade the NGOs started to set themselves up. They took part in public consultations and concluded agreements on social and citizen collaboration with what was then known as the Department of the Federal District. These NGOs, the Group of 100 (G-100), the Mexican Ecologist Movement (MEM) and others are still active in the struggle against air pollution.

The damage wrought by the 1985 earthquake spawned a broad-based social movement that led to mounting public pressure, especially from the NGOs, to tackle a range of urgent urban problems. Among these, the decline in air quality was plain. Demands for information and urgent measures to deal with the problem grew substantially.

In 1986 the RAMA network began operating reliably, providing the public with hourly updates. Citizens embarked on initiatives to improve air quality, since the information on pollution levels and health risks prompted immense public disquiet.

The Union of Environmental Groups and the Mexican Centre on Environmental Law (CEMLA) were founded in the early-1990s, and Greenpeace appeared on the scene. The latter, together with the G-100, the MEM and the Mexican Green Ecologist Party, are the organizations that take the most active role in reporting air pollution.

In 1996 the General Law on Ecological Balance and Environmental Protection (LGEEPA) was reformed and a forum for public consultation was introduced. Finally, in 1997 pressure arose to enact the General Law on Civil Society Groups and Organizations for Social Development.

Citizen participation in environmental management in the MVMA has been marred by structural problems of organization and deficient information, as well as by financial constraints. The local governments

therefore set up training programmes to inform the public of environmental pollution, such as the Environmental Citizenship and Education Programme established by the Federal District's Secretariat for the Environment.

E.   Citizenship and air pollution

This section examines the link between citizen awareness and air pollution in the MVMA, a link that is related to that between awareness and participation.[2] In this case, and with regard to this problem, citizen participation is a crucial matter. As State-centred measures wane, the prospect of extending mechanisms to reduce air pollution depends on public involvement in two areas: dealing with social conduct that is polluting; and playing a leading role in decision-making on comprehensive strategies to be adopted by society at large.

As in the cases of Santiago and São Paulo, which are also included in this project, three key and inter-related variables have been used as a basis: 1) the roles and responsibilities of the actors involved; 2) social communication; and 3) citizen participation. The study is based largely on interviews with local sources who are familiar with the issue. They belong to different interest groups among the wide range of significant actors, and they have been divided into two groups: structural actors (thus named because of their direct involvement in the measures taken), including members of civil society and the political class; and functional actors (dubbed thus because they constitute a link between the structural actors), including all those in civil society. This classification was proposed in the document on methodology that served as a basis for research in the three cities.[3] This section also covers the discussions at the final validation workshop in Mexico in early-2001, in which several of the interviewees took part.

As the first section of this chapter showed, the systematic, State-led progress made to date in improving air quality in the MVMA has run out of steam. The hypothesis underlying this research is that the past

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[2]   But whose complex linkages, which are beyond the scope of this project, remain subject to research and debate.

[3]   Some 20 actors were interviewed, all in some way working on the issue of pollution. Four State actors were interviewed, two from the national level and two from the metropolitan level. Three of the interviewees were representatives of the private sector. There four NGO representatives, two leaders from the community sector, three journalists specializing in the issue, one academic, and three interviewees from the political sector.

achievements can only be preserved and further progress can only be made if all citizens are involved and committed. Such commitment requires more information on the damage wrought by pollution and on what the State and the leading polluters are doing to encourage more active citizen mobilization and participation. This means, on the one hand, that the State should consider citizen participation as a central variable in its management. On the other, it means that citizens should take charge of the problem, since responsibility for it is shared between public and private actors.

If citizens are to participate actively, their environmental awareness must be raised. To that end, consumption patterns must change and attitudes must shift from passive and limited participation to the exercise of real influence on decisions (designing, implementing, following up and assessing plans, programmes and projects) that guarantee citizens' commitment to measures designed to improve air quality in Mexico City and its metropolitan area. This course of action demands stronger social organizations and civic groups. The question, however, is how to strengthen them. The following describes the range of actors involved, as a starting point for designing a new strategy.

1.   Individual and collective behaviour

Levels of citizen awareness and behaviour

The limited information available precludes a precise definition of something as complicated as the extent to which each of the actors is aware of air pollution, but an acceptable approximation is possible. Levels of awareness, or of citizens' individual concern, are low. They might amount to more than a simple opinion on the matter, but they do not amount to a proactive attitude.

According to the interviewees, the public is increasingly aware of pollution and wants both information and government action. The public, however, believes that this is a matter to be dealt with by the various authorities involved. Belying its own expressed concern, when the authorities take action the public resorts to a chiefly reactive attitude and resists them, evading initiatives such as "Don't Drive Today" or the Environmental Contingencies Programme by using a second car that pollutes even more or other dodges. This suggests that citizen concern is purely declaratory and that the public is far from being truly engaged.

Citizens seem uninterested in taking part and making their voices heard, thereby losing an opportunity to influence policies and even to do so on an individual basis, where the chance of change is thought to be very high. Citizens, moreover, do not seem to feel that they are being referred

to when calls are made for the public responsibly to assume the costs generated by its pollution. Neither do citizens take the opportunity to acquire greater environmental education and become more aware.

This circumstance is in striking contrast to the tradition of engagement among Mexico City's population, which in the 1970s and late-1980s played a leading role in movements demanding that the government do something about the quality of the air, especially after the Metropolitan Air Quality Index (IMECA) data were made known. Some of the ground gained in the areas of awareness and participation has been lost.

In discussions with the leaders of institutions that bring together industrial entrepreneurs and microbus firms, by contrast, the interviewees evinced substantial understanding of the problem's causes and effects, although the microbus owners were somewhat more contentious. The industrial sector interviewee stated that his trade association is active in the CAM, a body that he agrees with and supports because he thinks it is continuously given sufficient information by the authorities. Despite the interviewee's statements, however, the sector's participation has been modest because industry has particular sectoral interests that do not necessarily coincide with all of the CAM's agenda. For that reason, according to other sources, the government has used economic incentives to induce the private sector to invest in "clean" technology.

It is reasonable to surmise that the reason for this collaborative attitude, which is reflected in the industrial sector's overall conduct, is fairly obvious: industrialists (together with companies transporting passengers and goods) are viewed by the other social actors as the source of air pollution and thus are concerned about their traditional demonization. Irrespective of the collaborative posture, however, they do not neglect to highlight the existing surfeit of regulation.

It is important to stress that the industrial groups' cooperative attitude is not matched by the concrete performance of their members. The latters' resistance sometimes finds expression as defiance of authority, corruption (in inspection centres or when faced with PROFEPA inspections of industries or services), lack of investment in control equipment, and even a wilful disorganization or the blocking of initiatives because different public officials are active in different political parties. Some of their representatives said that entrepreneurs do little voluntarily or on their own initiative. This somewhat unsympathetic attitude to the environment seems to be even more intense among small and medium entrepreneurs.

The attitude of the industrialists contrasts with that of at least some of the bus companies, who heeded the government's call to use LP gas against the wishes of the business association's leadership. The latter, at least

in their public statements, displayed less solidarity with the position of the State authorities. That leadership takes part in the Metropolitan Commission on Transport and Roadways (COMETRAVI), another metropolitan commission, although more plainly sectoral. Consistent with the above, its participation is less in tune with that of this State body because it feels insufficiently supported.[4]

As to the behaviour of the intermediate or functional actors such as the press, the universities, the NGOs, political parties and the community sector, these evince an adequate understanding of the problem. Somewhat contradictorily, however, they do not play a proper role by using their knowledge to raise public awareness.

Some representatives of those media that cover the matter most, and that specialize in the environment, also took part in the study: Radio RED, Televisión Azteca, the *Reforma* and *La Jornada* newspapers. These have found it very difficult to consolidate sources and fora around the issue of air pollution or to foster pro-environmental attitudes among media leaders. Generally, and unfortunately, they seem to lack a fixed policy on reporting environmental matters.

Among the universities, those most active in the field are the College of Mexico, the National Autonomous University of Mexico (UNAM), the Metropolitan University, the Ibero-American University, and the Autonomous Technology Institute (ITAM). Some interviewees stated that these institutions have focused on research rather than on education and dissemination. Their contribution has generally been confined to a highly academic level, and they have neglected to undertake more concrete initiatives to disseminate information on the issue and to train and mobilize young people.

They have also foregone the opportunity to research the matter in greater depth, to spark a debate on how their work programmes are designed and implemented, to take part in programme follow-up, and to analyze solutions and effects.

Prominent among the NGOs in Mexico City are Mexican Citizen Presence and the Union of Environmental Groups, the latter a coalition of 54 groups that take part in the Consultative Councils on Sustainable Development and the CAM. The NGOs serve as catalysts; they are crucial in establishing civil society's demands and in channelling them to the authorities and the State, but as a whole their role has varied. At least a hundred such groups have been set up in Mexico. Initially they acted as a channel for communication between the sectors involved, but at the start

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[4]   Although according to Lacy (Lacy et al., 2001, p. 35), its power is dominant.

of this decade their strategy shifted. Without entering into the reasons for this change, it can be said such groups have failed to provide more information, an approach that has been conducive to public passivity and thus to a lessening of attention to environmental degradation.

Most of them are not working seriously on air pollution. Neglecting to propose forceful and enduring solutions, they confine themselves to taking part in the assessment and monitoring of public policies and to asserting pro-environmental goals, but they have devised no action-orientated programmes and projects. Some interviewees argued that NGOs improvise when critical events occur and that many of them are sensationalist. The same interviewees maintain that without information —which is what the NGOs normally provide— no action is possible.

In some quarters, moreover, their technical capacity has been questioned, especially as a valid interlocutor in possession of the kind of technical information available to the State.

Greenpeace and a few other smaller organizations are different, since they have a high level of expertise on the issue. Although they participated in the early-1980s in the criticism of and reaction to government policies and programmes (with more emphasis even than the other NGOs mentioned above), as well as in informing the public, towards the end of the decade they became more proposal-orientated, less social, and more technical-administrative.

The political parties interviewed —a sample covering only the National Action Party (PAN) and the Mexican Green Ecologist Party (PVEM)— display divergent levels of familiarity with the issue of air pollution but in general (apart from a few leaders) they have a real lack of knowledge. Broadly speaking, Mexico's parties lack a significant and substantive course of political action in terms of the priorities of their agenda for Mexico City's environmental problems. The PAN has included environmental issues and sustainable development-related issues in its political platform but the PVEM lacks a well thought-out programme in this field and legislators are ill-informed. They have not specialized, and they are short of capacity, information, and trained replacements.

Political party leaderships have failed to foster lasting and effective linking mechanisms between the public and the environmental authorities. Such mechanisms would enable them to include the environment in their own agendas and political platforms, and would bring about greater political, institutional and legislative force in the area.

The community sector, another of the intermediate actors, comprises small groups of 20 to 100 charismatic, extrovert and combative members. Each group has a governing board and they communicate mostly by

telephone or in person. They make intermittent contributions and arrange meetings when necessary. Their contacts are almost always at the municipal level, and in exceptional cases at the state and federal levels. For the most part their members are housewives who are in neighbourhood associations or are block leaders.

The community sector groups are significant sources of influence on environment-related municipal decisions at the level of the citizen: widening streets, reducing green areas and so forth. Almost always their strategy consists of sending letters of protest; sometimes they make recommendations for improving air quality.

In general the sector faces four kinds of problems: resistance from business and the general public to compliance with the prevailing regulations; corruption; the systematic defiance of political groups opposed to measures imposed by the authorities; and the economic and political interests of polluters. These difficulties constrain the cohesion of social groups concerned with improving Mexico City's air quality. Despite these circumstances, some successes have found echo among more important groups. This was the case, for example of the "Don't Drive Today" programme, which began as one housewife's idea and which was entirely voluntary when it started in 1989.

The foregoing suggests that the structural and intermediate actors are not clearly assuming their responsibilities for Mexico City's air quality. They seem to expect that a change in State policy and management will brighten the prospect of cleaning up the MVMA's air. According to one interviewee, the public is increasingly aware of air pollution, and wants information and government action. Pollution affects broad expanses of society and for decades it has caused public health problems that are now apparent on a huge scale. The ecologists, political parties, intellectuals, and even the industrialists want answers, and they are pressuring the government to organize itself, to implement PROAIRE, and to be effective.

2.   Changing individual actors' behaviour towards air pollution: obstacles and incentives

The various actors' awareness levels and behaviour having been described above, it is important to examine how certain behaviour is impeded and encouraged. The aim is to overcome the crisis depicted here, to raise public awareness, and to encourage behaviour that is conducive to an improvement in the MVMA's air quality.

The information gathered in the interviews and the final workshop, as well as the data gleaned from secondary sources, reveal some possible

reasons why each of the MVMA's civil society actors act as they do. According to a substantial number of interviewees, the reason why individual citizens are relatively unaware of the problem is that the media and the public have had enough of the issue and, believing that pollution has declined, people "are tired of it". Others suggest that citizens are interested in the matter but that their interest is limited, since they display little inclination to take part when they are asked to make an effort, to show commitment, and to change their behaviour.

As mentioned earlier, this attitude has been changing for the worse. In the case of the "Don't Drive Today" programme, the reaction of civil society and the media was as follows. First, there was strong social pressure. Television, radio and the press reported extensively on the matter; intellectuals were concerned with it and acted as spokespersons for the public's protests and disquiet. Journalists asked political party leaders —the PAN, the Institutional Revolutionary Party (PRI) and to a lesser extent the PVEM— what their position was. The leaders had to become acquainted with the issue and to respond with a consistent and pro-public political line. Everybody thought that the government was hiding information, and they fought because they were made aware of the real levels of pollution and the damage it was causing.[5]

Why this degree of public concern was transformed into the indifference evident in the late-1990s remains an unanswered question, although many explanations have been advanced. Why were citizens uninterested in securing greater environmental awareness and education as a means of participation and expression? Why were they unwilling to assume responsibly the costs that everybody generates as a source of pollution? The answers lie in a more structural form of conduct that is applicable to a much broader population than the inhabitants of the MVMA. To some extent it is related to the swift change in social consumption patterns throughout much of the world, and especially in large cities. It might be said that people have developed an excessive "tolerance" to the benefits of car use,[6] without considering that its abuse makes the public a polluter.

Many civil society actors, moreover, display a marked unfamiliarity with air pollution issues; their opinions clash with impartial information.

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[5]   There is clearly a need to investigate how fears of the seriousness of the health effects combined with opposition to the PRI, which was spawning growing resistance in civil society.

[6]   This attitude is not unrelated to the poor quality of public transport, which for a certain proportion of the population justifies intensive car use even though this causes congestion and pollutes the air.

This means that there has been a decline in the amount of information that underpinned the mobilization of civil society in the 1970s and 1980s. The public is apathetic and distrustful of official information on air pollution control. These kinds of reasons make it hard to secure compliance with programmes such as "Don't Drive Today", environmental contingencies, obligatory vehicle testing, forestation and so on.

With regard to the business sector, and as explained earlier, there is a divergence between the pro-environmental attitudes of the business association leaders, especially in the industrial sector, and the behaviour of the individual members. The latters' reluctance to abide by the regulations, and their refusal to take steps to reduce emissions, arise largely from resistance to change unless there is an attendant benefit. According to a representative of the Confederation of Chambers of Industry (CONCAMIN), they also resist because they are aware that emissions began to shift some years ago from fixed sources (industries) to mobile sources. The same interviewee pointed out a factor of crucial importance: most industrial entrepreneurs are aware of their environmental responsibilities but small and microenterprises face difficulties in this regard because they have to comply with an avalanche of government requirements, not only in the environmental field.

For reasons similar to those of the industrial sector, and perhaps because they understand their delicate role in air pollution (although this is an issue to be researched in greater detail), many of the minibus and haulage companies seem to be more pro-environment. They now use petroleum liquid gas, notwithstanding the clear resistance of society and the media to the use of the fuel. This situation is aggravated by the authorities' failure to provide service stations; Petróleos de México (PEMEX) does not want petroleum liquid gas at its filling stations. According to the interviewee, moreover, the Federal District government does nothing about this, even though it is in opposition to the central government.

The sources consulted for this study offer some explanations of the difficulties (as mentioned above for the media) involved in acting responsibly towards the environment, and especially towards air pollution. There is some consensus that the media seek sensationalist stories. They exploit environmental emergencies (fuel leaks, explosions, environmental risk and so forth) and events that boost sales, ratings and so on. In general, moreover, most journalists, reporters and broadcasters lack sufficient knowledge of the environment and of sources of scientific and technological information in the field.

The sources consulted do not point this out, but the timorous profile of the universities mentioned earlier, especially as regards training, dissemination and mobilizing youths, might be explained by the lack of a

university tradition. Their reticence in research, as well as in programme follow-up and the analysis of solutions and effects, merits a more detailed examination. It might stem from a combination of political considerations, institutional culture, barriers to the universities' integration in the institutional framework of air quality and other factors.

As regards most NGOs, which are subject to sharp criticism because of a series of failings, the only explanations suggested concern their financing, which has prevented them from acting independently and makes them vulnerable to political forces or international movements. This might not be true for Greenpeace, since it has enough financing and its position (at least on air quality) is wholly consistent with that of the developing countries.

Initially, Greenpeace sought to acquire and distribute information on the real health impact of air pollution. It organized several public protests to encourage people to participate and to raise their awareness. Its current technical proposal is to improve transport, which is the city's main problem. Thus it has shifted focus from the general to the particular, but in the latter area it has not made significant progress.

The material used for the research offers no explanations for the almost non-existent (and in general sharply criticized) role of the political parties in the environmental field, nor for their widespread unfamiliarity with the issue of Mexico City's air quality and their consequent indifference. The reasons for this attitude should be explored. There is a need to assess, among other things, whether what happens in many other countries also happens in Mexico: lack of social pressure erodes the obligation to put the issue on the agenda of all the parties.

As regards the community sector, its limitations as an actor in the field of air pollution require a great deal of further study (as does the behaviour of the other actors), although it might stem from the sector's own weakness as a social actor to tackle the powerful interests involved. That weakness might have originated in the feebleness of individual awareness (the predominance of a pro-spontaneity position) and the limited role of the other intermediate and functional actors (the press, universities, NGOs and political parties), which should nourish such awareness with motivating knowledge. To these factors must be added the very important consideration that the authorities not only fail to provide support but, as was reported during the research phase, they boycott initiatives, and foster the involvement of disruptive groups that are foreign to the neighbourhoods where action is being taken.

To this range of obstacles can be added some of the considerations that arose in the interviews with knowledgeable sources. Neither the

structural nor the intermediate actors have the power to change environmental conditions in Mexico City. Influential political and economic interests, which have prevented the decentralization and deconcentration of industry, urban reorganization and transport reform, are the real centres of power.

3.   Social communication strategies

a) Civil society: knowledge of air pollution and policies towards it

With the emergence of the first official programmes to prevent and control air pollution Mexico, such as PICCA (1990-1994) and PROAIRE (1995-2000), the environmental authorities responsible for implementing them adopted a strategy of information, environmental education and social participation that involved a series of measures. These included:

-    Reporting on the IMECA and the Programme for Environmental Contingencies during rush hours.

-    Environmental education and information campaigns in primary schools, using cartoons ("Pico and Pica").

-    Register of emissions and pollutant transfers (RETC) for the MVMA.

-    Establishment of the National Centre for Clean Production to promote training and technology transfer geared to self-regulation and prevention.

-    CAM dedicated facility for public assessment and the lasting adoption of new initiatives.

-    Study on developing and introducing methane-powered passenger and cargo vehicles, starting with government vehicles.

-    Windshield identification of low-polluting vehicles.

-    Permanent mechanism for public assessment and the adoption of new initiatives to reduce vehicle emissions..

-    Public audit of the Automatic Atmospheric Monitoring Network (RAMA).

-    Programme to disseminate ideas on the ecological cities project of the Organization for Economic Cooperation and Development (OECD).

Other steps taken by the State's structural actors (including those at the national, state and community levels) to set up information and

dissemination mechanisms are concerned with communication with the most important sectors, including business and academic groups, as well as with civil society.[7]

In short, the State could have made the kind of efforts mentioned above to communicate and report on the results of its programmes and strategies. It failed, however, to take the lead in mounting a reasonably clear, effective and fluid campaign, using the right channels and mechanisms, to inform citizens of the pollution costs generated by all activities and social groups and to encourage them to bear those costs. Since the public is ill-informed (as another section of this chapter has shown), it has no environmental awareness; diffuse and distorted perceptions of the problem itself and the way in which the State is dealing with it persist. If the State acts in this way, there is little prospect for debate, consensus and solutions grounded in citizen participation.

At first glance, the foregoing seems to be at odds with the fact that, as in other countries, the Mexican public's chances of acquiring information have grown exponentially through various media, including written and electronic channels. These new channels, however, especially the electronic media, are not available to all citizens.[8] At the same time, moreover, problems abide with the quality of the information, the mechanisms that provide real data on the city's air quality and, above all, the organized and responsible alternatives and courses of action. Additionally, the specialized approach persists, and hence there has not been greater engagement with the various social sectors.

The absence of coordinating mechanisms for implementing clear measures, as well as for informing all the sectors involved, runs counter to Mexico's legally established institutional regulations, which provide for civil society's participation in the programmes, as happens with PROAIRE.

Notwithstanding what has been said thus far, it should be noted that of civil society's structural actors (and especially for citizens/individuals), the industrial sector believes it receives enough information from the authorities on a continual basis, at least according to the CONCAMIN leader mentioned earlier.

Of the intermediate actors, the universities (as sources of knowledge) arouse expectations that they will be more independent of the information

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[7] For example, the Federal District's Secretariat of the Environment (SMA) includes a General Directorate of Environmental Education, which does not guarantee positive outcomes in this area. Moreover, the information available does not reveal if there is the same kind of institutional space at the national level and in Mexico State.

[8] Only a minority in the region, including in Mexico, have Internet access. Even fewer have regular access.

provided by the State. Hence they bear more responsibility because of their failure to generate enough information and to make it available to the other sectors of civil society. In particular, they have a responsibility to promote a pro-environmental culture and education, especially with regard to the MVMA's air quality.

Still with the intermediate actors, the political parties, in the context of Mexico's currently complex democratic system, have not spearheaded the development of a democratic culture and have not laid the ground for a respectful and proper use of such natural resources as the MVMA's atmosphere. They do not promote dialogue between civil society (specialists, entrepreneurs and others) and political society. Such a dialogue would make decision-making, as well as the creation of public policies and programmes, more transparent. They do not cooperate with the State in informing the public, with a view to securing an aware and active citizen participation. Such problems are exemplified by the PVEM, a party that lacks not only an adequate environmental platform but is also short of properly trained leaders and activists.

Still to be tackled in Mexico City are the tasks of securing timely and truthful information, and of ensuring that all sectors involved take steps towards informed participation. This means that the transition from identifying information to raising awareness and a consequent shift in attitudes is not only a difficult step to take but can only be realized over the long term.

b) Obstacles to changes in the strategies for communications between the State and civil society

The research findings seem to show that there has been inadequate communication between the State and civil society on air quality and policies to improve it in the MVMA. In other words, the measures taken have not sufficiently raised the awareness of the various non-State sectors. Moreover, the quality of communication has not improved over time, and the lessons learned in the experience have been squandered. There are at least two explanations for these failings: either the instruments used to raise awareness were not the right ones because of a lack of expertise, or there has been a dissociation between the discourse on awareness-raising and the real aim, a process in which the instruments used have been ingenuously inconducive to awareness.

With regard to the charges of ineffectiveness, but not those of secondary intentions, the interviews suggest that while at the metropolitan level there is a highly developed institutional structure for decision-making, as well as qualified personnel, roles are dispersed and operational problems

persist. These naturally affect communication with the social and private sectors on the measures they should take in a spirit of co-responsibility.

The assumption of secondary intentions is lent credence by the opinions of some interviewees. There are problems of manipulation and superficiality in managing public information. As another section of this chapter has pointed out, when the "Don't Drive Today" programme was set up everybody thought that the government was hiding information, and they fought because they were made aware of the real levels of pollution and the damage it was causing. The Greenpeace official interviewed claimed that the State assumes the role of a protector, safeguarding national security, for fear of causing alarm or incurring political costs, rather than taking preventative and awareness-raising measures on the basis of valid and truthful information. More research is needed, involving more focused questions and a larger number of interviewees, to clarify the divergence between these two possibilities —which are not necessarily incompatible in the policy as a whole.

In view of the relative deterioration in the conduct of many of the intermediate actors, it is unreasonable to demonize the State alone and to hold it solely responsible for diminishing awareness. Various sectors have so far made mistakes; the different levels of the State cannot elude responsibility for some of them; but neither can academic institutions that should act as a bridge, nor the public itself.

