

INEF-Report

Institut für Entwicklung und Frieden (INEF) der
Gerhard-Mercator-Universität – GH – Duisburg

Competitiveness and Environmental Policies: The Cases of Chile and Korea*

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Projekt
Meso
NRW

Heft 42 / 2000

Gerhard-Mercator-Universität
Gesamthochschule
Duisburg

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INTRODUCTION

Competitiveness and sustainability share a common aim: to use resources more efficiently. In the long run, unsustainable production patterns may lead to the depletion or degradation of natural resources, and that means loss of future competitiveness.

The concept of sustainable development was endorsed by most of the world's governments during the Rio Summit in 1992 as a priority principle for public agendas at the local, national and supranational levels. There are ethical, political and economic implications to this consensus, borne out by an expectation that the sustainability of a country's development pattern should be reflected in its capacity to achieve goals in such interdependent fields as environmental balance, social justice and economic prosperity. (Rio Declaration, 1992)

A state of environmental balance is recognized as one of the foundations for achieving sustainable development, not only in individual countries, but also on a global scale. Hence both the Rio Declaration and Agenda 21 acknowledge its importance and urgency, both as a priority for governments and international organizations, and as an objective for economic and political agents, institutions and civil society.

In this context, the design and implementation of environmental policies at national level may be a decisive factor in promoting capacity-building processes, at the same time reconciling issues of environmental sustainability with goals for development and growth. As Jänicke outlines, the debate

on capacity building around environmental protection is currently associated above all with developing countries which are "candidates" for receiving expertise and the transfer of good practice from the most successful donor countries, assuming that these might be regarded as models worth imitating" (Jänicke, 1997).

These considerations acquire special relevance in those developing countries which have registered major economic growth in the last few years. The present contributions focus on the recent cases of Chile and South Korea, often (though for different reasons) regarded as economic models of growth in their respective regions, and whose environmental legislation, capacities and institutions are relatively new.

In the case of Korea, a strong state led rapid industrialization and sustained high economic growth in order to break out of domestic poverty in a relatively short period of time. In some industrial sectors Korea has been able to develop its own technological capacity, and some companies even began to emerge as market leaders in first world markets. Because of this remarkable performance Korea has often been cited as a model of development by the World Bank, but too little attention was paid in the past to the environmental aspects of this rapidly growing economy. In fact, substantial environment protection measures were incorporated somewhat belatedly into Korea's political apparatus around the early 1990s. Korea is a "late cleaner". Nevertheless, there are now some notably active civic organizations and many more environmental institutions, while the big companies are trying to be green.

The Chilean case is characterized by a rather small economy which, from the mid-seventies, pursued a model of growth with a considerable neoliberal bias and broad market deregulation as the country opened unilaterally to international trade and the role of the State was pruned back. This strategy was followed from the early eighties by strong export incentives, which have consistently encouraged a productive structure geared to the extractive industries and the primary elaboration (mainly commodity oriented) of natural resources, both renewable (forestry, fishing) and non-renewable (mining), in a context of sustained growth (over 7% annual average rate for the period 1984–1997) and rising investment rates (reaching 29% of GNP in 1997).

The two case studies display certain common features, such as a previous lack of any environmental regulatory framework during decades of strong economic expansion, the late arrival of the environment issue on the public agenda, the slow incorporation of channels for public participation and dialogue with non-government organizations, and the accrual of an environmental debt – resulting from the former absence of protection – which both societies have had to confront since the beginning of the present decade.

Nevertheless, they also provide plentiful illustrations of substantial differences with regard to factors such as the role and leadership of the State, capacity-building processes, priorities for environmental instrumentation, the relationship between the State and industry, and the strategies more recently adopted by companies under pressure to maintain or improve their position in international markets.

Having identified existing capacities, the strategies of various actors, and the main instruments of environmental policy along with their performance to date, these papers will in each case single out a number of elements for the actors (State, companies, institutions) to consider in seeking a framework of protection and an environmental balance which will allow them to reconcile aspects of competitiveness and sustainability within their development models and productive structures.

COMPETITIVENESS AND ENVIRONMENTAL POLICY IN CHILE

Elements for a Diagnosis

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1. General purpose and summary of conclusions

According to World Bank statistics, Chile currently ranks as an upper-middle income developing country. Its annual per capita GNP is around US \$5,000 (Central Bank of Chile; 1998), and adjusted to purchasing power parities, it rises to around US \$9,500 (WB, 1997).