Partly substantiating what was said earlier about the press, one interviewee maintained that the internal policies of some media dictate that they accord the issue prominence only if they can stress its more sensationalist aspects or emphasize the possibility of an imminent threat, rather than preventative measures and the consolidation of citizen programmes and initiatives. Similarly, another interviewee argued that there are constraints on the provision of more and better information, because most of the media have been insufficiently independent and have had too little interest in continual and neutral reporting. Market conditions, moreover, dictate that the media are subject to business considerations such as ratings, which further reduces their autonomy. There have been cases in which the media companies have neglected the matter because they deem it more important to report cases of extreme risk. In line with this tendency to trivialize the news, the media generally lack journalists trained in specific issues such as air pollution in the MVMA. This too makes it difficult for them to produce technically sound reports.

Some interviewees maintain that the State has sought to relativize the costs, as mentioned earlier in this chapter, among other things by boycotting civil society intermediate actors, by keeping a tight hold on the purse strings, by using individuals from other neighbourhoods to infiltrate

the meetings of the community organizations, and through the discretionary placement of advertisements. From the viewpoint of social communication, however, there is no doubt that mistakes are made not only by those who send the messages but also by those who channel and receive them.

4.   Mechanisms for citizen participation

The information gathered during the research reveals that there are (albeit few) State institutions that offer an arena for civil society participation in solving or attenuating the MVMA's air pollution problems. The most traditional of these are related to direct action, while other and more recent arenas are for decision-related participation. Examples of the former, outlined in other sections of this chapter, include the "Don't Drive Today" programme (which began in 1989), environmental contingencies and reforestation. The latter are exemplified by the CAM (since 1996, but with its roots in the Metropolitan Commission for the Prevention and Control of Environmental Pollution in the Mexico Valley, which was set up in 1992). The CAM is a senior-level consultative body comprising Mexico State and the Federal District; the central government is not involved. Its mission is to analyze the programmes and strategies implemented in Mexico City and its metropolitan area. Another example of the latter kind of institution, this time at the national level, is SEMARNAT (formerly SEMARNAP), which has fostered the creation of local groups that can propose effective measures to reduce air pollution. Prominent among these groups are the committees to improve air quality, the regional consultative councils for sustainable development, and the committees for social participatory oversight linked to PROFEPA. These play the most active role; the SEMARNAT and the National Ecology Institute (INE) take part in them.

Notwithstanding the existence of these institutions, however, the environmental authorities of the State in its three levels largely encourage civil society to participate through actions. Only to a much lesser extent —and even in an almost formalist way— has it encouraged participation in decision-making. Hence, for example, the participation of civil society representatives in the CAM's working groups is non-binding on CAM decisions. In other words this is simply a matter of consultation. The COMETRAVI's decisions remain heavily influenced by the circumstantial interests of the transport companies, which hold the real power (Lacy et al., 2001).

That these consultation mechanisms exist doubtless represents significant progress in Mexico's scant tradition of democratic decision-making in public affairs. Such a tradition is slight in the vast majority of Latin American countries. Most of them have been (and in large measure

remain) marked by technocratic thinking within State bodies, including those linked to environmental issues and, in this particular case, to the problem of air pollution. It should be determined, however, whether in practice these consultation mechanisms simply act as escape valves for social pressure and fail to halt traditional processes, wherein decision-making often stems from negotiation among the most powerful corporative sectors.

An example of this is provided by attitudes to the CAM's decision-making processes, as evinced in interviews with various social actors. Worth considering, for instance, is the Confederation of Chambers of Industry (CONCAMIN). A long-standing player on the Mexican stage (it was founded in 1919), CONCAMIN wields enormous influence. It brings together 67 chambers of industry and 34 industrial associations that account for the whole of the country's industrial sector. It is inconceivable that CONCAMIN, with its vast influence, has not had and does not continue to have preferential access to public decision-making. Hence it is quite likely that its participation in the CAM amounts to nothing more than the legitimation of business as usual: it has taken an active role in devising environmental regulations since the 1970s, and especially in the past six years, long before the creation of the participatory State bodies mentioned above.

One of the interviewees substantiated such speculation. According to this source the groups in the leading business organizations —CONCAMIN, the National Chamber of Processing Industries (CANCINTRA) and the Private Sector Studies Centre for Sustainable Development (CESPEDES)— have been actively involved in drawing up Mexican laws and official regulations on atmospheric emissions, in the Environmental Contingencies programme, and in planning the creation of an Environmental Fund.

Such, then, is the State's policy on civil society participation. In that context it is worth asking how the intermediate actors can help change the policy, a change that would be conducive to a form of democracy in which those involved have greater influence on decision-making.

As other sections of this chapter have said, most of the NGOs are weak or ineffective in fostering social action and participation. They have not sought to train and inform the various local leaders, and their programmes doe not embrace all social sectors. Lacking in credibility and inadequately legitimated, their activities are not conducive to broader engagement with civil society. Currently, Greenpeace and other NGOs of similar stripe cannot work with the public as they did in the early-1990s.

As previous sections have shown, the universities, like the NGOs, are still far from acting as links between the State and civil society in a

search for channels for participation. Indeed, they are not even involved in social participation initiatives, and their research findings are not made available to all social sectors.

The political parties, as other sections reveal, do not cooperate with the State in efforts to inform the public and to secure aware and active citizen participation.

F.   Conclusions

This chapter has revealed the level of attention that the State pays to air pollution in Mexico City, and the deficiencies of channels for communication and participation between the state apparatus and the other civil society actors involved.

There have been undeniable improvements in the MVMA's air quality, especially in the 1990s but, as all the actors acknowledge to a greater or lesser degree, they have been insufficient. There are two reasons for this: first, the improvement in those aspects of air quality normally identified has only been partial; and second, greater knowledge is revealing new dimensions of the problem that are still to be addressed.

The progress made has been the result of government action at the national, state and municipal levels, and of State institution-building. Those measures have included greater knowledge of the issue and the establishment of intervention programmes to attenuate it. The extensive institutional apparatus has included the RAMA network, a mechanism for describing how much air quality is affected; PROAIRE, an instrument for corrective intervention; the establishment of a Secretariat of the Environment for the Federal District; and the Metropolitan Environment Commission (CAM), a coordinating body.

As regards the CAM, although it brings together the various State and civil society actors, both structural and intermediate, in practice (and in view of the meagre results) it does not seem to be the right way of forging links between political-territorial jurisdictions or sectors. Rather, programmes and instruments that do not enjoy popular legitimacy overlap, and thus there is no guarantee that a solution will be found and that a policy will be applied to improve Mexico City's air quality.

Greater knowledge of the numerous and complex facets of the problem —responsibility for which, as mentioned, has thus far been assigned largely to the State— has revealed that policies to improve air quality should make provision for intervention in other areas. Action should

move beyond immediate causes such as vehicle transport and industry (whose role is of declining importance). It should also focus on factors that are less visible but crucial in the causal chain, such as the physical growth of the city and its immense metropolitan area. It is plain that this huge conurbation will only be sustainable if there is a long-term strategic plan to tackle its serious environmental problems.

The city's future depends to a large extent on raising awareness that urban development has passed a point that is healthy, and that the population's air quality needs have outstripped the capacities of the three levels of government and of civil society. Mexican society's environmental demands, combined to political demands and the implications of the new international economic relations, call for the establishment of a new form of development planning.

These demands, however, cannot disregard the existing trade-off between, on the one hand the restrictions of an open economy exposed to the vicissitudes of international free trade and a speedy process of market globalization and, on the other, the new constraints and incentives imposed by the criteria of ecological sustainability.

The success of the programmes and projects implemented (even with the constraints indicated), as well as of other forms of intervention, depends among other things on intervening in the decision-making of power groups within the institutions, through practices that often include corruption. This has depleted political will, and hence led to budget shortages, excessive bureaucracy, administrative obstacles, centralization, difficulties of coordination and delegation, and above all, to a matter of particular concern from the perspective of this study's proposal for managing pollution control in Mexico City: civil society's lack of serious engagement in processes ranging from the planning of projects and programmes to their implementation.

In the latter regard, while the State has made efforts to report on the problems tackled with and the outcomes of its actions, those efforts have not been effective enough. Society's participation in recent collective mobilizations demanding an improvement in the city's environmental conditions have had only modest results. This is in contrast to what happened in the 1970s and 1980s, when significant social movements found responsive echo, their leading actors sharing responsibility for air quality with the State.

Although the idea sprang from the public itself, there is now resistance to and non-compliance with obligatory programmes to reduce the number of cars on the roads, such as the (initially voluntary) "Don't Drive Today" scheme and the Environmental Contingencies programme.

In that context it is no coincidence that the vast majority of people continue to believe, despite improvements in air quality, that the air has changed barely enough to avoid the most critical situations and that the authorities are responsible for solving the problem.

The two considerations are related. Citizens do not properly value the progress made. They have no faith in the usefulness of their own contribution, especially the middle sectors' refusal to countenance foregoing (even partially) their own means of transport. Thus they acknowledge that an emergency has been overcome and feel that they can relax and unload responsibility on the State. It might almost be said that citizens have made too much of a sacrifice in abjuring clean air for the benefit that the car confers on their lifestyles, and in neglecting to consider that improper and excessive car use pollutes.

This disengagement might also reflect citizens' growing mistrust of the traditional groupings among the political class, including the parties in power. In this regard, it is interesting to note that with the change in the political model in 1999 and the democratic opening, both civil society and some organized groups considered the political discussion of the problems of Mexico City and its metropolitan region.

Another significant explanation of the public's current disengagement is the lack of a State information strategy, one that informs citizens of the problems and of government actions, so that they can assume the costs of the pollution caused by each activity and social group and take part in decisions to tackle it. It is very likely that this happened because of the powerful interests at stake.

If citizens had more information on the damage wrought by air pollution they would make a greater effort to mobilize and participate. This is a fundamental aspect of effecting proper citizen participation and therefore, because of their substantial engagement with the public, more effective use should be made of the media.

The serious thing about neglecting to inform the public is that it is an insurmountable obstacle to further progress on improving air quality in Mexico City.

Social policies should induce a change in attitude to the problem, so as to imbue the general public with environmental awareness. It is highly likely that, to that end, the State must give civil society clear guarantees as to its real influence on decision-making.

More robust action to improve the MVMA's air quality demands changes in consumption patterns and a participation similar to that of at least a decade ago, such as the strengthening of social organizations and

civic groups. An inescapable precondition of that, however, is to show individual citizens and their organizations that they have entered into a qualitatively superior stage of participation.

This will not be possible without proper information mechanisms, especially those geared to social sectors with relatively less power. This is because the powerful industrial sector believes it already receives enough information from the authorities. In that regard it is interesting to note that although they criticize what they regard as excessive regulation in the industrial sector, business associations have evinced interest in joining in State policies to improve air quality. By contrast, the citizen/individual is more vulnerable than the business sector and is the most State-dependent of civil society's functional sectors.

In this respect, regrettably, it seems that neither the NGOs, nor the universities, nor the media, nor the political parties are playing their roles as links between State policies and civil society's structural actors. These organizations, at least some of which helped raise citizen awareness of the problem in previous decades (as they currently fail to do), are significant causal factors in the public's inertia.

In short, and adopting the ideas of one of the intermediate actors, it is plain that the State should place less emphasis on national protection or security and relinquish its fear of causing alarm or of incurring political costs. Its initiatives should be more preventative, raising awareness on the basis of reasoned and accurate information; but the other actors involved should also play their full role so as to nurture a culture of proper care and management of the precious resources in the Mexico Valley basin.

These factors demand that social participation be accorded the highest priority in drawing up and implementing State plans and programmes. They call too for a form of participatory policy-making that allows social actions and decision-making to be reoriented, and for effective communication and information mechanisms.

Chapter V

Citizen awareness and air pollution: the case of the São Paulo Metropolitan Region[1]

Introduction

After the 1972 United Nations Conference on the Human Environment in Stockholm, environmental policies began to be viewed as a component of development strategies. The link between environmental degradation and poverty took other forms and led to the consolidation of the concept of sustainable development in the 1987 Brundtland Report. Since then, the targets of what is normally termed the "brown agenda" have come to be seen as crucial for the protection of the world's environment.

In both developed and developing countries, urban traffic and the mounting use of private vehicles in cities are problems that have most attracted the attention of specialists and governments concerned with quality of life and governability in urban areas. To a greater or lesser extent, urban mobility has helped degrade the cities because the urban transport

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[1] The final version of this chapter was prepared by Daniela Simioni, Environmental Affairs Officer of ECLAC's Sustainable Development and Human Settlements Division, on the basis of documents from the project "Enhancement of citizen awareness for the formulation of air pollution control policies in three metropolitan areas of Latin America: Mexico City, Santiago and São Paulo", prepared by the consultants Pedro Jacobi and Laura Valente de Macedo.

sector underpins disorganized urban growth. Property and car use indices have risen continuously since the 1950s and, more sharply, since the 1960s. There is a clear link between purchasing power, urbanization and the use and purchase of cars. As the living standards of urban populations rise, the increase in purchasing power is reflected in the growth in the number and use of cars, and only at the end of the twentieth century did decisions on urban transport policies take account of the environment.

This chapter, based on research into the management of air quality in the São Paulo metropolitan region (SPMR) at the end of the 1990s, considers the importance of citizen participation in public policies, such participation being brought about by enhancing citizen awareness of environmental problems and by inducing a stronger sense of responsibility among all the actors involved in pollution control.

A.   Air pollution in the São Paulo Metropolitan Region

1.   Urban transport in São Paulo

At the start of the twentieth century, Brazil's transport policies were not substantially concerned with urban traffic. They were confined, rather, to the bureaucratic functions of granting driving licenses and vehicle insurance. São Paulo was an emblematic case.

In the 1920s and 1930s, São Paulo's urban transport was managed by changing the use and occupation of land, and public policies focused on the question of roads (Vasconcellos, 1996). Traffic became central to urban policies in the 1940s, and the 1945 proposal to introduce a subway system was reconsidered only in the late-1950s. Work on it began in 1975. Thereto, the main and almost only means of urban public transport was the bus. Traffic was managed at the state level between 1960 and 1972 through large-scale plans, and administrative decisions were highly centralized.

The municipalization of traffic management in 1973 allowed for more flexible arrangements as joint technical committees deliberated on urban traffic, greater oversight and educational programmes. This approach prevailed until the late-1990s, although in the period analyzed in greater detail an effort was made to adopt a different strategy. This tendency was reflected in the revision of the 1966 National Traffic Code in 1998: the new regulations made provision for some environmental considerations, such as the environmental inspection of vehicles as a condition of being granted a license. In São Paulo, the state government made an effort to integrate

public policies between 1995 and 1998. This effort, which replaced the sectoral approach with a strategy that gave priority to the quality of urban life, made an explicit link between transport and the environment, and led civil society to question the consumption patterns typified by car use.

In the 1990s the city of São Paulo covered 1,502 km^2 and accounted for 25% of Brazil's vehicles, the SPMR having the highest traffic density. The city has 3,000 kilometres of main roads and a total urban road network of 14,000 kilometres.

The city's climatic conditions make it vulnerable to critical outbreaks of air pollution. Studies of the link between climate and pollutant dispersal conditions show that there are two distinct periods: September-April, when the conditions are favourable; and May-August, a critical period because of atmospheric stability. In the latter period, winter is conducive to thermal inversions, whereby cold air from the ground meets a layer of warm air; the air becomes denser because of the absence of wind, which hinders the dispersal of pollutants. This is when pollution from vehicle emissions normally reaches critical levels. The human health consequences and social costs are immense. Some 2,400,000 hours a day are spent in traffic and about 4,000,000 people without access to a car are obliged to suffer the externalities attendant on vehicle use.

Public transport quality problems, in conjunction with other aggravating factors that are characteristic of cities in poor countries, make cars the most attractive transport option in São Paulo.

From a socioeconomic perspective, and in line with world trends, car ownership in Brazil depends essentially on the user's circumstances. Since cars are status symbols, consumers tend to assume the cost of buying the good and then control its use so as to economize on the costs of using it. Since the 1960s, car-buying has been made easier through a variety of marketing and financing plans. Since the 1994 Real Plan in particular, financing plans have made it easy to buy new and used cars, which accounted for more than 300,000 cars on São Paulo's streets. By 1998 there were more than 5,000,000 licensed vehicles in the metropolitan region; in São Paulo there were 2.18 inhabitants per vehicle. In 1997, individual trips accounted for more than 47% of all journeys by vehicle (CPTM/STM, 1997).

The mobility index of the SPMR's inhabitants has been falling since 1977. Statistics for that year (origin-destination research) show that 30,800,000 people a day make a trip; some 10,300,000 of the journeys are by public transport, 9,500,000 by private transport, and 10,600,000 are on foot (see table V.2). Use of private transport is increasing: from 38% of the total in 1977 to 47% in 1997 (see table V.1). The region had more than

5,000,000 vehicles in 2000. It is important to note the declining share of the bus as a means of public transport, in parallel to the marked increase in the use of cars. Daily congestion in rush hours averages 75 kilometres in the mornings and 95 kilometres in the evenings. Often, there are more than 100 kilometres of congestion. Congestion hit a record in 1996: 163 kilometres in the morning and 242 in the evening (CET, 1998). Average speed fell from 45 kilometres an hour in 1992 to 39 kilometres an hour in 1995 and will continue to decline in the coming years.

Congestion is the city's second biggest problem. Some 40% of the population spend more than two hours travelling from home to work and back again. The transport sector's main externality, its cost is estimated at 2% of GDP. Congestion is responsible for over 20% of pollutants (Cámara Municipal de São Paulo, 1995).

Table V.1
TRENDS IN MOTORIZED JOURNEYS BY MEANS OF TRANSPORT IN THE SÃO PAULO
METROPOLITAN REGION, 1977, 1987 AND 1997

Main means	1977		1987		1997	
	Trips (per 1 000)	Percentage	Trips (per 1 000)	Percentage	Trips (per 1 000)	Percentage
Subway	542	3.39	1 438	7.64	1 697	8.23
Train	512	3.20	825	4.38	649	3.15
Bus	8 659	54.12	8 058	42.83	7 928	38.44
Car [a]	6 127	38.30	7 996	42.50	9 741	47.24
"Colectivos"	-	-	26	0.14	200	0.97
Other [b]	159	0.99	473	2.51	406	1.97
Total	15 999	100.00	18 816	100.00	20 621	100.00

Source: Companhia do Metropolitano de São Paulo/Secretaría de Transportes Metropolitanos de São Paulo (Metro/STM), Pesquisa Origem-Destino/1997. Síntesis de Informações 09/98, São Paulo, 1998.
[a] Includes taxis.
[b] Includes trips on foot.

Table V.2
JOURNEYS BY MAIN MEANS OF TRANSPORT IN THE SÃO PAULO METROPOLITAN
REGION, 1997

Main means	Trips/day	
	Number (per 1 000)	Percentage
Public [a]	10 307	33.4
Bus [b]	7 965	25.8
Subway	1 688	5.5
Train	654	2.1
Private [c]	9 578	31.0
Other [d]	382	1.2
Motorized-Total	20 267	65.6
On foot	10 615	34.4
Total	30 882	100.0

Source: *Companhia do Metropolitano de São Paulo/Secretaría de Transportes Metropolitanos de São Paulo (Metro/STM), Pesquisa Origem-Destino/1997. Síntesis de Informações 09/98*, São Paulo, 1998.
[a] Corresponding to the means of transport of greatest capacity among those used (in combined trips).
[b] Includes normal traffic, rented buses, rented school buses and 200,000 clandestine trips/day
[c] Cars and taxis.
[d] Motorcycles and bicycles.

2.   Air quality

By the late-1990s, the SPMR had high indices of various health-damaging pollutants. The most significant are particulate material (PM10), photochemical pollutants such as ozone (O_3) and carbon monoxide (CO). Pollution conditions are classified according to the concentration of these gases as measured in the stations of the Environmental Sanitation Technology Company (CETESB).

The annual mean of breathable particulates ranged from 18 to 150 mg/m³, and usually exceeded the maximum acceptable level of 50 mg/m³ in several places. The maximum mean of CO concentration in the SPMR's saturated traffic areas ranged from 5 to 8 ppm and was below the 9 ppm air quality standard for eight hours. In the final years of the 1990s, however, there were several isolated occasions on which the concentration reached the warning level of 15 ppm. The maximum ozone concentrations normally exceeded the 160 mg/m³ norm for an hour, and sometimes reached the warning level of 200 mg/m³. In September 1999 there were 79 O_3 warnings in São Paulo.

Lead (Pb) and sulphur dioxide (SO_2), which are other significant pollutant gases, were controlled and cut to acceptable levels in this period. Lead tetraethylene was completely removed from gasoline in 1992 and SO_2 was cut as a result of a massive and effective campaign to control industrial emissions at the start of the 1980s. This also led to a substantial decline in

particulate material. Motor vehicles became the main sources of air pollution in urban areas, a minimal share originating in industrial heat-generation, the burning of residues, and the transport and storage of fuels. Vehicles cause almost 90% of the pollution. Diesel vehicles, as well as those using gasoline and alcohol, produce toxic gases that are emitted into the atmosphere in varying amounts.

Light vehicles using gasoline or alcohol are the main sources of CO and hydrocarbons (HC).[2] Vehicles using alcohol emit 50% less carbon monoxide (CO) but they are the main source of aldehyde, another health-damaging pollutant. Heavy diesel vehicles are the chief sources of breathable particulates (BP), sulphur oxide (SOx) and nitrogen oxide (NOx). The data show that diesel vehicles are the leading pollutants, accounting for almost 30% of breathable particulate emissions and 18% of the CO. Gasoline vehicles emit 60% of the CO and 10% of the breathable particulates. These particulates cause the most health damage, especially in high concentrations, while the effects of CO are lasting. Diesel vehicles, moreover, emit the highest proportions of HC and NOx, precursors of atmospheric ozone, which is the most common pollutant in the spring and summer[3] (see table V.3). Gasoline vehicles are the main problem: hence Operation Rodizio, a rota system to keep vehicles off the roads. It was justified on the grounds of the long-term potential of CO, especially that emitted by light gasoline vehicles, to cause pollution and damage health. Data for 1997 on vehicles in the SPMR show that CO is the pollutant most emitted, since light vehicles exceed diesel vehicles by a factor of 10, trucks by a factor of 20, and buses by a factor of 100 (CETESB/SMA, 1998).

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[2]   The use of alcohol in gasoline led to the almost complete elimination of lead from Brazilian fuel as of 1992. The level of lead in gasoline was about 0.2 mg/m^3 (the World Health Organization (WHO) allows up to 1.5 mg/m^3).

[3]   The environmental impact of ozone that forms in the lower levels of the atmosphere is different from stratospheric ozone, which protects the Earth from solar radiation.

Table V.3
RELATIVE CONTRIBUTION OF SOURCES OF AIR POLLUTION IN THE SÃO PAULO
METROPOLITAN REGION, 1997

Source of emission		Pollutants (percentages)				
		CO [a]	HC [b]	NOx [c]	SOx [d]	BP [e]
Vehicle	Gasohol	60	22	18	17	10
exhaust	Alcohol	15	8	5	-	-
	Diesel [f]	18	13	70	36	30
	Taxi	2	1	1	1	-
	Motorcycles	3	1	1	1	-
Crankcase	Gasohol	-	35	-	-	-
and	Alcohol	-	8	-	-	-
evaporation	Motorcycles	-	1	-	-	-
Fuels	Gasohol	-	7	-	-	-
transfers	Alcohol	-	1	-	-	-
Industrial processing activities (1990)		2	3	5	45	10
Particulate resuspension		-	-	-	-	25
Secondary aerosols		-	-	-	-	25
Total		100	100	100	100	100

Source: CETESB/SMA (Companhia de Tecnologia de Saneamento Ambiental/Secretaria do Meio
Ambiente, Governo do Estado de São Paulo), *Relatórios Anuais de Qualidade do Ar 1993/97/1998. Sério
Relatórios*, São Paulo, 1998.

[a] Carbon monoxide.
[b] Hydrocarbons.
[c] Nitrogen oxide.
[d] Sulphur oxide.
[e] Share calculated according to the receptor model study of breathable particulates (BP). The contribution
of vehicles was prorated among gasoline and diesel vehicles according to the available emissions data.
[f] Only heavy vehicles.

In 1995 CO emissions reached 1,770,500 tonnes a year, of which
38,500,000 tonnes were of industrial origin and 1,731,000 were from mobile
sources. Most particulate emissions originated in fixed sources, accounting
for over 50% of the total in the SPMR. Vehicles produced 98% of CO
emissions, 97% of hydrocarbons (including the percentages for evaporation
as fuel is transported), 97% of the NOx, 85% of the SOx, and 40% of the
breathable particulates, not to mention their contribution to particulate
resuspension. Diesel vehicles' main contributions were oxides of nitrogen
and sulphur.

3.   Air quality management

To control air pollution, the Brazilian government has adopted
measures of varying scope at the federal, state and municipal levels. Air

quality management is based on a policy of command and control measures, and authority is shared among the various government institutions. The legislation governing fuel quality and the rules on engine manufacturing are issued at the federal level, while responsibility for overseeing compliance is vested in the states.

The Motor Vehicle Air Pollution Control Programme (PROCONVE), instituted at the federal level, has been the chief legal instrument for regulating, monitoring and enforcing limits on vehicle emissions. PROCONVE, which entered into force in 1987, demanded that vehicles and engines leaving the factory should comply with maximum ceilings on pollution emissions and noise, in line with norms established in standardized tests using reference fuels. Revised periodically, the programme also calls for the certification of product prototypes, the special authorization of the federal environmental agency (the Brazilian Institute for the Environment and Renewable Natural Resources, IBAMA) for the use of alternative fuels, and the recall or repair of vehicles or engines that do not comply with production or project standards. It also bans the sale of models that have not been endorsed as IBAMA-compliant.

PROCONVE is administered in São Paulo State by the Environmental Sanitation Technology Company (CETESB), a technical body affiliated to IBAMA. According to data based on official tests (SMA/CETESB), in the 1989-1997 period there was a 90% mean decline in the emission of pollutants from light vehicles. Heavy vehicle emissions fell by almost 50%.

In São Paulo, the government is responsible for controlling the quality of the environment through the Secretariat for the Environment, a control it exercises through the CETESB. Since 1976 the CETESB has implemented Operation Winter, a set of preventative and corrective measures that are stepped up during the period of thermal inversion (May to September) or during severe bouts of pollution, in line with standards set out in the prevailing regulations. Operation Winter covers control of fixed (industrial) and mobile sources, as well as unconventional sources such as the open air burning of residues. Up to the mid-1980s emphasis was placed on industry and the reduction of sulphur emissions, but from 1987 onwards a higher priority was accorded to mobile sources such as motor vehicles. Prominent among Operation Winter's measures are educational campaigns directed at transport firms and department store customers, and controlling the level of sulphur in diesel oil. Another crucial programme against air pollution concerns the control and monitoring of black smoke emissions. In Brazil, the revised National Traffic Code, in effect since 1998, made provision for vehicle inspections as of 2001. São Paulo's vehicle inspection and maintenance programme has been under discussion since 1994 but no solution has been arrived at. The main point of disagreement concerns the authority to implement

the programme, and the dispute is between São Paulo State and the municipality.

CETESB's telemetric network of 25 stations monitors air quality in the SPMR and Cubatão. There are 13 stations in the city of São Paulo. Following its reform and expansion in 1996, the network resumed measuring pollutants, such as NO_x, that had not been monitored since 1992. CO, previously measured in only five stations, was thereafter measured by eight. Up to 1997 these data were made public by means of "clocks" that "translated" the air quality indices into concepts such as "good", "average" and so on. Because of a problem with the company that maintained the equipment, however, the contract was cancelled at the end of 2000 and has not been renewed. Data on the indices measured by CETESB were then made available on the Internet and in the press.

As mentioned earlier, the steps taken led to a significant improvement in air quality: environmental concentrations of lead fell by 80%: the use of catalytic converters (which cut pollutant emissions by almost 90%) was enforced; and environmental concentration of sulphurous oxides were kept under the legal limits. According to comparative data from the telemetric network, moreover, there has been a slight improvement in ozone and a modest decline in PM10 breathable particulates. The most significant decline has been in CO levels, which were 10.8% lower than five years earlier.

Other activities, undertaken in parallel to those in previous programmes, include environmental management programmes, monitoring of fuel quality and maintenance, and education, orientation and awareness-raising campaigns for transport companies. Letters of intent were signed with the transport sector to institute a programme of environmental management and company self-monitoring.

In 1995 the Secretariat of State broke the vicious circle in air quality management and set up the controversial Operation Rodizio in the SPMR, thereby creating a new platform for management and debate. This strategy of restricting the number of vehicles on the roads was part of an emergency and preventative air quality policy. One outcome of Operation Rodizio, which was based on a similar experience in Spain, was the "transport solidarity" programme or the solidarity-based hitchhiking schemes, which sought to offer alternatives for the days when driving was restricted. The initiative entailed environmental education initiatives and the production of informative material for communities, firms, and condominiums.

Another special project, set up by CETESB in 1996, created environmental assemblies, discussion fora whose participants include representatives of various productive sectors and consultative bodies. The aim was to enhance pollution control in partnership with representatives of the sectors being monitored, so as to involve civil society in environmental protection. The

assemblies could assess environmental management norms, procedures and instruments, and could propose changes to them. They could also draw up environmental management plans on the use and preservation of natural resources and energy, and on the adoption of clean production technologies.

At the local level, in 1993 the prefecture of the Municipality of São Paulo created a Secretariat on Green Issues and the Environment. Its mission was to preserve and maintain the city's green areas and to conduct environmental education programmes. The same year saw the establishment of the Sustainable Development Council (CADES), a consultative body equivalent to the State Environment Council (CONSEMA).

B.   The research

The underlying premise of the research in São Paulo was that citizen awareness determines improvements in the quality of the air that people breathe, since heightened awareness would induce a shift towards more sustainable forms of conduct.

On the basis of this premise and in line with the project methodology, a series of qualitative interviews sought to determine what might raise awareness and thus foster the participation of the city's inhabitants in the system for controlling pollution.

The public sector structural actors were identified from their involvement in the implementation of policies to improve the SPMR's air quality. The civil society structural actors were chosen from among representative sectors that mobilize members of the public, and that take part in environmental projects. They were selected on the basis of their political influence and their capacity to join forces for the purposes of improving local or metropolitan conditions.

The functional actors comprised institutions or individuals directly involved in disseminating information on air quality management, mainly in the 1995-1998 period. Apart from the contribution made by institutions representing individuals, their activities carry a seal of authority because of their background and personal interest in the matter.[4]

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[4]   A total of 31 interviews were held. The recordings were transcribed and revised between July and September 2000. When the interview material had been systematized a preliminary report was prepared, and a summary of it was submitted for discussion among the participants of a working group.

1.   Structural actors

The public sector actors belong to the three levels of government. The state government bears most of the responsibility for controlling air quality. In this regard the most decisive and controversial initiative was Operation Rodizio, effected by the Secretariat for the Environment (SMA) between 1995 and 1998. The SMA undertook a series of activities in the period under analysis. Interviews were held with various SMA officials, such as the Environment Secretary, the technical coordinators, press advisors and environmental education specialists.

Other interviewees included officials of the state secretariats —transport and health, the public ministry— and agencies of the Prefecture: the Secretariat for Green Issues and the Environment, and the Secretariat for Metropolitan Transport. To varying degrees these actors took part in activities coordinated among state bodies. Interviewees from municipal agencies did not necessarily play a role in state policy. Given the nature of air quality management in the SPMR, and particularly in the city of São Paulo, these actors cover the whole range of possible options.

The federal-level actors belong to two ministries active in this field, the Environment Ministry and the Science and Technology Ministry. Within their remits these institutions deal with the issue at the federal level but they are not necessarily linked to policy applied in the SPMR under the aegis of the state. In the case of the Environment Ministry, through the Secretariat for Environmental Quality in Human Settlements, the federal government has paid particular attention to the problem of the municipalities at the national level because of the pressure exerted by urban populations on natural resources. Currently, 80% of Brazil's population lives in urban areas and urban activities have a direct and indirect effect on the environment in the form of air and water pollution.

Greenhouse gas emissions from industrial processes and transport comprise the main issue for the Science and Technology Ministry in international negotiations on climate change. The contribution of Brazilian cities as a whole encompasses all emissions caused by industrial processes, energy-generation and the road transport sector, but the continuing deterioration is still driven by growing urbanization and the attendant demand for energy and transport in the cities. Moreover, the transport sector is the main source of greenhouse gases, a circumstance that calls for a link between local air quality management and national and international policies on climate change.

Apart from actors in the government apparatus, interviewees also included representatives of political parties, businesses and unions, and members of community associations.

2.   Functional actors

These were chosen according to their capacity to influence public opinion. From among an extensive and highly varied range of actors, the press and some business organizations in particular had leading voices in the debate on the urban environment, and in the case of Operation Rodizio they voiced their criticism forcefully and often.

For a number of reasons, the NGOs have not displayed unlimited engagement with the environment. First, only a few of them are truly active in urban environmental matters. Many take action periodically and on particular matters, and only in specific cases does a very diffuse issue like air quality draw sympathizers and activists. None of those interviewed could name a social movement working on air quality, even though it is something that affects all of the SPMR's inhabitants daily.

The universities merit special mention. Few institutions undertake research on air quality in the SPMR apart from the University of São Paulo, and even that has not brought all its potential resources to bear on the matter. Research is confined to certain fields that call for sectoral scientific know-how. Some researchers have played prominent roles but they have done so in a personal capacity.

3.   The three variables

The three variables used a reference points for a comparative analysis of the three cities prompt reflection on the complex endeavour of inculcating citizen awareness of air quality in São Paulo, a city with one of the highest levels of air pollution.

a) Individual and collective behaviour

This heading covers the level of citizen awareness, the extent of the actor's engagement with the matter, and their attitudes to air quality management.

As regards individual behaviour, the aim is to identify the factors that foster or constrain change, as well as those that determine the nature of the change. The questions asked of the various actors sought to dispel some uncertainties about those factors.

When making policy recommendations it is crucial to have as impartial a picture as possible of how civil society works, the nature and causes of mobilization or the reasons for its absence, how the institutional apparatus works, and the constraints on and spurs to action. The analysis

made it possible to ascertain the degree of citizen mobilization on air pollution and future trends in that regard, and to make recommendations for enhancing individual and group mobilization.

b) Social communication

This is another issue that warrants particular attention. The underlying premises of the research sought to spark a debate on the communication problems between civil society and the State, and to determine why there is such a hazy view of the issue of air quality. Hence an effort was made to analyze what it is that leads public sector messages on air quality management to be accepted, absorbed or disregarded by social actors. The chief hypothesis in this area is that there is only limited awareness of the public institutions and policies involved in controlling air pollution.

The survey findings provided a basis for recommendations and proposals on how to enhance social communication strategies on this issue.

c) Social participation: relations between civil society and the State

Citizen participation is a multi-faceted issue of ever greater social importance. This study linked it directly to the challenge of fostering a sense of co-responsibility among citizens and encouraging them to respond in the interests of improving air quality.

The research sought to discern how the different actors interpreted the functions of each level of government, their powers (compatibilities and conflicts), their conduct, the scope and legitimacy of their activities, and the extent of and constraints on the role of various structural and functional actors. An effort was also made to understand which factors (in both civil society and the State) facilitate improvements in the level of citizen participation, to review the available mechanisms, and assess both the progress made and the problems encountered.

These endeavours facilitated analysis of the actors' perceptions of how useful and relevant the existing channels and instruments for participation really are. It also aided an appraisal of the incentives for and constraints on citizen participation in air quality management.

4.   Environmental citizenship and awareness

Broadly speaking, there has been little or almost no mobilization of citizens concerned with air pollution. The most active movements focus on direct damage. Some movements in particular parts of the city worked

against industrial pollution in the 1980s, but they disbanded once the problem had been solved.

Environmental awareness has nonetheless increased. Of note in that regard has been the role (albeit somewhat variable) of the media.

The media provide civil society with a great deal of information on the environment, but a recent study of the Brazilian public's perceptions of environmental problems and sustainable development shows that, five years after the United Nations Conference on the Environment and Development (UNCED), citizens still have little or no knowledge of those problems.

The questions raised about "environmentally-friendly" behaviour are closely linked to the need for a diverse citizenry whose response to the decline in living conditions attendant on socio-environmental deterioration (especially in large urban areas) involves expanding and reinforcing society's adoption of practices that are conducive to ecological sustainability.

Civil society's evincement of environmental awareness marks a transition from a reactive to a proactive attitude to social conduct.

In São Paulo and in Brazil in general there is a growing institutionalization in the environmental field, although it is lacking in effectiveness and technical capacity. This is a field that is marginal to local power arrangements. The channels for society's participation are under-used, and the political and institutional framework remains ill-defined and unrepresentative.

The population makes few demands, because citizens are beset by more pressing matters such as violence, the scant provision of public transport, and problems of housing and environmental sanitation. It is plain, moreover, that air pollution is almost absent from the programmes of the most active groups, which raises questions about the limited scope of public policies.

In general, environmental movements have not been particularly active. The political environmentalism of previous decades took another form in the 1990s, and was much more geared to responding to particular problems. The thinking that had prevailed since the mid-1970s changed, and the much more conspicuous mediation between social and political life has found expression in new forms of environmental activism, most particularly through NGOs.

The activities of environmental organizations are normally confined to particular areas, especially preserving the ecosystem, improving the quality of the environment (air, water, solid residues), environmental

education, expanding access to information, and sustainable agriculture. These movement make ever greater efforts to influence those state institutions concerned with environmental issues, the legislature, the academic community and the private sector. Many environmental organizations have sought to professionalize themselves in various ways: by securing more financing, for example, thereby helping to support their own institutional strengthening.

The opening of offices in Brazil by prominent international organizations such as Greenpeace and Friends of the Earth has stimulated the development of the local institutions.

The greater conceptual consistency of environmental organizations and the rising profile of their activities have directly helped other actors, such as academic groups and elements of the business sector, to play a more vigorous role in the environmental debate. The academic community's presence has expanded, and various inter-disciplinary research centres, as well as academic institutions offering post-graduate courses in environmental disciplines, take an active part in programmes and projects carried out in conjunction with government agencies, NGOs and private companies. The initiatives are geared to the conservation and sustainable use of biodiversity. Elements of the business sector increasingly provide financing to various environmental bodies and participate more actively in public fora on sustainable development.

Despite the fact that most of Brazil's population lives in cities, however, the outcomes of these endeavours for the urban environment have been practically nil.

As regards levels of environmental awareness, the interviewees maintained that the importance of the environment has risen substantially, and is now almost part of the media's routine vocabulary. Nevertheless, media references to air pollution are few and far between except (as happens during periods of thermal inversion in particular) when there is a severe outbreak. The general public evinces little engagement with the matter and, according to most interviewees, those whose conduct is consistent with a sense of co-responsibility are still a minority. Citizens are unwilling to make sacrifices such as foregoing car use because cars, increasingly, are status symbols.

Factors conducive to real behavioural changes are in short supply. It has been argued that a policy of incentives (either new means of public transport or economic incentives) could alter this situation by causing citizens to perceive a direct benefit in changing their conduct.

The severe difficulty of inducing a change in behaviour is a prime obstacle, and the biggest problem is imbuing citizens with an individual

awareness of a collective issue. This was proved beyond doubt by Operation Rodizio, which sought to safeguard a diffuse interest and incited various forms of resistance. Its opponents' main argument centred on the restriction of individual rights, a line of reasoning that found responsive echo in public (and especially middle class) opinion. The constant critical refrain was the "unconstitutional restriction of the right to come and go". Operation Rodizio, an example of a government initiative that was imposed on the public, had sparked NGO interest in the problem, but its cancellation by the São Paulo government led to waning interest in the issue among the non-governmental sector.

The political parties, too, have displayed no great interest in air pollution. Indeed, their concern for environmental problems in general has been meagre.

The awakening of the business sector has been slow but is now under way, largely because of pressure from society and the need to show that development can be reconciled with environmental protection. A growing number of firms have responded to a kind of obligatory raising of awareness of the importance of environmental control. Attitudes have become more proactive, albeit hesitantly, and more as a reaction to the market than because of greater awareness of the issue.

In sum, the Brazilian public is not well organized and exerts very little pressure. There is concern for environmental matters but it is confined to the (still very few) people working in this field. Air quality has featured on the work programmes of few organizations, and when it has appeared it has prompted only temporary and case-specific responses. In this the role of the press, radio and television should be acknowledged. Notable among the progress that has been made is the intensification of the debate, largely because of the activities of some NGOs and, in some cases, because of severe climatic crises that have spurred longer-term initiatives.

The main obstacle to a behavioural change is that air pollution is a priority for neither the state nor municipal government. A change in government practices is not in evidence, and there is a shortage of political will to tackle the issue.

Operation Rodizio raised many questions, most particularly about motivations for participating. As an obligatory initiative it placed all motorists on the same footing, but it was still seen as a sacrifice to be made solely as a means of avoiding a fine.

One positive outcome is that the inhabitants of São Paulo accepted Operation Rodizio as part of the city: there was a prevailing sense that without it the city would cease to function, even though it was imposed by the Prefecture. Nonetheless, people still believe they are doing something

very important to control pollution when it is to their advantage, and even more so when they buy a car with a catalytic converter.

Note, however, that there is:

-       little or no mobilization around the issue of air pollution;

-       little or no willingness to make sacrifices —that is, to do without the car;

-       a lack of government initiative and follow-up, since Operation Rodizio was applied exceptionally in the 1995-1998 period.

5.   Roles and responsibilities

As to the role of the various levels of government in air quality management, there is a significant problem of coordination. This arises partly because of the country's federal structure. In general, state bodies are inadequately linked together, and problems of coordination between the federal-level Secretariat for the Environment and the Municipality of São Paulo hamper concerted action.

The struggle against pollution, moreover, does not feature prominently on the government's agenda. The question of air quality, involving neither votes nor prestige, is not deemed a priority. The notion persists that respect for certain environmental quality standards runs counter to economic development.

In the widespread opinion of the interviewees, the federal government plays an institutional role in managing air pollution, in the sense that it provides the legal means to prevent and control it. It also has a role as an instigator and guide. It should lay the groundwork for air pollution control by instituting regulations that place ceilings on pollution levels, and should take account of academic research to guide it in amending legislation. Its role is to establish pollution control guidelines, programmes and policies, to translate these into legislation, and to ensure that the laws are enforced. It should also provide infrastructure for the necessary studies, practical measures and planning. The federal government should rally public opinion around citizens' responsibility by providing information and by giving people, a clearer impression of the scale of the problem, how it can be tackled, and how they should participate.

Thus far its environmental activism has been very hesitant. The Environment Ministry has a number of environment- and transport-related programmes but air quality is not prominent among them. Environmental management is still seen as the exclusive responsibility of the ministry and

its secretariats at the sub-national level. This attitude raises a problem, since it favours a partial treatment of the matter and gives rise to deficient coordination with the other sectors. Progress depends on an institutional apparatus and operational capacity (still modest because of a lack of training), and on the provision of human and financial resources. At the same time, federal legislation allows for little flexibility.

The state government is responsible for pollution control but, in the view of the interviewees, it should act more vigorously. The main obstacles to greater government efficiency are the qualitative decline in public administration, in terms of facilities and human resources; the state (metropolitan) government's innate difficulties of inter-sectoral coordination; budgetary constraints; the way in which priorities are set; the lack of comprehensive transport planning; the shortage of policies on land use and occupation; and the absence of master plans. São Paulo is the only state with the technical capacity to monitor air quality, especially vehicle pollution, and this (despite the public's critical view of government initiatives) enhances the credibility of its management. Progress depends on a robust institutional apparatus and operational capacity, even with modest human and financial resources.

There has been no attempt to coordinate government actors and agencies on air quality issues. The sole exception has been Operation Rodizio, which partially succeeded despite the resistance to it. In that case the government set up a process for coordination and took the initiative to present the problem to the public and the press. It appealed to society and proposed a way of tackling the matter, which brightened the prospect of participation.

There is little concern for air quality at the municipal level; the municipalities are only just becoming active in this field. Controlling air pollution is a question of regulation, enforcement, and building public awareness. The municipalities need to be ready to take part in environmental management. They have the authority to monitor environmental problems and the associated damage, but municipal power remains fragile.

At the local level a distinction should be made between municipalities. Traffic and pollution problems are concentrated in the capital; the other 38 municipalities are almost marginal to the issue. The participation of the São Paulo municipality in the debate, by contrast, is crucial.

With the exception of Operation Rodizio in the rush hours, however, thus far the Prefecture of São Paulo has displayed no great interest in doing anything. Operation Rodizio had no effect on public health; it affected only the number of vehicles on the roads. The experience did, however, focus attention on air pollution, health and transport. Regrettably, despite the furore that it provoked, and the value of the public debate that it sparked,

the government could not guarantee its continuation, and the organizational difficulties between the Secretariat for the Environment and the Prefecture made continued cooperation difficult. The allocation of functions proved particularly problematic.

Disputes between the state and municipal levels of government on the vehicle inspection programme typify the difficulties of joint management. The Prefecture, responding to political differences, wanted to take responsibility for controlling vehicle emissions. This brought it into conflict with state-level decision-making. That incited a legal battle and the programme was suspended. It has not been reintroduced to date, and the quality of the SPMR's air has declined as a result.

The interviewees averred that comprehensive management of pollution control is more effective at the intermediate level, the main advantage being the satisfactory degree of organization in the Secretariat for the Environment and CETESB. State-led initiatives, moreover, can be geared to the metropolitan level, an increasingly important matter in the management of large cities. The absence of a metropolitan agency truly active in environmental issues, however, is a key determinant of the quality of the management.

The state level has other comparative advantages in pollution control: the capacity to inform, access to teaching networks, the availability of technical and scientific data, and appropriate research conditions. The state also has the authority to draw up legislation, define rules and regulations, and combine the municipalities in a coalition to improve the quality of transport. Thought should be given to investment in public passenger transport and to agreements with the universities, with a view to improving the efficiency of the transport system and reducing pollution.

Other advantages of joint endeavours with the municipality are that initiatives are closer to citizens, their needs are made known, and policies are coordinated better. Many local interests and demands, however, hinder the broader action needed to tackle air pollution.

A behavioural shift is becoming apparent in the business sector, spurred by a desire to dodge social pressure and to avoid being held accountable for environmental deterioration. As business has become more sensitive to environmental issues, its image has improved. Businesses with environmentally-friendly practices are more competitive, and it is a sign of progress that air quality features in some firms' corporate policies. While they generally display greater social responsibility, however, in the area of mobile pollution sources their activities are at a very early stage. It is here that they need to invest in replacing technology and fuels, environmental management, control of the industrial process and so on. The challenge for

the private sector is to increase the number of associations so as to reduce pollution, and to promote solutions to the problem of urban public transport from both a technological standpoint and an economic perspective.

Community associations have normally had little to do with the pollution issue. Their initiatives are specific to their own locality. More concerned with preserving quality of life and with the inhabitant's daily lives, they find it difficult to deal with more amorphous matters.

For their part, NGOs play a crucial role in raising questions about environmental problems caused by government actions and private initiative, and in proposing specific projects. Given leverage by their independence, they perform functions that the government does not, or in areas in which society is disorganized. What they do is important because they can mobilize a large sector of society, mainly opinion-makers, and can reach people and institutions with the power to shape attitudes and spread knowledge, to enlighten and censure. They also play a very substantial educational role. Unfortunately, they have taken little part in urban environmental issues and do not accord priority to air quality.

The universities are very important sources of inputs, studies, and experts for society in general and the government in particular. In this area they normally have a highly segmented view of air pollution. The academic community as a whole is not engaged with the issue. Some researchers have a personal interest but many of them are not concerned with the more concrete matters.

The media play a highly significant role in shaping public opinion, in raising awareness, in reporting problems and in exerting social pressure. They are pivotal in changing the conduct of large sectors and their educational role can be significant.

They find it hard to work with an environmental vocabulary, however, because few journalists are experienced in the issue.

The media sometimes report erroneous data without checking it, a failing that undermines the quality of their work. Usually, they focus on a particular accident or emergency and neglect to analyze pollution's underlying causes.

This is because they have no clear position on the matter. They have shown little willingness to foster alertness and provide information on air quality, to criticize the main polluters, and to initiate a debate on the kind of industrial planning that would upgrade sources of pollution.

The political parties' role in environmental policy-making is insignificant. They display little interest in converting environmental issues into legislation, and few parliamentarians are concerned with air quality.

Even in a city like São Paulo, the public makes no demands about air quality. Only a minority has access to information for research purposes, and even fewer pursue the matter aggressively. In a context of widespread irresponsibility it is hard to espouse new values, change behaviour, and take account of air quality in daily routines. In the last decade, however, there has been a substantial improvement in civil society's organization. In Brazil it is discovering the advantages of collaboration. This is conducive to an active citizenry, one that is more aware of its contribution to the collective good through its criticism and actions. Citizens should make demands and do their part: in electing their representatives (by giving preference to candidates at all levels who are concerned with environmental protection), and by acting in ways that reflect their own commitment to an improvement in air quality (by assuming individual responsibilities and reducing their use of private transport).

6.   Social communication

The interviewees were in full agreement that it is important to keep the public well informed on trends in air quality and on public policies in that field. Most people, however, know little or nothing about air pollution and only a very small group is interested in acquiring more and better information. That circumstance gives rise to deficient communication between citizens and the government, and to a lack of clarity, transparency and credibility in the information provided. Information from the government is generally incomplete, and tends to omit negative data or to offer only what is asked for. The information issued by public institutions is not always cogent or easy to understand, and is not presented systematically.

To understand the links between management, its outcomes and effects (and consequently to support the steps taken), citizens need constant access to coherent information that is easy to absorb. Hence it is vital that the information be translated into plain and easily-understood language. There is a need for information on the relationship between pollution and its causes, the health effects of transport, the link between transport and urban land use, and also on what the government is doing. Disseminating information only on particular initiatives, either directly or through the press, constrains a critical assessment of the government's pollution control activities. Social communication is inefficient, which can also discredit the country's public institutions.

Because it is poorly informed, the general public is unaware of the efforts made by the various levels of government, and the government has not mounted a campaign to raise awareness of air quality problems.

At the federal level, initiatives on deforestation, burning, water and air pollution are known because of the information provided by, above all, television.

At the state level, Operation Rodizio sought to inform the public, but a more effective communications policy was needed, one that linked air pollution to meteorology and health, so that people affected by pollution (those with breathing problems) could be reached more directly. Operation Rodizio imposed restrictions on people; enforcement is unpleasant and burdensome, and the fines incited resistance. Thus, when the issue no longer attracted the attention of the media and the public, the government —unaware of the importance of the campaign— discarded it and freed itself of the inconvenience.

For the most part, the public is unfamiliar with the outcome of Operation Rodizio because the results were not made known, There was no attempt to persuade people of its benefits, and communication from the government was highly ineffective. This is the result of several factors: little pressure to adopt environmental policies; the modest operational capacity of government institutions; an institutional culture based on a command and control strategy that views the environment from an exclusively sectoral perspective; and the government's lack of credibility when it takes steps to safeguard the population.

At the same time, citizens were uninterested, irresponsible and powerless; they did not grasp their role in pollution control.

According to interviewees in São Paulo, people are wrongly and poorly informed of the quality of the air: the government should improve its communication with the public; upgrade entrepreneurs' participation in environmental education initiatives; enter into partnerships with NGOs that prioritize the issue of pollution-related urban mobility; and provide more comparative information so that citizens can identify causal links. It is vital that the government invest in environmental education so as to inculcate a sense of co-responsibility among the population. It should expand its communication mechanisms, in collaboration with other sectors and other public bodies, so as to enhance its dialogue with civil society in fora such as churches, schools and community associations.

7.   Citizen participation

Citizens are contradictory in their use of the available channels for participation and take little advantage of them. This is why they are so poorly informed about how to participate and how to pressure the government. People are generally unaware, for example, that they can take part in public hearings.

The mechanisms for participation have increased in the past ten years but there is little concern to make them work better, and the problems posed by the current mechanisms —such as the State Environment Council (CONSEMA) and the Sustainable Development Council (CADES)— are plain. The National Environment Council (CONAMA), headquartered in Brasilia, is highly problematical. In practice it does not work; it acts only as a forum for a kind of participation that is scarcely representative. Exceptionally, in the case of Operation Rodizio, the State (through the Secretariat for the Environment) took the unusual step of convening all social actors, but there was no coordination or engagement among the different secretariats.

There are more opportunities to participate but, because of the abiding lack of credibility and administrative continuity, the public fails to grasp the consistency and scope of the policies adopted. In Operation Rodizio there was a quite substantial effort to enlighten the population about pollution and its health effects, by providing information through various channels and by means of environmental education. This sparked a debate, but provided no forum for citizens to discuss options and choose alternative solutions (apart from buying another car).

When the public is truly engaged, however, as in the case of the Participatory Budget exercises in various Brazilian municipalities, it is clear that its real participation in decision-making processes (viewed as an expanded mechanism for society's engagement with public policy-making), demands a greater effort to institutionalize, on agreed bases, the ways in which demands are attended to. It is a matter of processing demands and pressure, and adopting formal mechanisms that include both the organized and mobilized sectors (fostering their adaptation to the institutional framework, and respecting independence and self-management) and those sectors that are unorganized.

There is almost complete consensus that NGOs and other movements would be useful and significant allies in pollution control initiatives, and that it is essential to foster the participation of the public. Citizens might be interested in taking part if they are made duly aware of the importance of their role in the process. One way of encouraging participation is to establish a link between broad issues, such as climate change or the greenhouse effect, and local concerns, thereby strengthening the connection between vehicle emissions, the greenhouse effect, and quality of life.

The key challenge in the field of participation is to support active citizens in such a way that they seek or demand information. It is important to know which institution is responsible, who participated, and if the inspection was carried out properly. In pursuit of common interests, citizens could monitor the environmental damage wrought by an industry; endorse

restrictions on car use in order to make improvements in air quality a feasible goal; or demand more, better and non-polluting public transport.

As mentioned earlier, the institutionalized mechanisms for participation have advanced, but some decision-making authority must be guaranteed because otherwise there is no real participation. The public is engaged, but is assigned practically no role.

C.   Some conclusions and recommendations

Efforts to strengthen the public's role in resolving environmental problems should include a process of mobilization and motivation, through education campaigns that foster preventative thinking. Improved access to information and social participation would encourage a change in attitude, one conducive to the development of collective environmental awareness. That would be a significant step towards strengthening citizenship.

As regards cars, in Operation Rodizio the biggest problem was convincing motorists not to use their vehicles on the days when traffic was restricted. Drivers argued that the measure was an unconstitutional constraint on free movement. The issue is more complicated, however, because a car is a potent status symbol, doubtless the most important icon of contemporary culture. For some it is also a necessity, since the public transport system cannot meet demand in the SPMR. Operation Rodizio enjoyed a high level of compliance because it was mandatory; fines were imposed, and thus economic ecological awareness was subordinate to economic concerns.

Information and transparency are required to secure a clear picture of why citizens comply with pollution control measures and the extent to which they do. To set up new and more equitable urban programmes, society must be involved in decision-making. Opinion surveys are no substitute for a legitimate process of democratic participation, and such a process is also needed to gain an understanding of expectations and the likely outcome of future initiatives.

As to the future, the initiatives of the 1995-1998 period prepared the ground for a sustainable transport policy. While there is virtual unanimity on the need to improve public transport through more effective government action, the different views of environmental policies reveal that the process of participation between the government and civil society has to be improved. Greater participation could demystify the paternalistic view of the government by fostering co-responsibility and legitimating government actions, even if those actions are restrictive.

Although there is resistance to making policies restrictive, the political costs evaded in the short term will have to be borne sooner or later. Not everyone can be expected to like restrictive measures, but people will only be convinced and become more aware through education and transparency. Questions about the legitimacy of such policies arise not only in the conceptual discussion of constitutional rights; they are also sparked by the incoherence with which the government applies them.

In the opinion of several social actors, the government's lack of credibility is one of the main reasons why pollution control policies fail. It is hard for imposed measures to find popular legitimacy, because the public perceives them as an effort to impose government authority rather than a desire to uphold the common good.

In these circumstances, over the medium term the lack of consistency will join the list of reasons for political failure, irrespective of which party is in power. Policies to reduce air pollution have never had and will not have any significant environmental outcome until public perceptions are no longer distorted by confusion between local- and state-level policies, and until there is an effective attempt to extend government initiatives to the needs of a public transport system whose comprehensive management is shared among the various sectors of the population and the different levels of government.

There follows a series of recommendations, compiled during the interviews and group working sessions, on how to increase the level of citizen awareness in São Paulo by revitalizing the interaction between the three variables considered in the research.

1.   Individual and collective behaviour

Suggestions for improving the level of awareness that affects behaviour:

- engage with interested social actors through education campaigns;
- rally the public to a cause (an improvement in air quality);
- redefine the concept of traffic (its measurement and administration);
- improve public transport and respect its contribution to improving the quality of the city's air. This could encourage drivers to use public transport;
- invest revenue from fines in specific projects that benefit environmental programmes and health initiatives, thereby linking cause and effect;

-       improve facilities for non-motorized transport so as to make
        it a viable alternative.

2.   Social communication

It is important to teach society to exert pressure. Communication is
a central factor but has been neglected in policies on air quality. Hence the
following suggestions:

-       conduct new surveys to acquire information on the public's
        perceptions and opinions;

-       invest in various forms of communication —the Internet,
        agreements with NGOs, universities and research centres— so
        as to enhance dialogue. The main challenge is to increase
        transparency and, in the allocation of resources, place more
        stress on environmental education. This is an important source
        of information and heightens public awareness. The network
        of schools and universities —influential opinion-formers—
        should be used more thoroughly;

-       make information available and facilitate access to data on
        pollution to users who can understand it and transmit it to a
        variety of groups;

-       improve communication by involving other social actors in
        government initiatives. Promote the creation of new channels for
        participatory communication, such as courses, seminars and
        meetings, so to as to induce cooperation in the implementation of
        air quality initiatives and stimulate either direct involvement
        in such activities or awareness of them. The communication
        process depends on the content, which in turn depends on
        participation for its effectiveness;

-       mount campaigns to engage the population in closer
        institutional collaboration between the different levels of
        government, so as to enhance communication between the
        authorities and the citizens. There is a need for permanent
        campaigns to alert the public to accidents, pollution emissions
        and related developments, and to heighten their awareness of
        such events;

-       set up partnerships between all levels of government and
        institutions that permeate civil society, such as churches and
        schools.

3.   Social participation

Channels for participation (councils, committees, fora) should be strengthened. Activities geared to training citizens in enhanced forms of participation should be supported. The suggestions in this regard are:

-       guarantee democratic access to information through permanent dialogue, sharing responsibilities and building mutual trust;

-       improve the quality of the information provided; make it constantly available and continually assess its impact. The information should include concrete examples, so that society and its actors, in partnership with the private sector, are engaged;

-       define more precise criteria for participation, and use civil society institutions with networking capacity;

-       strengthen mechanisms for participatory policy-making, and promote and support public hearings to divulge the results of environmental impact assessments;

-       emphasize the importance of environmental education. The government should inspire people through education campaigns. Middle class Brazilians are now willing to be environmental actors;

-       enhance participation at all stages, from planning to the implementation of policies on air quality;

-       strengthen the consequent participation, so that citizens see they have decision-making power in the process.

Chapter VI

Citizen awareness and air pollution: the case of Santiago[1]

Introduction

At the start of the 1990s the Chilean authorities classified environmental conditions in Santiago as critical. Public intervention then began, evident as a clear concern to resolve a problem that was affecting the health of the city's more than 5 million inhabitants.

After ten years of State leadership of environmental management, it is time to assess what has been done. The aim is to identify the achievements underlying the successes, and the difficulties that have hampered further progress.

In Project CCC, ECLAC established that the participation of the inhabitants of the affected cities is crucial to pollution-reduction policies. This chapter reflects on possible new strategies that would enable the State and the population to make joint progress on the efficient management of pollution control in Santiago.

The study rests on the premise that citizen awareness is a determinant of pollution-reduction management. More specifically, it is assumed that the systematic progress made to date in the environmental field can only be maintained with the commitment of all citizens. This means, on the one hand, that the State should consider citizen participation as a central variable in its management. On the other, it means that citizens should take charge of the problem since responsibility for it is shared.

The chapter is divided into two sections: air pollution in the Santiago metropolitan area; and the public and air pollution.

The first section addresses the city's general context, public policies and the stages of pollution-reduction strategies. The second explores the perceptions of all the actors involved in the issue through their varying viewpoints on air quality, their different roles, social communication and citizen participation.

A final section presents the study's conclusions.

A.   Air pollution in the Santiago Metropolitan Area

1.   Geographic situation and meteorological factors

In conjunction with meteorological factors, Santiago's geographic location has the greatest effect on the decline in the city's air quality.

The Santiago metropolitan area (SMA) is in the Maipo River basin at an altitude of between 400 and 900 metres above sea level. The basin is bounded to the east by the Andes mountain range, which rises more than 3,200 metres, and to the west by the Costa foothills, which do not exceed 1,500 metres. To the south lie the Cantillana hills, none of them above 2,000 metres, and to the north the Chacabuco chain encloses the basin. Only to the southeast is the city open to the Maipo River valley.

This cordon around Santiago curbs the city's ventilation and impedes the dispersal of pollutants. Other adverse factors include the wind speed and direction (horizontal circulation) and limits on vertical propagation because of thermal inversion.

During the day, pollutants emitted in the central and south-western areas move to the north-eastern sector. At night the reverse happens: cleaner air descends from Andean foothills and the polluted air moves to the city's central and western areas.

Pollutants usually disperse in a layer between the surface and an altitude determined by thermodynamic factors. The altitude at which the pollutants mix varies by time of day and season. In Santiago, the altitude of this layer varies substantially depending on the month; it can be as low as 300 metres in winter and as high as 1,000 metres in summer. The altitude is affected by thermal inversion. When the air temperature falls proportionally to altitude, warm polluting gases rise. When the temperature does not fall enough, however (as often happens in Santiago), an inversion layer forms. This causes the primary gases to linger and thus facilitates the formation of secondary gases in the atmosphere. The phenomenon is more acute in winter because the land surface is colder.

2.   The city and its growth

For administrative purposes, Chile is divided into 13 regions. Santiago is in the Metropolitan Region. The SMA covers 36 municipalities of the Metropolitan Region. The current population is estimated at 6,189,964. Some 40% of the country's total population lives in Santiago (INE, 2001).

According to the most recent censuses (1982-1992) the SMA's population grew at an annual average rate of about 2%. In the same period, population growth varied substantially by neighbourhood. Those on the outskirts grew at rates above 5%, while the rates were negative in the central and intermediate areas. In the 1990s the relative growth of the population was similar (higher on the outskirts), but the central areas of the city were revitalized (Arriagada and Simioni, 2001).

The SMA's growth, has been marked by its low density and striking extent (De Mattos, 1999). Since the 1980s, large cities have tended to breach consolidated urban boundaries and to spread to land previously used for agriculture. This is the result of public policies to build houses on the outskirts, and of private real estate operations for middle- and lower-income families. The metropolitan area is consequently divided by social strata.

Thus another peculiarity of Santiago is that the metropolitan area is polarized and segregated by income levels. Geographic segregation is evident in areas of significant socioeconomic uniformity —a circumstance that constrains co-existence— and in segregation originating in the economic use of the land.[2]

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[2]   For example, common land is the site of 44% of the all land approved by the city of Santiago for commercial use; other common land is the site of 52% of that authorized for services; still more is the site of 52% if the land approved for industrial use; and 53% of the land available for residential use is common (MIDEPLAN/ILPES, 2000, pp. 59-61).

This division by socioeconomic level and land use affects the movement of people in the city and therefore the levels of air pollution caused by their journeys.

3.   Urban transport

As regards urban transport in Santiago, it is worth recalling the city's characteristics, especially its sharp sociogeographic divisions, and relating the latter to income levels and land use. The lower-income neighbourhoods of the city's western sector are most affected by pollution, while in high-income neighbourhoods in the east cause most of it, largely through car use.

The number of vehicles in Santiago has grown substantially and constantly every year. Between 1985 and 1996 the number grew at a rate of 64% (from 383,187 to 627,452). This increase includes taxis, which now account for 5% of private vehicles. At the same time, public transport declined by 30%, largely because the State reorganized bus traffic. It is estimated that there are now over half a million private vehicles (including taxis and trucks) and 11,800 public transport vehicles in the city. It should also be recalled that the richest 5% of the city's inhabitants use private transport 40 times more often than the poorest 20% (SECTRA, 1995).

Some 970,891 vehicles were registered in Chile in 1996; by 2000 the number had grown to 1,139,471, a 17.3% increase over the period. This was below the 28.2% growth in registered vehicles recorded in the 1995-1999 period. The SMA is home to 555,736 vehicles, or 48.8% of the total (INE, 2001).

Private transport in Santiago has very high income-elasticity (Escudero and Lerda, 1997), and thus there is a significant increase in car-buying as the population's purchasing power grows. There is, moreover, a "functional division" of the city (in line with each social group's access, facility and interest), which increases the need for people to travel. This is evident from the destinations. In the early morning, for example, when many of the daily journeys are made, 4 of the 36 boroughs account for 43.5% of all the trips. Santiago borough alone accounts for 24.3% of them (SECTRA, 1995).

Public services in Santiago, as in many Latin American cities, are beset by problems. Historically, the private bus systems are the country's only service providers; they are in the hands of a large number of small owners. The authorities have normally encouraged public transport because it offers a fairly cheap means of transport for low-income users and is less burdensome on public finances. The operators enjoy broad autonomy to

determine the quality of the services they offer. This system is efficient from an economic perspective, but it is easily affected by the disorganization wrought by external factors. The sharp competition between buses in the streets and the mayhem of traffic have magnified congestion, since competition encourages people to drive recklessly, which obstructs traffic. Consequently, public transport today, especially the buses, is unappealing to car owners and passengers are "exported" from public transport to private vehicles.

The city's main transport problems, therefore, are that trips are concentrated along particular routes and at particular times, and that the poor quality of public transport encourages private car use. These circumstances cause high levels of traffic congestion, which gives rise to accidents and to air and noise pollution (CONAMA, 2001).

4.   Pollutants and emissions

Air quality in the SMA has improved in the past decade but Santiago is still normally listed as one of the most polluted cities in Latin America.

The official network for automatic monitoring of air quality and meteorology (the MACAM Network) was established with five monitoring stations in 1988. The network was revamped in 1997 and expanded to eight monitoring stations as the MACAM-2 Network. All the stations are connected remotely to the Metropolitan Environmental Health Service (SESMA) and the National Commission on the Environment-Metropolitan Region (CONAMA-RM), which allows real-time access to air quality data.

Substantial progress has been made on introducing technologies to prevent certain episodes of emergency, pre-emergency or alert. These assess probabilities such as meteorological factors and transport intensity, and can predict levels of air pollution fairly precisely.

What pollutants are in the air? The authorities have concentrated on those that most affect air quality and public health. They have four main sources: evaporative emissions, street dust, mobile sources, and fixed sources.

Vehicles (mobile sources) are one of the main causes of pollution, especially of carbon monoxide (CO) nitrogen oxide (NOx) and volatile organic compounds (VOCs).

Traffic is directly responsible for producing particulate material (PM10), especially the dust raised by buses. Evaporative emissions are significant sources of VOCs, while fixed sources, mainly industrial, are largely responsible for the production of sulphur dioxide (SO_2).

Ozone is another persistent pollutant. Though not the most aggressive, it is distinct from the others. Above all, there is more of it in summer than in winter because it depends on the amount of solar radiation. It is difficult to reduce ozone, because it is a combination of two other pollutants, VOCs and NOx.

Currently, according to the emissions inventory (CONAMA, 2000), transport is the most polluting sector in the region, accounting for 48% of the PM10, 84% of the NOx and 91% of the CO. It is also a significant source of VOCs (30%) and SOx (34%) emissions. Fixed sources (industries) generate 21% of the PM10 and 64% of the SOx. The main residential emissions are VOCs (38% of the total). Residential use of firewood accounts for 13% of the PM10, while other sources[3] generate 27% of the volatile compounds and 89% of the ammonia emissions (NH_3).

The SMA's air quality has improved: annual average volumes of PM10 have declined and above-norm levels have fallen from 83 to 45 days. As to pre-emergency and emergency conditions, the number of days fell from 32 and 10 in 1989 to 10 and 0 in 2000. In the same period there was a 50% drop in the annual averages of very fine particulates (PM2.5), which include the most health-threatening compounds.

Particulate material conditions have improved markedly; the proportion of good days (below norm) increased from 59% in 1997 to 76% in 2000. In the same period the number of pre-emergency situations declined from 37 to 10, and emergencies fell from 4 to zero. Daily maximum levels of PM10 fell by 20% in the same period. Thus there was a substantial decline in the number of episodes, and the year-on-year trend is constant for pre-emergencies and emergencies (CONAMA, 2001).

These positive trends, which continued in 2001, stem from industry's use of new technology and less polluting fuels. Other determining factors were the establishment of a road network exclusively for public transport in 2000, and vehicle restrictions that even included those with catalytic converters.

All measures geared to improving air quality are part of a multi-sectoral approach to the problem. They cover both public and private transport, industrial production, and changes in citizens' behaviour.

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[3]   They are grouped by category: agricultural activities and commercial activities.

5.   Public policies and institutions

When the country returned to democracy in 1990, the first *Concertación* government acknowledged the pollution problem and adopted new public policies to protect the environment. In this new political context the government created the Special Commission for Reducing Pollution in the Metropolitan Region (CEDRM), the National Environmental Commission (CONAMA) and the regional and provincial environmental commissions (COREMA).

CONAMA worked mainly to upgrade coordination on environmental issues among government ministries and to draw up legal instruments. The entry into force of the Environmental Framework Law (LBGMA) in 1994 marked the first time that environmental issues were viewed comprehensively, with a regulatory framework and the involvement of the State, the private sector and the public.

CONAMA's Governing Council is chaired by the Minister-Secretary General of the Presidency, which reinforces its multisectoral character. Each agreement is effected through the instructions that every ministry gives to the public agencies under its aegis. This process is coordinated by CONAMA's Executive Committee. The regional environmental commissions (COREMA) work in parallel to CONAMA. They are chaired by the Regional Intendent and comprise the regional ministerial secretaries (SEREMIS), four regional advisors, and the regional director of the National Environmental Commission.

These institutional arrangements help underpin the horizontal and multisectoral approach to environmental management, but they also make such management cumbersome. This is because CONAMA, as the coordinating body, has to share decision-making with other State agencies and lacks legal authority to demand that other public institutions apply public policies. This circumstance directly affects each ministry's resource-allocation for the environment.

In practice, the current institutional structure raises a number of problems. It gives rise to a variety of sectoral and jurisdictional interventions that are sometimes incompatible, which makes it difficult to coordinate activities. The array of public and private institutions at the national, regional and borough levels with authority in the metropolitan area spurs incoherence in policy-making and has a direct negative impact on pollution control measures.

Various plans have sough to tackle air pollution:

-      The Plan to Reduce Air Pollution in the Metropolitan Region (PDARM), 1990.

- The Plan to Prevent and Reduce Air Pollution in the Metropolitan Region (PPDA), 1997.

- The Plan on Urban Transport in Santiago (PTUS), 2000.

a) The Plan to Reduce Air Pollution in the Metropolitan Region (PDARM)

Drawn up by CEDRM in 1990, this laid the groundwork for the 1997 Plan to Prevent and Reduce Air Pollution in the Metropolitan Region (PPDA).

PDARM's main outcomes are as follows:

- Regulation and elimination of the most polluting industrial sources, and regulation of residential emissions (heating systems).

- Building capacity to enforce the regulations on fixed sources by creating the Programme to Control Fixed-Source Emissions (PROCEFF) and mobile emissions (periodic technical inspections).

- Withdrawal of polluting buses.

- Progress in controlling traffic and bus emissions (putting the routes out to tender).

- Introduction of vehicles with catalytic converters.

- Paving hundreds of kilometres of streets.

Both public and private actors, moreover, were involved in efforts to improve the air quality. Private actors are responsible for environmental degradation (transport, urban services, industrial and construction companies and so on). The sectoral and territorial public actors —such as ministries of health, transport, telecommunications, housing and urban development, and the Metropolitan Administration— are responsible for implementing and enforcing public policies. CEDRM also proposes an institutional framework to improve air quality management in Santiago.

b) The Plan to Prevent and Reduce Air Pollution in the Metropolitan Region (PPDA)

According to 1994's Environmental Framework Law (19,300), the authorities should set up pollution control plans in areas where pollution levels systematically breach environmental regulations, as well as prevention plans. In 1996 the Metropolitan Region was declared an area saturated by four atmospheric pollutants: carbon monoxide, suspended particulates, breathable particulate material and ozone. The area was said to be a latent zone for nitrogen dioxide.

The PPDA, which is to last for fourteen years (1997-2011), seeks to secure compliance with air quality norms and protect public health while simultaneously ensuring the region's sustainable growth. The plan makes provision for enforcement and follow-up, as well as for its own updating.

As stipulated in the plan, the principles underlying environmental policy are as follows:

Participation: extending the participation of several sectors coordinating the various public sector bodies active in environmental matters.

Prevention: controlling the adverse effects of the Metropolitan Region's economic growth in recent years. The aim is to obviate a further decline in air quality and gradually to reduce current pollution levels.

Responsibility: compiling an inventory of activities and emissions sources; establishing short-term reduction targets; and drawing up a timetable for these measures' entry into force, with an indication of those responsible for enforcement and oversight.

"The polluter pays": internalizing the social costs generated by air pollution. To that end, those responsible for each polluting activity or source must bear the costs of meeting the targets.

Efficiency: tackling the problem of air pollution as effectively and cheaply as possible. For that purpose the direct costs will be analyzed and indicators to measure the efficiency of each measure will be defined.

Gradualism: defining progressive targets for emission-reduction so as to avert emergencies in the immediate future and pre-emergencies as of 2005, and to meet the air quality standard in 2011.

In 1997 the PPDA involved 104 measures —whose implementation was dependent on 29 institutions— geared to the direct and permanent reduction of emissions by controlling polluting activities and sources such as transport, industry, commerce, construction, agriculture and resuspended dust. The success of such policies, especially those within the PPDA, was curtailed by the relentless growth of the city (11.5% on average in the 1990s) and of the number of vehicles.

In that regard it is worth noting that CONAMA's statutes allow the institution to foster a horizontal and multisectoral conception of air pollution, but they do not facilitate policy implementation. Coordinating the various agencies involved in each proposed measure can be a slow and cumbersome process that constrains the flexibility required in public policy-making.

The institutions involved in setting up the plan did not have the same significance and responsibility (O'Ryan and Larraguibel, 2000).

In this respect the way that each sector relates to the issue of air pollution is crucial. Mobile sources, for example, bear a heavy responsibility; hence 52% of the measures proposed in the plan were to be carried out in the transport sector. Other significant sectors are industry, commerce and construction, the targets of 25% of the measures. Efforts to cut levels of resuspended dust involved 16 measures and the collaboration of 10 institutions.

Functional overlap pervades the transport sector, where several agencies are active: the Transport Infrastructure Investment Planning Commission (SECTRA), which is responsible for drawing up the Santiago Urban Transport Plan; the Ministry of Public Works's Concession Coordinating Unit, which is entrusted with managing urban road concessions; and the Regional Ministerial Secretariat for Transport and Telecommunications, which regulates public transport companies. Other bodies involved are the Ministry of Public Works's Road Directorate and the Housing and Urban Development Service (SERVIU) —both of them regional-level agencies that build urban roads— and the municipalities developing the regulatory borough plans that make provision for neighbourhood road administration and smaller investments in road surfacing.

Unsurprisingly, this situation has highlighted the difficulty of reaching agreements and effecting them. Implementation of the plan has not been problem-free; the difficulties have included:

-      CONAMA-RM lacks the institutional capacity (financial and professional) to undertake the huge coordinating effort required.
-      Many of the institutions do not regard the environment as a priority issue. This means that PPDA activities are the first to go when budgets are cut.
-      The PPDA budget is shared among many institutions in line with CONAMA's institutional structure and coordinating role, but this makes it hard to manage.

CONAMA's authorities —having noted the outcome of certain processes, including an audit by an external agency— have drawn up a draft plan to review, reformulate and upgrade the PPDA so as to meet the air quality targets set for 2010.

This change in the plan, part of an reorientation effort under way since 1999,[4] is geared to:

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[4]   In that year more than 1,000 people from various sectors took part in several workshops, and more than 20 national and international consultancies were commissioned. In addition there were three independent assessments of the Plan in the same year: the international audit; the report of the investigating committee of the Chamber of Deputies; and the assessment report of the municipalities in the metropolitan region (CONAMA, 2001).

- Focusing the instruments on reducing particulate precursor emissions containing sulphur oxides, nitrogen oxides, some volatile organic compounds and ammonia. These precursors account for 50% of fine particulates and come largely from combustion processes.

- Specifying the various sectors' responsibilities in the release of air pollutants. Emission-reduction efforts will be proportional to the sectors' responsibilities for emissions of particulates.

- Giving primacy to environmental management instruments that have an immediate impact on combustion control, and consolidating emission-reduction in the medium and long term.

The draft proposal thus makes provision for measures that have an immediate and quantifiable effect (based on technological improvements and using economic incentives); strategic programmes with a long-term approach that are crucial for meeting the plan's goals; complementary management tools geared to transport, territorial planning and a comprehensive compensation system; and a legislative agenda involving a system of tradable emission permits with the attendant institutional changes.

In recasting the PPDA, moreover, the government has sought to strengthen its communication and dialogue with the various sectors involved. To that end it called on citizens to conclude a New Agreement for Clean Air, which aimed mainly to reduce pollution caused by particulate material (fine fraction, PM2.5) and gases.

c) The plan on urban transport in Santiago (PTUS)

When the public transport service was liberalized in 1975, bus routes were completely deregulated. Prices and transport-related regulations were determined by the bus owners.

With the return to democracy in 1990, the new government began to regulate public transport.[5] The routes were put out to tender and different stops were created. The transport ministry adopted the first anti-pollution strategies: reduction of private vehicle emissions; policies on reducing passenger and cargo transport emissions; and consideration of the environment in transport planning, with a view to averting new trips by motor vehicle.

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[5]   Some 2,600 buses in poor state (from a total of 13,500) were withdrawn from circulation.

Later years saw the introduction of unleaded gasoline and special lubricants, and the upgrading of equipment in technical inspection plants. Vehicle control and testing indicators kept vehicles that failed to comply with ministry regulations off the road, and plans were made to use gas in the buses.[6] For public transport, four courses of action were followed: introducing lanes solely for public transport, limiting bus routes, enhanced integration of public transport, and upgrading the bus companies' management capacities.

Despite these measures, the urban transport system has deteriorated substantially in the past two decades. This is not only technically significant but also politically, economically, socially and ecologically.

The deterioration is clearly apparent in Santiago and springs from population growth (with a corresponding increase in the number of per capita journeys) and the greater number of private vehicles. The authorities' interest in improving the situation is further driven by the decline in the use of public transport and the city's unruly growth.

The new PTUS for 2000-2006 stresses the intention of devising, in the clearest terms, an effective transport policy.

The plan rests on the following policy goals:

-       Encourage the use of public transport as the city's leading form of transport, and rationalize car use.

-       Rationalize patterns in the location of houses and economic activities.

-       Reorganize transport-related institutions.

-       Expand participation and assign new responsibilities to non-governmental actors (and indeed to all citizens) involved in urban and quality of life issues.

Some measures, such as special lanes for public transport, the introduction of clean technologies and the use of natural or liquid gas, have been well received by the public, although initially they sparked some debate (SECTRA, 2001).

It should be stressed that the State is making an effort to collaborate with both the community and business sectors, the latter including the association of private transport firms.

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[6]   Between January and March 2000 the State offered credits for the purchase of 13 buses running on natural gas. The conversion of another 270 private buses to natural gas is currently under consideration.

6.   Stages in pollution control management

Analysis of citizens' awareness of air pollution demands attention to how the current situation came about. This is a new issue, and there have been public policies on it for barely a decade.

Figure VI.1
SANTIAGO: HOW POLLUTION CONTROL MANAGEMENT HAS DEVELOPED
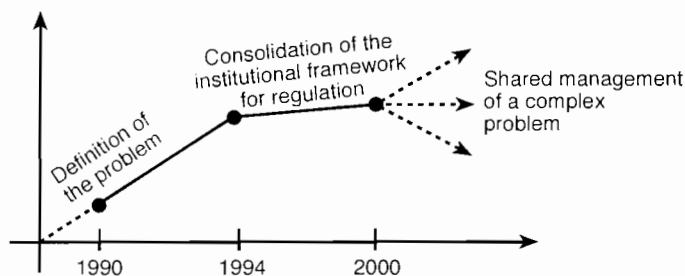
In the first stage (1989-1993), when the problem of pollution was first identified, the outlook for tackling it was favourable. Chile was in the midst of a political transition. The return to democracy seemed to presage a social climate that encouraged the authorities to make efforts to solve the problem and to induce citizen participation. The early drafts of the Environmental Framework Law made provision for the participation of the public as an important part of the process. Citizen involvement in managing the problem, designed to heighten awareness of it, was aided by the media's increasing coverage of environmental matters. This stage was marked by mounting concern on the part of both the authorities and the public. Surveys conducted by the Centre for Public Studies (CEP) show that disquiet about air pollution increased in 1991, 1992 and 1993, but from 1994 onwards ceded ground to concern for other issues such as health, poverty and crime.

In the second stage (1994-1999) the institutional framework was consolidated and the public —now familiar with the situation— abided by the regulations imposed by the authorities: vehicle restrictions and technical inspection, non-use of chimneys and so on. Such efforts, however, did not give rise to any radical change in behaviour or shift in public attitudes towards the environment. In the public mind, Santiago began to be seen

as almost irredeemably polluted, and there prevailed a perception that no progress had been made in solving the problem. Towards the end of the 1990s, the environmental authorities, the proposed plan and, especially, the channels for participation all suffered a certain amount of discredit. Significant weaknesses in this period were the communication mechanisms and the information provided. The signals sent to the public were not clear enough, and were not designed to educate people in the interests of bringing about a radical change in their daily routines. No significant progress was made on more structural problems, such as the growth of the city and the transport system. In the absence of a clear-cut message and a single discourse, various interpretations of the problem arose.

According to Adimark surveys in 1994 and 1996, citizens increasingly believed that only the State bore responsibility for environmental management, not the public as a whole (Adimark 1994-1996). Thus public interest in taking part in air pollution management declined.

The final stage (since 2000) is marked by acknowledgement that air pollution is a complex problem that calls for shared management. After ten years of continuous work an historic moment has arrived, one in which various opportunities can be exploited so as to face new challenges. An effort must doubtless be made to remedy the structural deficiencies and improve social communication, but above all to recapture citizens' interest and secure their active involvement in the process. The aim is to move from a formal representative democracy to a participatory democracy that acknowledges the urgent need for the population's inclusion in environmental policy-making. Given the problem's seriousness and complexity, public sector policies will not move forward if citizens are not engaged and if there is no progress towards fashioning a shared vision of the environmental goal to be attained.

Technical knowledge of factors that have a bearing on Santiago's air pollution has improved somewhat. It is now time to study how people can be persuaded to engage with the problem, accept their responsibility for it, and help find a solution.

It is encouraging that two kinds of citizens are interested the matter and are willing to make sacrifices to live in a clean city: traditional ecology groups, and those people who are not interested in organizing or acting collectively but who can choose to act in non-polluting ways.

B.   Citizenship and air pollution

This section of the case study includes an analysis of Santiago residents' perception (meaning how they think on the basis of the information they receive) of air pollution.[7] The underlying premise is that the city's pollution is a reflection of the level of its residents' awareness of how they treat the air they breathe.

In this regard it is important to note the relationship between human awareness, citizen awareness, and the public's individual or collective conduct. Human awareness can be seen as part of an individual's response to local stimuli; citizen awareness is a heightened sense of a particular public policy issue and the consequent readiness to act on the basis of the available information, wholly mindful that each activity makes a marginal contribution to problem of air pollution. The various forms of behaviour are to be understood by analyzing perceptions of real conduct, of attitudes, of the degree of engagement, and of the level of awareness reached.

An individual's response to local stimuli involves a two-stage process.

In the first stage, what people do is inconsistent with their stated intention of doing something. Thus awareness, as an individual response, has a declared intention phase and an action phase. Not all individuals might go through the two phases (although it is more likely in social groups or individuals who are members of such groups, since their context can be a strategic factor in reconciling intention with action). In this regard the intention is an ideal that a person wishes to fulfil but fails to, because other factors constrain action at the point when an effort is made to put the intention into practice.

In the second stage, the individual internalizes the intention but external conditions prevent him or her from acting on it.

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[7]   The study was based on interviews with 29 actors, all of them working on pollution in some way. There were eight State actors (three at the national level, two at the metropolitan level and three at the borough level). From the private sector, interviews were held with five representatives of business and four community sector leaders. There were also four NGO representatives, three journalists specializing in the issue, three academics and two representatives of the political sector. Systematization and analysis of the interviews provided the basis of a document whose conclusions were discussed in a workshop with 39 participants. These included representatives of the regional government, the municipalities, business associations, ecology movements, universities, government ministries, CONAMA, NGOs, consultancy firms and others. The workshop served to validate the analysis of the role of the various actors, the existing mechanisms for participation, the level of communication between the authorities and the population, and incentives for individual and collective mobilization.

Sometimes it is difficult to know which of the two elements —the internalization of the action or the influence of external factors— explains the gap between people's intention or willingness to do something and their actual behaviour.

Proof of this is the breach between willingness to do something about air quality and what people actually do. The goal of this case study is to identify what specific factors affect citizen awareness and participation, since such an exercise makes it possible to enhance the efficiency of public policies to deal with air pollution.

1.   Public perceptions and air pollution

a) Views of air quality

The national debate on the environment features four perspectives on the nature of air pollution and possible solutions to it. The different types of actor, in line with their own interests and their role in pollution control, stress particular facets of the problem and identify strengths and weaknesses according to their own perspective.

The variety of outlooks makes social communication less efficient and smooth. Communication failings, in turn, kindle or perpetuate confusion because of the range of views of the same issue. Thus air pollution can be seen as a structural problem arising from the development model, an institutional matter related to public rules and regulations, a technical issue requiring scientific solutions, or as a social condition for which citizens bear some responsibility. Certain actors, groups and categories of citizens are advocates of one or another of these positions.

b) The structural view

This group, largely comprising politicians and some NGO leaders, maintains that air pollution is a result of the country's prevailing development model and of the way in which the options for growth have been set up. The environment is damaged by an economic development model that stresses growth rates, productivity increases, individual gain and unrestrained consumption, and that neglects such processes' negative externalities and the social cost of dealing with them. It is a model in which everybody pursues their own interest and nobody takes responsibility for shared problems. The environment is adversely affected by the absence of social mobilization, the weakening of democracy and social inequity. According to proponents of this view, the main problem is that neoliberalism disregards the need for economic agents and other actors responsible for the problem to internalize the cost of spawning negative externalities in their use of a public good.

When the cost of rectifying this bleak environmental situation is much higher than the resources that could be used to prevent it, the authorities are burdened with the task of finding solutions urgently. In these circumstances the government has responded with palliative measures that divert attention from what really matters. Public management is wasted on technocratic studies while the underlying problems are neglected.

The issue should be recast in structural terms, and economic policies should be linked to environmental and social policies. A solution will be found to environmental and other, equally important problems if economic policy is reformed and the development model is redefined in such a way as to give citizens a leading role. At the same time, some policies and practices should be adjusted so as to pay more attention to decentralization, participation, the powers of local governments and so on.

c) The institutional view

This group comprises representatives of the business and community sectors, who argue that air quality and its management mainly depend on Chile's institutional arrangements for tackling the problem. Here, criticism centres on the public sector's leadership in pollution control and the model it has chosen to address the issue. Specifically, questions are raised about the efficiency of CONAMA, the Pollution-Reduction Plan and the concentration of decision-making in the central government. The problem of air quality has not been solved because the right management model has not been used and the political will to find real solutions has been lacking.

For some, the PPDA have been inadequate. The Environmental Framework Law and CONAMA's technical team are well regarded, but their actions have not given rise to good management tools and hence the State has failed to devise effective environmental policies.

CONAMA is viewed as an organization without clear functions, and lacking in power and resources. Its leaders are trusted but their power and authority are deemed too modest to make the organization effective. Some observers maintain that CONAMA was arbitrarily chosen to hamper management and mask the lack of political will to tackle an issue as complicated as Santiago's pollution. The authorities have sought to evade the political cost of restricting and regulating those sectors that pollute most, but that enjoy substantial power. Like those with a structural outlook, members of this group conclude that the delay in finding a solution is attributable to the implementation of palliative measures.

d) The technical view

This group comprises experts in State institutions or the universities who have been active in identifying, analyzing and finding solutions. They are issue specialists (in the areas of health, transport, climate and so on) with a technical-scientific outlook, and they think that all problems can be solved technically. They admit that pollution is complex, but assert that the main factors in finding a solution are scientific knowledge and continued experimentation.

This group's approach focuses on methods of identifying pollution sources, mechanisms to determine environmental emergencies and pre-emergencies, and models to forecast future environmental scenarios. Their outlook is generally optimistic and their arguments are not always easily understood by the public: air composition analysis, types of pollutants, atmospheric reactions, projection models, climatic factors, measuring instruments and so forth. Their studies underpin the policies and regulations with which the public must passively comply. Questions of how to change behaviour, foster a sense of responsibility and secure public support are marginal to their outlook.

These specialists pioneered the identification of the issue and helped attract public attention to its technical aspects. This left little room for actors better equipped to engage in social communication and stimulate citizen participation.

e) The social view

This perspective stresses the responsibility of individuals for today's world and awareness that the planet is vulnerable to human activity. This post-modern perspective, more commonly found in developed countries, has recently found expression in Chile through some social and NGO leaders. It holds the environment to be the absolute responsibility and choice of those who live in it, since it is their behaviour that causes environmental problems and crises. In this view, a solution is only possible if citizens change their attitudes towards the environment. Experts and the authorities alone will be unable to solve the problem without the informed commitment of the public.

From this standpoint, pollution can be tackled by a policy that raises citizen awareness. It will not suffice to educate the public on the various issues, since information does not entail the necessary public awareness or incite citizens to engage with the problem. The measures adopted should make citizens feel that the quality of the air depends on how they act as individuals, and that each of them plays a personal role in exacerbating the situation. This approach should induce a reappraisal of values that affects how people act towards the environment.

2.   Differing roles: responsibility, technical capacity and power

The actors' vision of the cause of the problem, as well as their own experience, determine how they view the respective roles. There follows an analysis of the relationship between those deemed responsible for the problem (originators), those technically equipped to tackle it, and those with power over pollution control management. It is assumed that some association between these three is necessary to manage the matter efficiently.

Two kinds of actors are involved: structural actors and intermediate actors. The former directly affect how pollution unfolds; they can be from the State sector or civil society. The latter should serve as a link between the structural actors and their fields of activity; depending on the circumstances, these too can be part of the public sector or civil society.

Unlike other countries, Chile lacks a ministerial-rank environmental figure with the authority to engage with government peers. As mentioned earlier, the country's highest environmental authority is CONAMA, which coordinates ministries and other agencies for the purposes of environmental policy-making.

The municipalities are the local authority. The Pollution-Reduction Plan confers on the municipalities a series of environmental duties but affords them neither the technical support nor the resources required to discharge them. The attention that a municipality pays to the environment thus depends on the political will of the mayor.

There are two civil society actors, the business sector and the community sector. Since most of the country's industrial and business activity is concentrated in Santiago, the private sector's participation in pollution control is crucial.

Chile's business sector is highly diverse in terms of company activities and size. In this regard it is important to distinguish between industrial entrepreneurs and those involved in passenger and cargo transport. In Santiago the leading industrialists represented by the Industrial Development Society (SOFOFA) have been active from the outset, not only complying with regulations but sometimes taking the initiative beforehand and helping to draw up new measures.

By contrast, the participation of the transport companies has been passive, or even simply reactive.

They have not been absent from working groups on the environment but they have been more passive in their attitude and conduct, simply abiding by regulations issued by the authorities.

Community sector participation in pollution control is limited to a small group of people for whom the environment is a central concern. Prominent, charismatic, spirited and diligent citizens now lead pro-environmental community initiatives. Most of them are interested not only in the environment but in all community activities, so pollution is often just one of their concerns.

The intermediate actors include the universities, the press, the NGOs and the political parties.

In the environmental field the universities have a duty to generate expert and reliable knowledge, help devise public policies, advise the authorities on the validity of regulations, help disseminate information and train experts in the field. Chilean universities have neither a clear position on the environment nor a multidisciplinary approach to the issue. In most cases, specialized groups in each institution address the matter from a particular perspective. The main universities in the field are the Catholic University of Chile (with its departments of chemical engineering, environmental engineering and urban studies) and the University of Chile (which has an environment department and CENMA, the National Environmental Centre).

The NGOs, as the voice and representatives of the organized citizenry, have become the main allies of community management by offering training, educating the population and publicizing the issue. Two kinds of NGOs are active in this field: those seeking to help solve problems and those seeking to report them. Organizations such as Greenpeace, the Institute of Political Ecology and the Sustainable Chile Programme are more geared to criticizing, censuring and protesting the authorities' decisions.

The print and broadcast media are the intermediaries between the State and civil society. The State favours the press when it informs the public of the problem and the policies adopted to tackle it. The Chilean press has brought the pollution issue to the forefront of public attention, although its reasons for doing so have not always been disinterested or transparent. There is no question, however, that the press has heightened the public's knowledge of the scale of efforts to improve the city's air quality.

In a democratic system, the political party system should be the channel for informing the public and transmitting citizens' concerns to the executive and legislative branches. At the moment, however, political party policies do not have the same citizen appeal as in the past; the parties have lost prestige and credibility, especially among the country's youth. Nonetheless, there is at least a small group of politicians interested in the environment as an emerging issue.

a) Actors responsible for air pollution

Actors' views of the degree of responsibility for pollution are shaped by their own positions. Those with a more reductionist outlook place the onus on inevitable climatic and geographical factors for which nobody is responsible. For others, the blame rests with the way in which the State has managed the problem: it has been criticized for failing to regulate the city's excessive growth, to encourage decentralization, and to discharge its assigned duties. Criticism has focused above all, however, on its scant conviction, its lack of political will to tackle the problem, and its evasion of the political cost involved in regulating complex and powerful sectors. A third perspective acknowledges the structural and management factors but identifies citizens as the prime culprits for pollution.

A significant step in pollution control, and one that poses its own challenges, is when the public sector and civil society acknowledge that individual behaviour contributes to pollution. The challenge is to convince citizens of their own contribution and responsibility.

b) Powers to solve air pollution

There is no consensus on where to find the kind of knowledge that would provide lasting solutions to the problem. First, note the difference between the various sources of technical expertise (usually specialists in a range of disciplines), and those administrative and political skills needed to manage a complex systemic problem like air pollution.

There is, however, consensus that the technical abilities reside mainly in the CONAMA technical team, in groups of experts in some universities and in the Metropolitan Health Service (SESMA), all of which are renowned for their quality and expertise.

At the same time there is agreement that skills needed to manage the problem and find solutions are in short supply. A public problem, in other words, is being poorly managed.

Air quality management is taken to mean how knowledge is applied to formulating policies and administering the system, as well as the political capacity to tackle problems that are susceptible to technical solutions. It calls for vision, leadership and the ability to mobilize a large number of actors, an area in which the authorities have very limited experience.

A third view is that all citizens are competent to examine the quality of the air they breathe. Just as it is acknowledged that all Santiago's inhabitants are responsible for pollution, therefore, some argue that the capacities needed to solve the problem are dispersed among the different actors, irrespective of their level of expertise or the amount of information at their disposal.

c) The power in pollution

Power —meaning the legal authority to make decisions on rules and regulations— rests with the central government. Prominent among the authorities with greater power are the Health Ministry and SESMA, as well as the Ministry General Secretariat of the Government and the Presidency. CONAMA, CORENA and the Intendent of the Metropolitan Region are deemed to have much less political power than the others and less chance to act. The institutional framework is arranged in such a way that power does not rest with those authorities that, by definition, are concerned with the environment and the Metropolitan Region.

Because of the substantial dissociation between the sector with the power and the sector where the power and management capacity should be located, roles are dispersed and operational coherence is lacking. Those with technical expertise lack the power to take part in management, and those with power do not necessarily have the required capabilities. This is not to say that the matter can be relativized to the point at which a solution is impossible. The deterioration of a public good is certainly everybody's responsibility, but only some (in this case the State) are empowered to curb and regulate the externalities attendant on its use.

3.   Social communication: underpinning citizen awareness

The dialogue on pollution between the State and civil society has been less effective and efficient than it might have been. Citizens are not properly informed, and public perceptions are marked by diffuse and distorted notions of the problem itself and how the State is dealing with it. The mistakes made hereto can be ascribed not to a single actor but to many, from the State, through the organizations that should act as linkages, to civil society itself. From the social communication standpoint, there are failings among those who send the signals, those who channel them, and those who receive them.

From the outset, the public sector has been far from convinced that an informed citizenry is crucial to the success of its policies; as a result, its communication strategies have been deficient. Regulations have often been issued with no explanation of their technical background, and the different levels of the State have expounded parallel and contradictory positions on environmental matters. The State has certainly made efforts to communicate, but there has been neither a substantial campaign nor a cohesive project.

Additionally, other actors' opinions often gainsay those of the authorities. This is true of industrial entrepreneurs, associations of private transport firms, microbus operators and others. These circumstances have

spurred disputes about the usefulness and legitimacy of some measures, such as restricting the number of vehicles on the roads and, more recently, regulating particulate emissions (fine particulate material PM2.5).

Pollution is as an issue of great public sensitivity, and it calls for clear and complete information. The prevailing perception is that the information provided by the State has been fragmented, ambiguous and diffuse. Some claim that it has been manipulated for particular ends. Others say that it is hastily compiled and superficial. These judgements might be overstated, but they should be viewed in the context of the expectations of a public whose air quality worsens by the day.

It seems plain that the State has failed to include citizen awareness in its programmes. It has neglected to consider the need for a change in worldview that appeals to communities rather than individuals in their dealings with the environment.

Tangible and innovative measures serve little purpose if the public is not simultaneously informed of the effects they will have and how they help solve the problem. If the authorities fail to make the public aware of such measures' technical bases and expected outcomes, they are vulnerable to the scepticism and criticism of those affected.

a) How information is received

Despite the appreciable growth in the amount of information available to people since the 1990s, the public still fails to behave responsibly. This is because people have not gauged the true scope of the problem. In contrast to what happened at the start of the decade, people know more in the sense that they can make more distinctions between different aspect of the issue, but their knowledge is disjointed inasmuch as they neither receive nor retain the most important and detailed information on air quality. It has been argued that the surfeit of information, the contradictions and the lack of a single discourse have triggered a credibility crisis.

The reason why the public is so ill-informed remains unexplained. Clearly, the public's proximity to and identification with a given problem determines the urgency with which it is handled. The most recurrent impression is that responsibility for such a complex and intangible problem is dispersed among many actors. It is hard, moreover, to determine each actor's marginal contribution to air pollution: hence the difficulty involved in assuming individual responsibility for an issue that in the end is abstract.

According to opinion surveys, the public is now more concerned with immediate issues such as poverty, unemployment and crime, which seem to pose more personal risks. Concern about air quality emerges in cycles

and dissipates when the immediate threat wanes. People do receive information, but they are not always ready to interpret it in a manner conducive to the common good. Most often, in fact, they interpret it in the light of their own interests or view of the issue. They tend to retain selectively the information most in tune with their own perspective. In other words, when the damage is not visible and severe they remain unaware of the role that everybody plays in improving the situation.

b) The role of the intermediate actors

Worth noting in the field of social communication is the role of the intermediate actors, those channels through which the State informs citizens and citizens make known their views of the efforts made by the State. Many of the mistakes made originate in the positive or negative actions of intermediate agencies and institutions, which have not always discharged their duties correctly.

The press has put the issue to the public and kept attention on it, thereby nourishing citizens' growing awareness. Nonetheless, there are constraints on the provision of environmental information because most of the media have lacked the independence to report responsibly and impartially. Market conditions, moreover, dictate that the media are subject to business considerations such as ratings and sales, which reduces their autonomy yet further.

The NGOs have been pivotal in working with communities, in organizing and training them, and in censuring and criticizing. In some quarters, however, their technical capacity has been questioned, especially as a valid interlocutor in possession of the kind of technical information available to the State. Additionally, the ways in which they are financed has prevented them from acting independently and makes them vulnerable to political forces or international movements.

The political parties no longer enjoy their traditional credibility and thus have lost legitimacy as public representatives. Since a large majority of voters are not concerned with the environment, politicians have not placed it high on their agendas. Through personal leadership, however, some political figures have helped keep public attention on the matter.

The universities, meanwhile, have focused on research rather than on education and dissemination. Their contribution has generally been highly academic, and they have neglected to undertake more concrete initiatives to disseminate information on the issue and to train and mobilize young people.

In these circumstances, the underlying problem shared by all actors is not so much that they fail to act as a link between the citizen and the State, but that most of them do not even see that role as theirs. For the

purposes of social communication, therefore, it is worth asking to what extent they can be regarded as functional actors.

4.   Citizen participation

Citizen participation emerged in Latin America in the late-1980s as a means of strengthening democracy in countries that had undergone traumatic experiences of authoritarian rule. More recently, citizen participation has been valued not only as a means of expression but also as a policy tool.

This study has confirmed the importance of citizen participation in environmental policy-making. Note that this is the first area in which the State established by law that public consultation is a requirement in decision-making. One of the aims of Chile's environmental policy is "to establish institutional guidelines, lead citizen participation processes... and broaden channels for of participation so as to involve people in environmental issues. At the same time, there is a need for programmes that help change behaviour and practices, so as to bring about a sense of co-responsibility for environmental protection". A stated goal of the Plan to Prevent and Reduce Air pollution in the Metropolitan Region (PPDA) is to "expand the participation of a range of sectors, and coordinate the agencies with authority in environmental affairs". This is a great stride forward, but there are different views of what participation should be.

A significant feature of this study is the difference between each actor's view of citizen participation. The differences are evident in conceptions of participation and its importance in anti-pollution efforts. Everyone agrees that citizens must participate; it is when the question of management is under discussion that the disparities become apparent. Diverging viewpoints are even evident within supposedly homogenous public and business sectors. Clearly, the different views of participation are much more than a matter of degree. The various positions relate not only to whether participation should be informative, consultative or decision-related; the discrepancy concerns the very substance of participation and touches on questions of which actors are sufficiently significant and legitimate to be involved. It is thus a matter of divergent political positions.

At least two meanings can be discerned:

-        Formal participation: participation is regarded as another convention to be respected because there is a public demand or legal requirement to do so. Citizens are viewed as a passive mass that complies with regulations and changes behaviour, not as a source of development and innovation.

- Real participation: participation is viewed as a positive and active attitude to a given circumstance. Here, it is not enough that the authorities set up systems to inform the public of what they are doing. That is only a first step. It does not exempt them from fostering citizen participation in the management of public affairs. There are three non-exclusive ways of bringing about real participation:

    (i)   as collective action, including all forms of organization, mobilization, protest, demand or other form of organized public expression. This alternative has been used most in Chile during recent years and it covers all civil society initiatives;

    (ii)   as support to the activities of those community organizations and NGOs that devote some or all of their energy to the implementation of civic programmes, either independently or in conjunction with the authorities; and

    (iii) as responsible behaviour, wherein the aim is to secure the citizen's permanent adherence to certain kinds of sustainable conduct and in which value is accorded to the citizen's capacity to innovate.

Doubtless what is needed, given the nature of Santiago's air pollution, is real citizen participation embodied in the three forms of expression mentioned above: the mobilization of organized actors, collaboration between citizens and the authorities, and engagement with the management of local problems.

The official aims of environmental policy have two dimensions: first, to enhance and strengthen the mechanisms for formal participation, such as environmental impact assessments and consultation; second, to give citizens tools that enable them to play an informed role in the mechanisms to which they are periodically summoned and, on the basis of a change in values, to act on their own initiative in environmental matters and always to act in accord with those values.

This study suggests that the greatest relative success in securing citizen participation has been in the area of environmental impact assessments and similar initiatives, in which efforts are made to evaluate very specific projects and the actors have a real interest. Some mechanisms for formal participation have had notable outcomes. The legitimacy and effectiveness of many instruments for participation have been called into question, but efforts have indeed been made to create participatory processes.

As to raising public awareness to the point that citizens change their daily behaviour, however, official policy has not given rise to enough participatory processes. CONAMA's March 1999 assessment of its own PPDA reveals the low level of compliance with those measures geared to altering behaviour: according to the report, the information campaigns were inadequate; municipal participation was virtually nil; and education and training activities were few and far between. To date, more effort has been made to encourage top-down participation in formal channels than bottom-up participation that originates in society itself and that covers both public mobilization and citizens' daily conduct.

The gap between stated policy goals and concrete activity probably has much to do with the different views of participation, and it indicates that the notion of purely formal participation abides in many government departments responsible for the issue.

It is worth noting that the results of efforts to strengthen bottom-up participation tend to become apparent over the long term, since they go in parallel to the development of citizen awareness of the issue. Hence the need to give everyone access to environmental education and to conduct large-scale information campaigns designed to enhance the population's civic mindedness. This calls for a reasonable amount of time to allow citizens to get used to the regular exercise of their rights and duties, and to revive group organization and mobilization.

The experience of the past ten years, however, has shown that civil society participation is not the same as three decades ago. Apart from the enthusiasm for participation that marked the return to democracy in the early-1990s, participation has generally been intermittent and related to particular instruments. There is nothing like the social movements that characterized collective participation in the 1960s and part of the 1970s, when citizens joined together to make social demands born of all-embracing ideologies. Today's participation is more a matter of practices than values, more local than national, and more cyclical than enduring. In other words, participation finds its legitimacy more as a management instrument than as a way of strengthening democracy.

Some of Chile's cultural characteristics, moreover, have a pronounced effect on how citizens behave towards and participate in environmental issues. Of these, the following are noteworthy:

(i)   citizens' paternalism and "welfarism". People tend to wait until somebody else does something for them; this "other" is normally the State;

(ii)   growing individualism, which leads people increasingly to act according to their own interests and not collective goals;

(iii)   a poor historical memory, which hampers the State's efforts
         to communicate because people do not long retain what they
         see or hear and do not make the effort to compare the present
         with the past in order to discern how the situation has evolved;

(iv)   short-term thinking, which hinders a longer-range perspective
         and thereby constrains commitment to initiatives geared to a
         distant future. People seem to act more when a situation is
         immediate and urgent, and thus fail to develop a greater
         capacity to anticipate and prevent;

(v)   a certain tendency to adopt and retain habits that require no
         great sacrifice, and to respect and obey regulations.

C.   Conclusions

Irrespective of positive or negative assessments of the results of
public policies to control air pollution, the great efforts made in the last
decade have helped improve the quality of Santiago's air.

In general terms, the policies of Chilean governments in this period
have curbed air pollution.

Worth noting in that context is the compilation of an inventory of
emission in the region, (from which emerged the PPDA); the technological
upgrading of measuring instruments; the introduction of pollution-control
regulations; the creation and subsequent consolidation of an institutional
framework for environmental issues and for implementing the city's PPDA;
and measures to change citizens' behaviour, such as restricting the number
of vehicles on the roads and banning the use of chimneys.

Note too that Santiago's pollution problem has been defined and that
solutions have been devised. Most of these, however, have been highly
technical. Their short- and medium-term results have been partial, and
decisions involving higher political costs have been avoided. Nonetheless,
there has been some success in reducing some of the more dangerous
pollutants, which is notable in view of the city's continual growth and the
increase in the number of vehicles.

In light of the foregoing it is worth considering what effects the
policies of the 1990s would have had if Santiago's growth had been
controlled. In this regard it helps to distinguish short-term measures, which
made a marginal contribution to lowering the pollution indices and tackling
emergencies, from those long-term decisions that raise questions about
some aspects of the present development model.

There can be no doubt that air pollution is a complex problem that calls not only for the measures already taken but for a permanent solution. Perhaps in that sense a clear policy of territorial and administrative decentralization, one with an unquestionable political cost and a short-term perspective, could eliminate (or at least lessen) one of the prime causes of air pollution in Santiago: the concentration of the population, opportunities, activities, and goods and services in the capital. It bears repeating that 40% of the country's population lives in Santiago, and that no discernible progress has been made on decentralization in the last ten years.

In terms of communication, however, citizens' awareness of air quality has grown, and the public has more views on it than in 1990. People have a greater understanding of the issue, they know more about its health effects, and they can identify the main sources. Despite this, ordinary citizens do not see themselves as part of either the problem or the solution. Awareness is still not such that individuals change their daily routines.

From a perspective that views anti-pollution efforts as an outcome of progress in State-civil society relations and in active citizen participation, people have not been persuaded to change the values that shape their attitude to natural resources, and particularly to the air they breathe. With the exception of some local leaders and nascent movements, therefore, citizens still fail to act responsibly and proactively.

The social actors that have taken a leading role have mainly been State institutions (CONAMA, some ministries, and those civil society actors that have had to comply with regulations). There has been a lack of defining efforts at the social extremes. At the upper level, politicians have not promoted radical policies geared to finding real solutions; and at the lower levels the public has not converted its heightened awareness into either proactive behaviour or a genuine willingness to make sacrifices in order to enjoy better air. This is evident in the lack of consensus on the roles and responsibilities of each social actor, and in the difficulty of reconciling the different outlooks that each of them has on the problem.

Against that background, social communication is a crucial determinant of pollution levels. Such communication involves not simply the exchange of information among the actors but a communications strategy that fosters agreement on the rules of the game and on what can be expected of each actor in efforts to curb pollution.

One of the chief obstacles to this is that nobody seems to understand what to expect of the others. The signals from the sector leading the process, moreover, have been ambiguous: the State expounds an anti-pollution discourse but its embodiment in actual measures is less robust. Consequently, the messages are erratic, and the stated willingness to solve the problem is not always matched by the real incentives offered to the public.

The quality of social communication has a direct effect on individual and collective behaviour and citizen participation, but it might be a mistake to assume that an increase in information will immediately raise citizen awareness and spur a willingness to act and participate.

Citizen awareness is evidently heightened when the information is underpinned by facts, regulations and incentives. In this regard it is less clear that citizens can be asked to be more pro-environmentally active if they are not presented with benefits. It is not a question of changing habits through incentives alone, which would entail emphasizing an economic rationale and not a more significant value-based commitment. It is a question of strengthening environmental awareness while conditions are right for acting to improve air quality, and thus quality of life.

Similarly, citizens cannot be expected to have greater awareness and alter their behaviour if citizen participation is hindered. Chile's mechanisms for participation have been questioned in this regard, largely because most of them are non-binding. Such mechanisms have often been used to present problems, attract public interest and foster debates on certain matters, but the fact that they are not compulsory has raised doubts about their effectives and legitimacy, since they do not seem to have a real impact on public policies, programmes and projects. This perception naturally demotivates participation.

Sometimes, certain cultural characteristics of Santiago's inhabitants, especially their individualism, has been adduced as a brake on participation. This tendency, which is on the rise in Chilean society, makes it harder to create participatory processes. In these circumstances it is yet more urgent that policies recognize the immense importance of fostering widespread environmental awareness, and that social communication is optimal.

In light of the foregoing, and to repeat the three variables covered in this study (social communication, behaviour and participation), it is clear that the relationship between them is systemic, and that simultaneous efforts are needed on all three fronts if the city's air pollution is to de curbed. Improving social communication alone will serve little purpose if behaviour is inconsistent with what is being communicated, or if there is a shortage of legitimate channels for interaction between citizens and the State.

Air pollution is a complex issue and the goal pursued is ambitious. It is unreasonable, therefore, that the responsibility and work to be done should fall to only one sector of society.

The experience of the last decade has shown that progress can be made through management led by public institutions. Such progress, however, is always limited if there is no legitimate leadership that can successfully appeal to the public and that is ready to take radical, long-term

decisions, even if such decisions raise questions about the current economic model. Similarly constraining is the absence of an engagement rooted in a re-appraisal of quality of life and the attendant priorities, a re-reappraisal that translates into daily choices and actions. The first of these constraints corresponds to the political sector; the latter to the citizens. Regrettably, these are the two forces that have had least to do with environmental management in the past decade.

Pollution-control in Santiago currently seems to be at a standstill. The prevailing impression is that there have been significant achievements but that the efforts made have been more pragmatic than the urgency of the issue demands, and that they have sought to alter lifestyles as little as possible.

If environmental awareness is defined as "awareness of the risk posed by human activity to the natural bases of human life, which coincides with a willingness to help", then by polluting, humanity is killing its own life source. A problem on the scale of Santiago's air pollution, which touches on quality of life issues, can only be resolved by changing the way people live. This is why the challenge for the future is to find a form of shared management that overcomes individualism and irresponsibility, and in which all Santiago's citizens play their part in efforts to recover clean air.

Chapter VII

Citizen awareness and air pollution in three Latin American cities: São Paulo, Santiago and Mexico City. Comparative analysis

Fernando José Brunstein[1]

This chapter, an attempt at a comparative analysis of the metropolitan areas of São Paulo, Santiago and Mexico City, seeks to formulate some concluding hypotheses about the relationship between citizen awareness and air pollution in those cities.

A.   Individual and collective behaviour

The chapter analyzes a series of issues that are inherent to citizen attitudes towards the quality of the environment in these three metropolitan areas. It examines, first, individuals' levels of awareness of the problem, especially their actions and attitudes rather than merely their opinions. Second, it assesses the factors underlying their behaviour towards the problem.

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Given the features of citizen awareness of air quality in the three cities, which are considered throughout the chapter, the analysis is confined to degrees of individual awareness and does not extend to collective movements.

The backdrop to the analysis is the meaning assigned to environmental awareness: whether it is simply a matter of persuading people to adopt environmentally friendly lifestyles; or whether it is something more complex, such as an understanding of the problem's causes and effects, through which citizens can be equipped to take part in decision-making on measures to secure socially acceptable air quality.

1.   Citizen awareness. Some conceptual considerations

It is important to discuss briefly what environmental awareness has been taken to mean in this project. According to its theoretical framework, the aim was "to show the importance of viewing environmental awareness as a new policy tool to complement legal and economic mechanisms" (Iizuka, 2000).

Environmental awareness is regarded as a precondition of environmentally-friendly behaviour, and the tacit assumption is that greater social involvement in environmental matters will enhance environmental management, which in turn will lead to an improvement in the environment. The ensuing hypothesis is that the higher the level of pro-environmental awareness, the greater the participation in environmental matters.

Iizuka examines the relative failure of environmental management in developing countries, including those with the most recent economic instruments (beyond the traditional instruments of order and control), and argues that the failure is partly explained by their inhabitants' lack of an environmentally-friendly lifestyle.[2] The UNDP's 1998 Human Development Report offers strong support for this view, pointing out that environmental problems have undergone a drastic qualitative change: they now stem more from consumption than from production, and the pressure on the environment is unprecedented. In this context, environmental protection demands that the general public act responsibly by adopting sustainable and environmentally-friendly lifestyles.

One of the leading actors in the area of air quality (sharing responsibility with others) is the motorist, whose unlimited car use spawns unwanted air pollution. An increase in drivers' (and all citizens')

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[2]   Environmentally-friendly behaviour is defined as consciously pro-environmental conduct such as using "green" products, recycling and car-pooling.

environmental awareness would lead them to espouse pro-environmental attitudes such as a more rational use of transport and strict compliance with pollution control measures.

"Citizen participation can complement existing legal and economic instruments, which cannot be enforced because of institutional, management and financial constraints. A higher level of citizen participation would entail greater respect for legal frameworks and greater acceptance of economic mechanisms, thus enhancing their effectiveness" (Iizuka, 2000, p. 3).

The aim of raising environmental awareness is to induce people to act in environmentally-friendly ways, not only so that they understand and support public policies but also so that they can help devise them, thereby gearing citizen participation to the decision-making sphere and to participation in implementation.

From this perspective, citizen awareness of air pollution is much more than a matter of lifestyle. It is a matter of understanding the problem (albeit not as a specialist) to the extent necessary to discuss it with public officials working in the field. In short it is a question of understanding the nature of the problem and its health effects, and of being able to discuss the factors (causal or otherwise) that have to be addressed in order to mitigate or resolve it.

2.   Citizen awareness and air pollution

This chapter focuses on two issues: knowledge of air pollution; and the State institutions responsible for formulating and implementing policies to tackle it.

The three case studies point out that among the various civil society actors (be they business or community actors), knowledge of air pollution seems to be very limited. According to Iizuka, they know so little that they can barely voice an opinion on the matter and, as exemplified by the cases of Mexico City and Santiago, their views are often at odds with objective information.

In Santiago, "while the quality of the air is better than eight years ago, this is not the perception that the citizens have of the problem [according to surveys in 1994, 1995 and 1996]... Half of Santiago's inhabitants think that the air quality has worsened."[3] (Iizuka and Nicod,

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[3]   According to Montero and Parra (2001), "In the public mind, Santiago began to be seen as almost irredeemably polluted; the perception was that no progress had been made in solving the problem".

2000, p. 39). The authors' explanation is that information is shrinking: "… citizens know ever less about what is actually happening …" (op. cit. p. 39) "citizens know ever less about what is actually happening …". They offer another example of the role of private vehicles in air pollution:

"… while private and public vehicles share responsibility for air pollution, just 4% of people know that private cars are part of the problem. If people are not aware that they should alter their habits, and that they should prefer public transport over private vehicles, it is hard to make them change their behaviour. Buses, cargo transport and industries seem to bear more responsibility" (op. cit. p. 39).

They provide other examples of a lack of awareness in the Santiago metropolitan area (SMA): for those surveyed "… the best way of controlling pollution in Santiago is to expand green areas"; "… the reduction of traffic congestion ranks fourth (24% of responses), after more environmental education and more stringent monitoring of the business sector" (op. cit., p. 40). Expanding green areas is obviously one way of improving air quality, but it is not the most efficient.

Pollution-control policies can fail because of this dissociation between technical objectivity and citizens' subjectivity, since a requirement of the policies is that the public (and especially car owners) adopt environmentally friendly lifestyles. That is unfeasible if people do not regard such lifestyles as important, and particularly if it means people have to alter patterns of behaviour that are deeply ingrained and highly valued.

Citizens' subjectivity, however, divorced as it is from technical objectivity, can amount to a boycott of pollution control policies because technical proposals tend to be watered down by political decision-makers. It is paradoxical that the counter-weight to technical reasoning includes many of those who do not own cars, who do not cause the problem (and therefore have no obligations in the matter) but who, along with their family members, are victims of it. Santiago is a typical example. Those who live in the south-east of the SMA, the poorest sectors with the fewest cars, are harmed even though they do not contribute to the problem. That circumstance, however, has not spurred mobilization, presumably because of the low level of awareness.

Levels of awareness that could incite citizen mobilization for better air quality are still remote. Current awareness levels in Santiago and Mexico City amount to a decline relative to those that triggered agitation in 1964 (in Santiago) and in the 1970s and late-1980s (in Mexico City). It is possible, although the case studies do not say so, that people could be encouraged to act against industrial pollution. Unlike mobile sources, whose emissions are dispersed, fixed industrial sources and those harmed by them are easier

to identify. Actions against industrial pollution, moreover, assume that the polluter is a social actor other than the victim (case B in Funabashi's 1989 categorization, cited by Iizuka in the Chapter I). This is not the case with pollution from vehicles, which make life more comfortable for some of those whose health they damage (case A in the Funabashi categorization).

São Paulo is different. At present the level of pollution awareness is low, but not lower than has traditionally been the case. An expression of this is that the cancellation of a measure of immense importance for air quality, like Operation Rodizio's restrictions on private car use, was not viewed unfavourably. At least it was not seen thus by the low-income sectors without cars, which derived no benefit from the programme's cancellation and were harmed by the growth of toxicity.

It might be argued that the fact that Operation Rodizio (which originated at the state level) and Operation Rush Hours (implemented by the Prefecture of São Paulo) were deemed qualitatively (but not quantitatively) similar measures is evidence of the prevailing confusion, because in reality one sought to improve air quality and the other merely to alleviate congestion at peak hours. This sham or real confusion is one of the reasons why people accepted the cancellation of the more restrictive programme: because they were seen as redundant. This "swap" of measures reflects conflicts between political parties and factions within them. It could not have happened in an aware society, one that placed the issue on its agenda and then obliged the parties and their factions to promote that agenda at the level of State policy and respect it.

This confusion is absurd, since the little information available seems to make plain the substantive differences between the two schemes. Note, nonetheless, that the "confusion" served the interests of car owners, since their mobility was restored and even enhanced as congestion declined. The confusion also favours the developmentalist and individualist worldview of the rising middle sectors, an outlook cultivated by many of the functional actors, especially television. All of this is to the detriment of another attitude, more concerned with the quality of common goods such as the environment and, especially, the air. Although this latter posture has proponents in the media, particularly the press, its messages do not seem to be of the same potency as those sent by defenders of the status quo.

In São Paulo (and throughout Brazil), air pollution was peripheral to the public's concerns during the developmentalist euphoria of the 1960s and 1970s. When it was a policy target, those policies were of secondary importance to a society more interested in short-term outcomes. This posture came at the expense of other policies emphasizing quality of life, health, human and social development, and popular participation in decision-making. In this society, cars are a potent status symbol, doubtless

the most important icon of contemporary culture (Jacobi and Valente de Macedo, 2000). Worth remembering is this happened during the famous "Brazilian miracle", when an emerging middle class's pursuit of material well-being left no space for the kind of recommendations made by the 1972 Stockholm Conference.

The studies analyzed draw very general conclusions about citizen awareness of air pollution, and almost always those conclusions are applicable to the population as a whole. They do not distinguish differences in awareness by age, gender, social stratum or political ideology, much less by the values or worldviews of the interviewees.

3.   Citizen awareness and the public institutions involved in the problem

The available information on this issue refers solely to the SMA, but it can be assumed that many of the conclusions are applicable to the São Paulo metropolitan region (SPMR) and the Mexico Valley metropolitan area (MVMA). This point should be researched in greater detail in future studies.

In Santiago, only one in six people can identify CONAMA as the institution responsible for environmental management in Chile, and two thirds of the population are unaware that there is an agency entrusted with the issue. Only 1 in 14 people know that CONAMA is responsible for controlling air pollution, and 1 in 15 cannot answer the question. This unfamiliarity with the institutional framework of the policies adopted is consistent with the limited knowledge of the problem, and is explained by the reasons mentioned above.

Given the lack of basic information on air pollution and the corresponding institutional framework (as expressed in surveys in Santiago), it is interesting to note opinions on government indicatives in this field. For example:

> "... government efforts in the area of pollution were viewed as good by 45.7% of the population in 1994, and by only 34% in 1996" (Iizuka and Nicod, 2000, p. 42). Apart from being able to express an opinion on the policy in question, respondents claim that its effectiveness declined between 1994 and 1996.

> "... over 92% of the population recognizes that pollution is a very important issue for the State" (op. cit., p. 42).

> "... over 90% (in 1994, 1995 and 1996) of the population believes that the State is placing greater stress on pollution, but they do not believe that the results of this effort are good" (op. cit., pp. 42-43).

This confused thinking should be researched further. It highlights the risk inherent in certain interpretations of opinion surveys, and the danger of basing policy decisions on attitudes that spring from media manipulation of citizens' beliefs and desires (parts of the media use truthful information from the surveys for their own ends). Most particularly, it again underscores the lack of citizen awareness of air pollution.

4.   Citizens' engagement and attitudes

Consistent with the limited awareness of the air quality issue among citizens in the three metropolitan areas, the case studies show that the attitude of the general public is one of apathy. It is said of Santiago (but this is surely applicable elsewhere) that:

> "Because of the problem's seriousness and complexity, the public sector cannot continue with its policies as it has done to date if citizens are not engaged and if there is no progress towards a shared vision of the environmental goal to be attained" (Dooner, Montero and Parra, 2001, p. 10).

In São Paulo, during the voluntary pilot phase of Operation Rodizio, only a small proportion of drivers took part (naturally, many fewer than had said they would in a prior survey). When Operation Rodizio was obligatory, a significant number of motorists wanted to be free of the constraints and advanced constitutional arguments in defence of their position ("the right to come and go"). Business groups such as truckers threatened to oppose the measure by mounting trucking stoppages to cause supply shortages.

In Santiago the population continued to comply with prevailing pollution control measures such as vehicle restrictions, technical inspections and limits on the use of household chimneys. As mentioned above, however, they did so simply in response to State coercion, not because they had adopted environmentally-friendly attitudes expressed as individual engagement —that is, attitudes that reflect significant levels of awareness. In fact, the residents of Santiago increasingly believe that only the State bears responsibility for environmental management, not the public as a whole. This outlook undermines their interest in taking part in controlling air pollution.

Something similar is evident in Mexico City. People are sceptical that efforts to control air pollution will succeed because they mistrust the official information they are given. The consequent apathy makes it difficult for the measures to meet their goals.[4] This is the case for the "Don't Drive

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[4]   It can be assumed that in the case of obligatory measures such as the "Don't Drive Today" programme or compulsory vehicle inspections, the problem might be lack of enforcement capacity. In the field of forestation, for example, the key is the non-compulsory collaboration of the population.

Today" programme, Environmental Contingencies, obligatory vehicle inspection (which involves maintenance), forestation and others.

Those without cars in São Paulo,[5] generally the poorest sectors most affected by pollution, have not sought to mobilize (predictably, in view of their limited awareness) in the interests of better air, nor to protest the government's evident lack of interest in the issue following the cancellation of Operation Rodizio.[6] They are not engaged and are disinclined to struggle against a problem of which they are victim. In Santiago, at least up to 1999 and before the government changed, there was a certain resignation to living forever with a polluted SMA. Responsibility for the pollution was ascribed to public officials' purported lack of technical expertise (Dooner, Montero and Parra, 2001).

In Mexico City, where movements devoted to improving air quality arose in the 1970s and 1980s, there now prevails an apathy similar to that evident in the other two cities.

There was clearly a sharp divide, at least in the 1995-1998 period, between São Paulo's political authorities; the state and the municipality were governed by different parties. The state wanted to promote Operation Rodizio and the municipality opposed it. It was the state government, however, with the same ruling party and governor, that cancelled it. Thus the problem of air pollution in the SMPR is on the agenda of neither the state nor even a political party. Only party factions are concerned with it. The way in which land is used, moreover, fails to curb urban growth and fosters air pollution by making more journeys necessary. There have been no proposals in this regard, not even for the transport system. The latter is still dominated by the obsessive use of private cars. It can be assumed that this reflects civil society's lack of concern for the issue, a circumstance related to the limited awareness of the SPMR's residents.

5.   Changing the behaviour of individual actors: constraints and incentives

As to why the structural and functional actors think and act as they do, the following (unranked) factors seem to be involved.

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[5]   Although the study by Jacobi and Valente de Macedo (2001) does not specifically address it (and possibly for that reason).

[6]   In fact, according to the authors of the case study on São Paulo, the decision to cancel Operation Rodizio had taken prior account of this positive reaction to the scheme's abandonment. An electoral consideration was at work: not to offend car owners further. This might be an example of the cause and effect relationship between the interests of the most powerful civil society groups and the interests of the traditional political class.

a) Incentives to environmentally-friendly behaviour

While there are few incentives to environmentally-friendly behaviour, it can be supported by a range of political, economic and social policies, all of them varying in cost and effectiveness, that discourage unlimited use of private cars but that do not necessarily seek to reduce air pollution. Examples from the case studies are voluntary vehicle restrictions or increasing the supply of non-polluting transport, such as the expansion of the subway systems in Mexico City and Santiago. These policies do not always conform to State goals. In some cases they are the outcome of conflicts between economic interests involved in different forms of transport or (as argued below) they spring from considerations of public image.

In line with the aims of the politicians in Governor Covas's first administration in São Paulo State, Operation Rodizio was initially voluntary. It can be argued that it was influenced by the 1992 United Nations Conference on the Environment and Development in Rio de Janeiro. Another influence was decades-long international reaction to extremely high levels of industrial air pollution in the São Paulo municipality of Cubatão, neighbouring São Paulo itself, and its effects on the health of the local population.

b) Constraints on environmentally-friendly behaviour

The research on citizen awareness in the three metropolitan areas has disclosed three key aspect of the issue:

(i)   the citizens' worldview and scale of values, which spur them to individualist and consumerist conduct whose most potent expression is the private car;

(ii)   urban dispersion and the poor state of the transport system, which legitimate car use;

(iii)   the way in which the State is organized; many of its actions and omissions validate a model of mobility based on obsessive use of cars, a source of significant environmental effects such as air pollution.

As to scales of values and worldview, the above-cited observation of Jacobi and Valente de Macedo (2001) on the car's extraordinary symbolic value is applicable to all three cities. One factor in this has been the constant bombardment of advertising unleashed on society by entrepreneurs and the functional actors of the press. Over several decades its message on cars and other material goods has helped induce a profound change in how most social sectors look at the world: consumerism is in the ascendancy.

The reasoning of Dietz, Stern and Guagnano (1998, cited by Iizuka, 2000),[7] prompts the question of whether this worldview is based on values inherent to the emerging middle sectors in the context of the post-war developmentalist models applied in Latin America.

Some of the observations about the MVMA are applicable to Santiago and São Paulo. From the conceptual perspective advanced by Inglehart (1990), cited by Iizuka (2000), the State does not seem to be exerting any force to counterbalance the materialist social model.[8] Programmes and instruments that bring about changes in attitude to the issue have been weakened. The State does not act to change consumption patterns or strengthen social and civic groups, and thus constrains the development of environmental awareness among the general public.

As to the physical space of the city and the transport system, the inefficiency, unreliability and inconvenience of public transport gives vehicle owners a sense of vindication in their choice of the car as almost the only form of transport, and undermines the argument that car use leads to congestion and air pollution. This observation is specific to the study of São Paulo but it can also be applied to Santiago and Mexico City. The state of public transport is often the result of policies that, wittingly or not, tend to weaken the public system and thus promote car use. A civil society with limited awareness of the problem cannot oppose such policies, as exemplified by the city of São Paulo. In the 1990s the municipality made huge investments in high-speed roads while the expansion of the subway was halted for years.

Iizuka and Nicod provide another example that is specific to Santiago but broadly similar to the São Paulo case:

"The sharp competition between buses in the streets and the mayhem of traffic have magnified congestion, since competition encourages people to drive recklessly, which obstructs traffic. Consequently public transport today, especially the buses, is unappealing to car owners" (Iizuka and Nicod, 2000, p. 15).

Discernible in this unsustainable policy of competition are the features of the extreme market model applied to the Chilean economy from 1973 onwards.

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[7]   The authors distinguish between worldviews and values as follows: (i) values are formed early in life, within the family, while worldviews can stem from political and social experience in the wider world; (ii) worldviews seem to be more general than values, covering a range of temperaments or orientations that are embedded in the same personality; (iii) values are probably more stable over a lifetime because they can only be defied by their desirability or appropriation.

[8]   Given the strong ingrainment in the deeper levels of individual consciousness, this is very hard to reverse.

Again with respect to urban dispersion and the transport system, the three studies highlight the growth of each of the metropolitan areas. Together with the deficiencies in the quantity and quality of public transport, this has helped justify increasing car use.

The third constraint on environmentally-friendly behaviour, mentioned in all three studies, is the governments' profound lack of credibility. According to Jacobi and Valente de Macedo (2001), the measures taken in the SPMR did not enjoy popular legitimacy because the public perceives them as an effort to impose government authority rather than a desire to uphold the common good. By way of example it is worth recalling that, because of administrative problems, the system for monitoring air quality ceased to provide information directly to the public in 1997 (and continued thus and at least up to 1999). When something as vital as information on pollution levels is not directly available to the public, questions arise about the government's commitment to building awareness.[9]

With respect to the transmission of public messages and their potential to influence citizens' attitudes, it is important to mention the role of the media in Operation Rodizio. The media in its various forms was not favourably disposed to the programme. In 1995 and 1996 in particular, many media adopted an ambiguous posture. They recounted the positive results in news articles but criticized the scheme in editorials and headlines. This stance was more common among newspapers and radio stations (Jacobi and Valente de Macedo, 2000).

In Santiago, "... in the last decade the issue of the environment, and of air pollution in particular, gained importance [as measured by the number of articles] in the press" (Iizuka and Nicod, 2000, p. 41). Air pollution is a very time-specific issue, however, and the number of news articles grows in the problematical winter months.

To return to the question of the State's legitimacy in the eyes of its citizens, it is said of the SMA:

"Towards the end of the 1990s, the environmental authorities, the Plan to Reduce Environmental Pollution and, especially, the channels for participation all suffered a certain amount of discredit. Significant weaknesses in this period were the communication mechanisms and the information provided. The signals sent to the public were not clear enough and were not designed to bring about a radical change in daily routines.

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[9]   The information was available on-line, but obviously only a small segment of the SPMR's population has Internet access. Doubtless that segment comprises a majority of the actors who, while they also suffer from the problem, have a profound responsibility for causing it because of the middle and upper income sectors' level of car ownership.

No significant progress was made on more structural problems, such as the growth of the city and the transport system" (Dooner, Montero and Parra, 2001, p. 10).

The same study maintains that the public has started to become disillusioned by such limitations (apparently of the administration in power until 1999), which seem to have begun to erode the legitimacy of representative democracy. This is important given the presence of CONAMA, a cross-cutting institution in which many hopes had been placed because it was thought that it might supplant the traditional, sectoral institutional model, one that is inconsistent with an all-embracing and systemic conception of the environment.

According to Iizuka and Nicod:

"The credibility of the State in general is at stake. The lack of expertise and of proper communication between citizens and public institutions prompts misunderstandings between the State and civil society". Nonetheless, "it should be pointed out that what is being questioned is not the political will to solve the problem but the government's technical capacity". "... The population has a marked shortage of information, not only on air quality but on the policies implemented and their results. Hence the State has little credibility, which exacerbates the misunderstandings between it and the population" (Iizuka and Nicod, 2000, pp. 42-43).

As mentioned earlier, one of the reasons for this limited trust and credibility is the lack of clear information accessible to all citizens. Such information should promote more active participation, not only to opine on State policies and react to them but to take action, to intervene, to join in the public debate and to help devise and implement policies on air quality.

As a result of these communications failures, and of the persistence of an entrenched technocratic model for managing social problems (including the environment and air quality), note that:

"... the residents of Santiago increasingly believe that only the State bears responsibility for environmental management, not the public as a whole. Thus citizens' interest in taking part in air pollution control wanes" (Iizuka and Nicod, 200, pp. 43-44).

The MVMA has made progress on reducing air pollution and by any objective view (and with all its limitations)[10] that progress has improved air quality. Most of the MVMA's residents, however, do not agree. As

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[10]   The measures adopted in the MVMA were essentially palliative, possibly a reflection of the weakness of State policy towards the problem.

discussed below, their scepticism about achievements and their mistrust in the information provided by the authorities are part of the reason for the declining interest in air pollution.

The above-mentioned apathy is very different from the attitudes that informed earlier urban movements to improve air quality. Following the movements of the 1970s and late-1980s, and when the Metropolitan Air Quality Index (IMECA) was made known on an hourly basis, the public used a variety of informal mechanisms to demand that the government take radical measures to tackle the problem. After a decade of air quality management, constant information and media discussion of the steps taken, collective interest in the programmes has fallen.

This attitude has a variety of causes, which in large measure amount to a response to how the State works. Apart from some very specific situations and policies in the MVMA (such as participation in forestation), all the factors outlined below are applicable to São Paulo and Santiago.

(i)   Almost always, the public is only called on when a "resource" is needed (forestation programmes, "Don't Drive Today" and so on). It is not approached as a conscious partner in decision-making. Hence the population, especially the car-owning middle sectors, adopts a passive attitude. Freed of their spontaneity, people tend to believe that there are signs that the problem will be solved. They want to believe this and it suits them to believe it, because it is the path of least resistance. Thus they cease to organize. In the MVMA, citizen participation never seems to move beyond a form of consultation that entails no commitment to comply (Lacy et al., 2001, p. 33).

(ii)   The public feels that its efforts have been unproductive. People believe that pollution levels have not improved significantly and are therefore disinclined to keep making an effort. This is because they receive little information, and hence cannot draw objective conclusions. Functional actors such as the press normally fail to clarify matters.

(iii)   At the same time, the population is concerned with issues such as violence, poverty and unemployment. These are real problems, but their gravity is distorted (and often overstated, for marketing purposes) by the functional actors, notably some elements of the press. False problems can also be created to divert attention from real ones.

(iv)   Apathy also arises because the population has been led to believe that environmental problems in general, and air quality in particular, are the exclusive preserve of technical specialists

and that the public has nothing to contribute. Apathy is a natural response to exclusion from the debate.

(v)   Apathy frees people from having to spend time on things that do not seem to offer concrete personal benefits (like most of the programmes mentioned here, which involve them materially) or that affect deeply-held values such as the right to use a car whenever they want. In this they are strongly influenced by sectors with substantial economic power and an interest in the matter (the vehicle and parts industries, the fuels and road-building sectors, and so on), those interests being furthered by functional actors such as certain elements of the press.

(vi)   The most significant apathy, and the one that raises government concern, is among the middle sectors. Since they are the leading car users, more participation is demanded of them. They are the ones most affected by the measures adopted but they are not the main beneficiaries. The poor, living in areas of dense traffic, advanced deforestation and little paving (and therefore with a high degree of wind erosion and air pollution) suffer most, but little can be asked of them apart from collaboration in forestation.

B.   Social communication strategies

1.   Strategies for communication between the State and civil society

The studies recount a (quite limited) series of State activities that reveal the nature of efforts to inform the public in the interests on enhancing policies on air quality in the three metropolitan areas.

Some examples from São Paulo:

-       Campaigns to educate drivers, when the priority shifted from fixed to mobile sources as part of Operation Winter in 1987.

-       From 1992 to 1997, giving residents of the SPMR and Cubatão air quality data from the monitoring network of the Environmental Sanitation Technology Company (CETESB).

-       Operation Rodizio's efforts to raise driver awareness in 1995.[11]

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[11]   It is probably true to say that Mario Covas's first government from the mid-1990s onwards made the most serous attempts to inform the public, albeit with the limitation that it was a partisan (not a State) policy and was applied at the state (not the national) level.

- CETESB's special 1996 project to create environmental assemblies. These are discussion fora involving representatives of civil society, such as various productive sectors and consultative bodies. The aim was to involve civil society in efforts to control pollution.

- The Consultative Committee for Controlling Transport System Pollution in São Paulo State, instituted by the state governor in 1996, comprised representatives of the three spheres of government and civil society. It sought to integrate public policies in the various levels and sectors of the government. The Committee's work gave rise to a public discussion document in 1997, which invited recommendations from the various social groups and actors involved.

In Santiago too there have been State-citizen communications initiatives in the SMA. A similar effort in Mexico City to provide an overall picture of the situation was distinguished only by the hourly transmission of the IMECA in the late-1980s. All the indications are that the State has paid little attention to these processes in all three cities.

In all three studies, moreover, an almost invariably critical reference to the way in which the State has carried out these activities surfaces immediately. In São Paulo:

- The education campaigns of 1987 were confined solely to drivers.

- Efforts to raise awareness through Operation Rodizio in 1995 yielded relatively poor results. A much smaller number of drivers complied than had given their "word" that they would support vehicle restrictions.

- By the end of 2000 the legislature had still not dealt with the 1997 public discussion document on the Consultative Committee for Controlling Transport System Pollution in São Paulo State.

- The cancellation of Operation Rodizio in 1998 prompted no public reaction; indeed, it happened amid a conceptual confusion about the difference between Operation Rodizio and Operation Rush Hour.

- CETESB's data on air quality in the metropolitan region and Cubatão[12] ceased to be divulged to the public in 1997 and less direct means of communication were used.

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[12] Note, incidentally, and as an example of inconsistency, that between 1992 and 1996 this did not measure pollutants like CO_2.

In Santiago too there are examples of the same kind of criticism:

-       By the end of the 1990s there were significant weaknesses in communication mechanisms and deficiencies in the information provided. The signals sent to the public were neither sufficiently clear nor designed to bring about a radical change in daily routines (Dooner, Montero and Parra, 2001).

-       "One of the causes of ... the limited trust and credibility is the lack of clear information accessible to all citizens. Such information should promote more active participation, not only to opine on State policies and react to them but to take action, to intervene, to join in the public debate and to help devise and implement policies on air quality" (Iizuka and Nicod, 2000, p. 47).

-       The State's messages to the population on air quality have been designed in such a way as to have as little effect as possible on prevailing lifestyles in Santiago, although it is these that cause air pollution (Dooner, Montero and Parra, 2001).

-       "... citizens know ever less about what is actually happening ...". "It is not only a problem of perceptions of air quality in general but also of disinformation" (Iizuka and Nicod, 2000, p. 39).

-       "... it has not proved possible to persuade people to change the values that shape their attitude to natural resources, and particularly to the air they breathe" (Dooner, Montero and Parra, 2001, pp. 29-30). Values (or perhaps rather worldviews) have not changed because of the disinformation.

-       "... the population has a marked shortage of information, not only of air quality but on the policies implemented and their results" (Iizuka and Nicod, 2000, p. 43).

The strategy for State-society dialogue in Mexico City is similarly open to criticism:

-       "In the late-1980s, and when the IMECA was made known on an hourly basis, the public used a variety of informal mechanisms to demand that the government take radical measures to tackle the problem" (Lacy et al., 2001, p. 72).

-       Most of the MVMA's residents "are sceptical about these achievements because they mistrust the information provided by the authorities" (op. cit. p. 71).

-        "... The population has been led to believe that that environmental problems in general and air quality in particular is the exclusive preserve of technical specialists and that the public has nothing to contribute". Apathy is a natural response to exclusion from the debate (op. cit. p. 71).

It seems that in none of the three cases has there been strong political will at the highest institutional level to work with the population in a non-paternalistic manner. That would have required that civil society be provided (and transparently so) with proper information on the problem, especially on its effects and causal linkages, and on policy options.

Evident in all three cases is that the behaviour of the State is conditioned by an entrenched bureaucratic model that normally places little faith in participation and that, faced with an obligation to share its information, wittingly or otherwise resorts to a form of boycott. It is likely that the similarities between the three cases are somehow connected to the fact that the prevailing political systems are of long standing.

2.   Constraints on the success of strategies for communication between the State and civil society

The preceding section addressed the barriers raised in all three cases by the State's reticence to provide information, a reserve evidenced by both the substance and style of the messages transmitted. Other obstacles to communication between the other structural actors, the functional actors and civil society can also be discerned.

As regards the barriers that can be ascribed to civil society, in all three cases it is important to stress that this is a structural actor whose values/ worldview hamper its capacity (Inglehart and Dunlap, cited by Iizuka, 2000) to receive the State's messages. This is the same phenomenon adduced by Dooner, Montero and Parra (2001) in their reference to Chileans' individualism, but doubtless it applies (with slight local variations) to the other cases. This is a matter of values and of a way of interpreting the world, one that (consciously or not) increasingly pushes the region's citizens towards individualistic and non-collaborative attitudes, and also towards zealous consumption, particularly of material goods. Chief among these are those products, like cars, that symbolically express individuals' ascent on the social pyramid.

The functional actors examined in the case studies are not neutral. The various forms of press depend on a combination of the interests of their leading advertisers, their editorial culture, their own ideology, and their own nature as media: seriousness of substance, means of communication.

The combination gives rise to journalistic styles and in that context it is possible to interpret ambiguities such as those evident when Operation Rodizio was in effect in São Paulo: the positive results were reported in the news articles but the scheme was attacked in editorials and headlines.

Of the media, only the television should (too often in the countries of the region) serve as an "information spectacle". As the example of Santiago makes plain, commercial criteria (sales) are determinant for all of them. An issues "sells" to the extent that the problem it alludes to is already on the social agenda, since commercial advertisers then have some guarantee of an audience.

"There can be no doubt that in the last decade the issue of the environment, and of air pollution in particular, has gained importance in the press. One indicator is the number of articles on environmental issues", but also "there are many more newspaper articles in the winter than at other times" (op. cit., p. 41).

Some problems commonly ascribed to the press can be deduced from the case studies on Santiago and Mexico City:

-       no stress is placed on training journalists to specialize in environmental issues;

-       the matter is dealt with from the perspective of immediate events and not of underlying problems;

-       the press does not finance special reports on the issue.

Thus, "while the number of articles increases, citizens' knowledge does not. In other words, there is no direct link between the breadth of press coverage and the public's degree of knowledge" (Iizuka and Nicod, 2000, p. 42). Hence the "lack of expertise and of proper communication between citizens and public institutions prompts growing misunderstandings between the State and civil society" (op. cit., p. 42), a circumstance that erodes trust and credibility.

In addition to the widespread lack of political decisions to provide the public with proper information there is the noise made by the press. Far from confining itself to accurate reporting, the press processes information according to its economic or ideological needs. Thus the message transmitted is not exactly the same as the one from the source. Added to all this are the values/worldviews of the population, which pose another kind of barrier to dialogue.

Another important aspect of the press is its capacity to transmit messages from civil society to the various State institutions, and not simply

in the other, traditional direction. Typically, coverage of citizens' campaigns or reports on civil society actors serve this purpose. This aspect of the issue doubtless merits particular attention in any continuation of this project's research.

Although the information on functional actors is very limited, it is worth stressing some of the considerations mentioned in the case studies (especially those on Santiago and Mexico City) regarding the NGOs and the universities. Questions are raised, above all and in greater depth, about their weak engagement with civil society.

In the case of the NGOs:

-	they do not promote the training of, and provision of information to, various local leaders;

-	they do not organize or coordinate participatory activities that spread their appeal to more citizens;

-	they do not engage strongly with civil society.

In the case of the universities:

-	they do not promote environmental culture and education;

-	they do not take part in social participation activities;

-	they do not seek to disseminate their research findings among all social actors.

## 3.	Resulting degree of communication between State actors and civil society

If the communication between the structural actors of the State and civil society were assessed —that is, if it were known to what extent information served to foster collaboration on air pollution control in the three areas studied— the results would be somewhat disheartening.

As mentioned throughout this chapter and with local variations in the three metropolitan areas, the population is not engaged with the policies and is losing what low level of engagement in previously had. The result is scepticism and apathy.

Communication between the State and civil society, which should be a two-way process but which normally goes from the State to civil society, faces a series of obstacles. These range from drawing up the message to its transmission and reception, and they can come to influence its interpretation. The failure of communication evidences the marked lack of political

decisions on the State's part to engage in a real dialogue with the population and thereby democratize decision-making. The lack of a political decision is apparent in the asymmetry of the communications process, normally entrusted to an actor addressing an isolated public using the wrong instruments. It is also apparent in the lack of policies geared to providing enough quality information (expressed in appropriate language) to allow civil society to become a valid interlocutor in decision-making on air quality.

Everything suggests that these communications activities are almost never conceived in such a way as to guarantee their success. The three case studies offer no cause to believe that political decision-makers understand that the most modest public information campaign must be conceived as a project, and must therefore be designed according to basic rules that enhance its prospects of success. In other words, such a campaign should have a logical framework of objectives that link activities and outcomes in a way that ensures communication with the public; its should fix impartial means of assessing whether communication has had an effect; and it should be based on realistic hypothesis as to citizens' capacity to absorb the messages and the mobilizing role of the information. The measures adopted are more or less isolated and generally unsustainable, and so sooner or later they either fade away or are cancelled.

A real communications project (that is, one backed by a strong political decision) should secure information on processes that are foreign to it, so as to use them as data —just as a gunner uses the law of gravity to calculate the arc of fire that ensures he hits the target. Without straying too far from the issue, information campaigns could follow the practices used by highly professional advertising agencies when they place a particular product on the market.

C.   Mechanisms for citizen participation

Traditionally, Brazilian public policies, most particularly in São Paulo and on very specific issues like air pollution, have not been participatory. Such policy-making has been characterized by only a few, spontaneous popular movements in parts of São Paulo that concerned themselves with air pollution when industry was the main source. These were spontaneous forms of participation using informal instruments for coordination and, as mentioned, they did manage to influence decision-making.

More recently, under the renewal policies of the first state government of Mario Covas in São Paulo, the CETESB sought to involve the population in environmental policy-making by setting up the

Environmental Assemblies in 1996. Discussion fora whose participants include representatives of various productive sectors and consultative bodies, these are institutions for consultation in which civil society's proposals, although not binding on the authorities, involve the public in decision-making. Recall that traditional forms of participation in policy implementation and follow-up had already been introduced in São Paulo in 1995, when the same administration instituted Operation Rodizio.

Santiago has even fewer experiences of participatory policy-making than São Paulo. This is consistent with the weakness of communications strategies, the lack of clarity, and the limited intention of effecting a radical change in daily routines, all deficiencies that emerge from the information available ((Dooner, Montero and Parra, 2001).

As in São Paulo, the channels for participation were confined to the traditional ones of implementation, such as vehicle restriction measures and technical inspection, but included others specific to Chile, such as limits on the use of chimneys. As mentioned earlier, these forms of participation, detached from decision-making, spawned public apathy.

According to the São Paulo case study, there were a few other forms of decision-making participation, but they never went beyond the level of consultation. Environmental impact assessments are an example. What was said in the preceding paragraph applies to São Paulo: the lack of clear information accessible to all citizens discourages more active participation, not only to opine on State policies and react to them but much more than that: to take action, intervene, to join in the public debate, and to help devise and implement policies on air quality.

An example is the "Actionline" ("*Fono Acción*") programme in Santiago. This was known by 70% of people in 1996 but it is assumed that almost nobody used because they had no faith in the effectiveness of reporting environmental problems in this way, since it was not binding on the government. The argument is not that people did not want to participate but that they placed no faith in the government (Dooner, Montero and Parra, 2001).

The MVMA is not rich in experiences of participation, but it seems to be the relatively least poor of the three. Those experiences range from implementation to participation in decision-making although, as in the other two cases, such participation has never gone beyond the level of consultation.

As mentioned earlier, the spontaneous mobilization of the MVMA's population (another example of a non-institutionalized channel) to influence decision-making on air quality in the 1970s and 1980s yielded significant results: the authorities took steps to improve the situation. In other words, the population was able to create informal instruments for collaboration.

In the MVMA, participation (now institutionalized) "in implementation" dates from the early-1990s and the Comprehensive Programme against Air pollution (PICCA). The community's participation was crucial to the application of the scheme: the contribution to the "Don't Drive Today" programme, obligatory vehicle inspection, reforestation, and the participation of political delegations and independent ecology groups in concrete initiatives to protect the environment.[13]

The PROAIRE programme (1995-2000) was a continuation of the PICCA; it addressed many of the same issues. It was markedly metropolitan in nature, however, and while the population had more power to demand that the target be met it had no influence over how the targets were set. Hence this approach was still consistent with traditional forms of participation in implementation.

The Metropolitan Environmental Commission (CAM)[14] was created in 1996. The first experience of participation in environmental policy-making in Mexico City, its main goal is to define, coordinate and follow up on policies, programmes, projects and measures to protect the environment, and to preserve and restore ecological balance in the MVMA. It does this in conjunction with the Secretariat for the Environment, Natural Resources and Fisheries (SEMARNAP), the Ecology Secretariat of the Government of the State of Mexico (SE-GEM) and the Environment Secretariat of the Government of the Federal District (SMA-GDF), as well as with other public bodies involved in environmental issues. The policies include environmental contingencies and emergencies, and drawing up criteria and guidelines for the integration of programmes, projects and special activities.

One of its working groups, the Air Group, is responsible for follow-up, analysis and assessment of PROAIRE.

Civil society's participation is embodied in the CAM's Consultative Council, whose mission is to foster social participation in environmental policy-making. The Council comprises delegates from the academic community, renowned experts in ecology, representatives of the social and private sectors, and members of the Federal District's Assembly and Mexico State's legislature. In line with what was said earlier, the authorities generally take the contributions of the Council members as non-binding recommendations.

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[13] The perception of the public is that environmental policy-making to improve air quality is solely the responsibility of the government and increasingly they refuse to take part. In Mexico City, the population resisted measures to restrict vehicle us and failed to abide by them.

[14] Although it had existed since 1992 as the Metropolitan Commission for the Prevention and Control of Environmental Pollution in the Mexico Valley (CPCCAVM).

For transport an institution was created between Mexico State and the Federal District, separate from the CAM but linked to it. This is the Metropolitan Commission on Transport and Roadways (COMETRAVI), where some parts of civil society (such as transport companies) really do intervene. There is no doubt, however, that this is far from what could be called a mechanism of participatory democracy.

"The transport sector being the most important in efforts to control air pollution in the MVMA, there has never been enough social or citizen participation with environmental interests in the COMETRAVI. Thus its decisions remain heavily influenced by the circumstantial interests of the transport companies"[15] (Lacy et al., 2001).

Some other legal instruments are connected in one way or another to the urban environment and air pollution, and these include participatory mechanisms. The General Law on Ecological Balance and Environmental Protection (LGEEPA) was reformed in 1996 to give authority to the municipal level and the Federal District. In the same year the Federal District's Environmental Law was enacted (it was reformed in 1999 to make it more punitive). In 1997, Mexico State enacted the Law in the Protection of the Environment for Sustainable Development. Another key piece of legislation is the Federal District's Urban Development Law of 1996. Most of these laws make provision for social participation mechanisms: informal instruments, public consultation, reporting problems, consultative councils, popular action and popular consultation fora. None of them, however, go beyond a non-binding consultation with civil society.

As in Santiago, people have become apathetic because the highest level of citizen participation is simply consultation. They have developed a scepticism towards the traditional mechanisms of "Don't Drive Today", vehicle inspection and others, and have begun to infringe them just when compliance is even more necessary.

With regard to citizen participation in air quality management in these three metropolitan areas, therefore, it can be concluded that (apart from variations in their number of experiences) in all cases such participation is on a particular scale. This ranges from more traditional participation, in which

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[15]   This is a very interesting observation by the authors, since it encourages further reflection on the meaning of participation. It exemplifies how the problem of participation in decision-making was not solved by opening up the State to civil society, of which the entrepreneurs are members. This example of civil society participation, in which entrepreneurs act as exclusionary representatives of civil society in decision-making (a widespread phenomenon in the region's transport sector and one that often obliges the State to accept only that sector's interests), is without question a highly undemocratic mechanism masquerading as civil society participation.

citizens are involved in implementation (undoubtedly needed, but unfortunately the least expressive aspect of truly democratic processes) to a form of participation in decision-making that never goes beyond non-binding consultation.

This latter form of participation unquestionably represents a higher level of respect for the population than those focusing on implementation. Often, however, it is simply a way of conferring social legitimacy on decisions that actually entail little participation. It serves to grant social validity to processes that are not always democratic, as the residents of Santiago and Mexico appear to have discovered. Hence their apathy.

As to the formal institutional framework, there seems to be little room for popular involvement in decision-making. The best known examples in the region are cases like the Participatory Budget, one possible form of participatory democracy, which was first used in Porto Alegre in the late-1980s and then tried in several other places.

Beyond that, collaboration-based channels for civil society participation (especially for community organizations) normally arise from movements outside the formal framework, as exemplified by concern for air quality in the MVMA in the 1970s and 1980s, and in São Paulo in the 1960s.

D.   Conclusions and recommendations

Analysis of the three case studies suggests that further improvements in metropolitan air quality can no longer be viewed as the sole responsibility of the State and independent of the active involvement of civil society.

This is because the population has to be involved in vehicle restriction schemes, inspection and maintenance programmes and so on. In short, the public has to take part in implementation. At the same time, the population should participate in decision-making[16] processes that lead the authorities to do what they should but do not, either because of a lack of citizen pressure or because the pressure comes only from those interests that benefit from the externalization of environmental costs. Implicit in this

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[16]   Note the risks involved in including in civil society the community and business sectors. Many segments of these latter have true access, albeit not legally overt, to the decision-making process. If fact, often they are the "real" decision-makers. Thus when business lobbies manage to impose their own decision, it is clear that this is not a case of participation in civil society decisions.

latter consideration is a need to enhance democracy through a more active citizen participation that escapes the confines of the representative model, which is in crisis in many countries of the region.

An examination of the studies on the three metropolitan area shows that in none of them is there a level of citizen awareness that exceeds the early stages of sensitization and that proactive, environmentally-friendly behaviour is a distant prospect. In São Paulo, there does not seem to be and never has been a popular mobilization to improve air quality. Consistent with that, Operation Rodizio showed in its first phase (1995) that many fewer drivers limited their vehicle use than had said they would before the operation came into effect. The high compliance rate in subsequent phases was almost solely a response to coercion on the part of the São Paulo authorities, since the scheme ceased to be merely voluntary.

The studies on Mexico City and Santiago reveal differences from São Paulo but also some interesting similarities. Citizens mobilized around the issue in both cities, very possibly because the levels of air pollution, even in the view of an ordinary, non-specialist citizen, were markedly higher than in São Paulo. The mobilization led the authorities to undertake activities with various degrees of planning. In both cases, public management of the problem led to the dissipation of citizen concern for air pollution in the riskier winter months, as evidenced by the unpopularity of the "Don't Drive Today" programme in Mexico City and the restrictions in Santiago.

Nonetheless, either because there was no mobilization (São Paulo) or a later demobilization (Santiago and Mexico City), in all three cases the public does not currently seem to take part in policies to improve air quality. Unfortunately, the studies allow only a very partial identification of the reasons for the similarities and differences. It would be helpful to fill that gap —and this is one of the chief recommendations of this study— so as to make recommendations for inciting civil society activism in this field.

It is possible that a long history of clearly authoritarian regimes in Brazil and Chile, and a longstanding authoritarian model (albeit veiled) in Mexico, have favoured paternalistic and clientelist practices in which the public has no decision-making capacity. It is also highly likely that this has exerted a powerful influence on citizens' values and worldviews. It should also be said, however, that the population has been changing for decades. This is perhaps independent of the influence of authoritarian regimes and has more to do with cultural changes that transcend national barriers. Under their influence, individuals tend to identify themselves much more as consumers than as citizens. The attendant values are inimical to solidarity and participation, and run counter to concern for common goods such as the environment and, particularly, the air.

In all three cases the population is apathetic. Citizens seem to have resigned themselves to letting the authorities decide what to do on their behalf about the problem, as if it were not a matter for civil society. Perhaps it is a question of marshalling forces to concentrate on individual concerns, but it could also be a matter of resistance to taking part as direct instigators of concrete actions because (in view of the Mexican and Chilean experiences) people are loath to participate in initiatives in which they see not positive results. There also sees to be a crisis of representation that compels them to withhold their cooperation, since they never (or almost never) see the viewpoints they express in consultation processes embodied in political action. By definition, and as shown above, such processes do not entail a commitment on the part of the authorities to heed the views of the public.

This *laissez faire* attitude also (and paradoxically) seems to grant the authorities some credit for the objective and tangible improvements in air quality evident in all three cases, although State efforts have almost always focused on reducing particulate material[17] and eliminating lead from the air. Given this systematic (and limited)[18] conduct, it is interesting to note that in general the authorities have unduly accepted a trophy, since the market was the main reason for the removal of lead from car fuel: it was a precondition of being able to use catalytic converters in vehicle exhausts. Evidence of this is that leaded gasoline began to be eliminated, at least in almost all the countries of the region, in the first five to seven years of the 1990s, clearly independently of each country's peculiarities. It is interesting to stress that the elimination of particulate material is one of the most politically profitable environmental achievements, and the most valued by the public, because it is literally a visible form of pollution.

When it comes to participation in activities, however, in all cases there seems to be a certain mistrust of the authorities, in some cases because of the lack of transparency. This is true of Mexico City, for example, which has an adequate monitoring system and contingency plan, and whose public officials cannot be considered as technically unskilled. In other cases, however, the mistrust is towards their technical capacity or their coherence: for example, contradictory policies effected by different State agencies; policies that promote restrictions on private cars and that encourage the population to acquire cars; policies that invest in infrastructure and that foster private car use.

The population perceives that it is not provided with enough information, or that what it receives is unreliable, because it seems to

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[17]   Doubtless the most visible of these air pollution processes in the metropolitan areas and the large cities.
[18]   Although this significant progress is to be applauded.

contradict the public's own perception. The cloudy skies of Mexico City or Santiago, for example, do not seem to be reconcilable with the improvement in air pollution indicators. To this should be added the strong, widespread and growing mistrust of the authorities.

This mistrust, which in another context of citizen awareness could spur demands, simply spawns indifference (if someone is unaware of the significance of the problem) or complaints (if someone knows of the problem but does not know what to do about it). Once emergencies have passed, therefore, indifference towards air quality leaves room for attention to other issues that seem to be of pressing concern in all three cases: crime, unemployment, poverty and others. No doubt living conditions in what are called "developing" countries are not divorced from this priority attention to short-term ills. This is very clear in Latin America after the 1990s, a decade in which unemployment and misery soared to unprecedented levels. Civil society's agenda is determined by the short-termism of "right now" rather than by a consideration of more serious issues for the sake of the medium and long term —in short, sustainability.

That said, the inevitable question concerns the prospect of inculcating society with a sense of concern for environmental issue like pure air, in a social context wherein many other unmet "basic needs" seem to be priorities. In other words, nothing can be a higher priority than immediate survival: food and shelter, which are by no means guaranteed for all the inhabitants of the countries examined here. Perhaps in these "undeveloped" countries the priorities of the social and environmental agenda are much more closely linked to such determinants of survival than to other issues that feature as priorities only on the environmental agenda of developed societies in the First World. For the populations of the metropolitan areas examined here, this is a matter of urgency but not one of importance, since short-term health must take priority over that of the longer term.

In the countries of Latin America the "normally visible" environmental problems are related the floodability of the habitat, the provision of healthy water and sewerage, water pollution, the disposal of solid waste and, in some specific cases (precisely those considered in the research that forms the basis of this book) air pollution. Hence in this "undeveloped" world there should be no contradiction between basic needs and the environment, since many of those needs are met at an environmental cost, thereby transferring as much poverty as possible to the environment. When society neglects air pollution in the face of other problems it is not exchanging basic needs for non-basic needs, or needs that are characteristic of a socioeconomic model whose basic problems have been solved, a kind of "luxury". It is neglecting, within a series of basic needs, what is invisible, what seems not to be pressing, because the visible and pressing problems are overwhelming.

In these new circumstances, wherein environmental problems are starting to be unwanted effects of consumption much more than of production, the population's participation in the implementation of measures is ever more necessary. The apathy mentioned earlier spurs conflict, since those without the necessary motivation are being asked to take part in initiatives to improve air quality.

There seems to be consensus among the authors of the case studies that engaging these sectors calls for more than moving past the idea of involving them as a resource, a simple executor of initiatives such as car restrictions, vehicle inspections and maintenance, forestation or monitoring of compliance with the law. It is also necessary to move beyond the limited forms of citizen participation in decision-making.[19]

It is a question of improving the amount of information available and upgrading the non-binding consultations (which are the highest levels the population reaches in its participation in decision-making), so that the public can play a truly effective role in the issues that affect its various interests.

The implicit premise is that this prospect of involvement as an active agent could not only trigger a shift in attitude towards the environment (at least for a substantial segment of civil society), but could help overcome the problem of discontinuity attendant on transfers of power between opposing administrations. Several of these are mentioned in the case studies but they are repeated in other parts of the region.

Civil society should be able to pressure the State to guarantee, for example, the continuity of pro-environmental policies, so as to obviate situations like that in São Paulo in 1998 when the population —in a show of indifference— was unperturbed by the suspension of the state's obligatory Operation Rodizio. In other words, it was unconcerned at a regressive measure that amounted to an attack on the quality of the environment and their health. The aim is an environmentally-aware, social critical mass that obliges the authorities to transform the management of air quality from the presently erratic policies of government to real policies of State.

For civil society to assume this new role, however, a critical mass of social groups must be coordinated in pursuit of that goal. This is not necessarily feasible. Whether it is or not will depend on what sets of actors

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[19]   Although they are not necessarily a matter of citizen participation in decisions on air pollution, experiences of participatory democracy, such as the Participatory Budget exercises that began in Porto Alegre in the late-1980s, should be considered. These radically transformed a widespread popular apathy, similar to that revealed in the studies on which this document is based.

there are and on clarification, at the minimum, of: i) their "real" interests, beyond the stated ones, which might simply be a façade for other divergent interests; ii) their capacity or inclination to coordinate with other actors with matching interests; iii) their "real" power, so as to overcome the inertia of the various processes; and iv) this jointly attained power's aptitudes or deficiencies to meet the goals. Other factors, such as the number of groups and the relative power of each, will determine what kind of authority ensues and the resultant civil society's clarity of objectives.

Also needed is the clearest and most accurate interpretation possible of the structural and functional actors. This is particularly important because, as other parts of this document have shown, in civil society a distinction must be made not only between the business and community sectors but also between the important sub-groups within them. There are micro, small, and medium entrepreneurs, concentrated companies, multinationals and others, and each of them —or even factions within each of them— might have a different attitude to the problem. The same can be aid of the community organizations, which can include a golf or riding club and a canteen for mothers in an insecure settlement. The same can be said of the State, whose different levels and sectoral (or horizontal, as the case may be) agencies might have different interests. This sort of distinction must also be made among the functional actors: there are many kinds of media, many kinds of NGOs, many kinds of universities.

For each of these many actors (many but not indiscriminate, since their selection and inclusion depend on hypotheses to be formulated in each situation), thought must be given to their objective interests, the values/ worldviews (which in many cases are self-contradictory) that motivate them, their formal or real capacity to trigger or hamper change, and the inter-actor affinities that facilitate coalition-building. This could aid understanding and consequent action.

In the case of the functional actors there is a need, for example, to understand the thinking behind the behaviour of the press; to know, for instance, why most of the media give greater, lesser or no lasting coverage of some issues compared to others. In the case of the political parties, what thinking underpins their activities? Which of them act in a highly calculated manner in pursuit of power, and for which citizen participation in decision-making might entail a loss of authority? Which act in line with a commitment to the growth of citizen awareness and participation?

As to the NGOs, the universities and the research institutions, it is important to ask why they so often focus on a fairly small set of issues relative to the wide range of real problems besetting large sectors of the region's population. Doubtless they should be asked about the origin of their financing and the thematic conditionalities imposed by the institutions

that sponsor them. And they should be asked about thematic fashions, not necessarily linked to the conditions imposed by their sponsors, which in research can have much more to do with the personal and often spurious interests of the researchers. The analysis should not stop there, since the behaviour of many of the latter institutions are related to different conceptions of knowledge, the importance of its application to the resolution of concrete problems, or the furthering of abstract knowledge.

A similar exercise can be carried out for the other actors. In the case of structural actors, such as certain political institutions often motivated by electoral considerations, problems like air quality are unappealing when they are not apparent, because their invisibility renders them absent from the agenda of a significant part of the population, and therefore they are not on the list of problems to be tackled. Other structural actors of civil society, such as industrial entrepreneurs whose businesses cause various levels of pollution, very often have tried and managed to externalize their environmental costs and impose them on society. A growing number, however, have begun to limit recourse to that safety valve as the leading firms impose a wholly different style by means of quality certificates. The current concern for many companies in the vehicle manufacturing, parts and fuels sectors and is how to upgrade vehicles so as to reduce air pollution (at least by the best known emissions) and thereby legitimate the unlimited use of the car in the transport system.[20]

Hence it is a question of locating citizens in their rightful place among the decision-makers, in this case as regards air quality and its present leading cause: the transport sector. For that to happen, however, citizen awareness must increase to the point in which the public feels a need to take part in decision-making and implementation. The question is: how to do that? Many of the hypothetical responses in the three case studies assume a State that generates awareness among the population. In circumstances wherein (in many cases) representative democracy is not a true expression of the citizenry, such awareness-raising must be undertaken elsewhere.

It is impossible to generalize in the different cases, even more so with the very limited information available on each one. In each metropolitan area an effort will have to be made to identify, from among all the structural and functional actors, those that share this approach, and thereafter to coordinate them to undertake this process of awareness-raising. Implicitly, this is based on the premise that, in principle, a participatory democracy is

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[20]   Although this issue is not addressed in depth here, the problem of global pollution (manly the greenhouse effect) is essentially related to emissions of CO_2, a gas produced whenever fuel is burned. If the improvement in emissions of pollutants with more local effects (CO, NO_x, SO_x, O_3, etc.) leads to greater use of the car as a means of transport, this will increase CO_2 emissions and thereby promote climate change.

possible in the region's current political context. There is a chance of concluding a new social pact between citizens and the authorities, one in which the mechanisms of power are reorientated.

In light of what has been said hereto in this chapter, some considerations might foster continuance of the efforts made thus far. The aim is to exploit existing knowledge in order to devise policy alternatives for improving air quality. In that process, citizens raise their awareness of the problem (its nature, its effects on health, and its causes, including their own responsibility to act in an environmentally-friendly way) as they take part in developing the alternatives.

There follows a possible (and tentative) work programme to meet that goal.

1. This first effort in the studies on citizen awareness and air pollution in the three metropolitan areas represents clear progress in the research. The operational recommendations should be gone into in more detail in national institutions responsible for environmental matters. This more extensive examination is justified by the fact that these are the three most polluted metropolitan areas in Latin America.

2. The new studies should be undertaken on the basis of an initial identification (using the studies herein) of the greatest possible number of actors involved in the issue of air quality. The aim is to understand: i) the determinants of their behaviour, such as personal objective and values/worldviews; and ii) the potential of their activities to bring about change and influence the behaviour of others.

3. The research will have to involve cooperation with and transfer to the population, those structural and functional actors whose conduct is consistent with citizens' interests. They can be identified in the process noted in point 2.

4. Using the knowledge of those involved and by means of dialogue with the population through the work of their own organizations, an effort should be made to devise viable alternatives for policies to improve air quality. These alternatives should facilitate the development of coordination in which citizens' interests are present.

5. On the basis of the foregoing, projects to improve air quality can be developed in agreement with the public. In that context, as one of the actors involved, the public can ask for an executive role in direct initiatives, in controlling the activities of third parties, and in other endeavours.

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