However, the distribution of income is highly concentrated among the richer segments of the population, so that by 1994 the poorest 20% only received around 3.5% of national income. According to World Bank estimates for the period between 1981-95, 15% of the Chilean population were still living below the poverty threshold for smaller incomes of US\$1 a day. This indicator compares unfavorably with countries with a lower per capita income, such as Colombia or Jamaica, and it is equivalent to that of Mexico (WB, 1997).

The present paper deals with current environmental policy in Chile and the part it has played in promoting competitive and sustainable production patterns and practices in domestic industry. The central conclusion is that up to now the main incentive for any developments in the strategies and investment projects of larger compa-

nies has come if anything from other factors, such as the requirements of external markets or the internationalization of the economy. The government, for its part, has focused its efforts since the current environmental legislation entered force on: first, improving and expanding the legal framework with regulations and standards of a more specific nature, whose implementation has been rather slow; second, resolving severe problems of environmental deterioration¹ primarily by means of command and control measures; third, setting up CONAMA, a government agency responsible for ensuring a coherent public agenda and coordinating the regulatory and monitoring agencies which address environmental issues; and fourth, performing an active participation in international environmental forums and agreements.

However an obvious delay regarding environmental matters persists among non-exporters and SMEs, partly due to the tardy design and implementation of new norms and standards, partly to a poor understanding of its interaction with regulatory and monitoring bodies (generally perceived as punitive entities with neither the capacity to assist nor the remit to prevent). Another factor is the even weaker link-up with other institutions involved in technical consulting and promoting integrated approaches to competitiveness and sustainability, such as *clean production* or *eco-efficiency*. In this segment of companies there is a widespread lack of information about the scope of specific regulations and also about networks of potential institutional support. Thus, while there is con-

1 For example, the special program to improve air quality in Santiago; the PRAT program to rehabilitate Talcahuano's Bay; and the remediation plan for agro-forestry lands.

cern about possible sanctions, initiatives towards environmental improvements remain rare, if not the exception. Even in the few cases where SMEs have invested in environmental improvements, the solutions chosen have often not been the most appropriate given their core products, processes, and the scales involved. This indicates that market failures are occurring due to “immaturity” in the current supply of environmental technologies in Chile.

As for pollution control measures and the regulation of investments with an environmental impact, recent efforts and advances should be recognized, in particular implementation of the System of Environmental Impact Assessment (SEIA), and the implementation of special environmental remediation plans coordinated by CONAMA. However, inadequacies still remain in the public institutions, with a weak regulatory framework governing many sectors, and often precarious institutional support for business strategies aimed at achieving environmental compliance.

Environmental policies have proved effective to some degree in improving critical environmental problems which confronted the government in the early nineties as a result of widespread deregulation and non-existent environmental policy during the military regime. However, the current set of instruments is still far from demonstrating that it can instigate a competitive and environmentally sustainable path for growth.

Its credentials will depend on the country's ability, through its various actors, to make substantial advances in the following areas:

1) Enhancing the current regulatory framework. Priority should be given to designing and updating environmental standards. It will be especially important to expand and update laws relating to extrac-

tive activities like mining, fisheries and forestry, given Chile's strong productive and export focus on natural resources. In addition, debate should begin in the government and among politicians about scope for including environmental considerations in the design of economic policy mechanisms such as taxation and subsidies.

2) Strengthening public environmental institutions. Current deficits and institutional weaknesses must be overcome to existing environmental policy instruments more effective. Priority should be given to recognizing the high transaction costs inherent in the coordination function that CONAMA performs within the public sector and in its interaction with industries and civil society. More resources must then be assigned to CONAMA to build its technical and professional capacity and supply it with methodological tools to deal effectively with its multiple tasks at national and regional level. Similarly, it is important to strengthen supervisory and monitoring functions in the environment field and improve links between regulators, technical monitoring bodies, industrial chambers, trade unions, employers' associations and intermediate entities engaged in technical environmental support and consulting for companies. One initiative that public institutions could and should promote is the formulation of incentives and sanctions, such as voluntary agreements on environmental action involving productive industries or groups of companies together with inspectors from supervisory and monitoring agencies and other intermediates. A third role for the public institutions is to disseminate more information on environmental issues. This ranges from arbitration in environmental conflicts and keeping citizens informed to circulating information in environmental

markets by means of accreditation systems about consultancy, equipment and technologies. The public sector can perform another similar function by playing a more active role in promoting environmental certification systems and eco-labelling. This, after all, results in better information for the consumer, while at the same time helping to improve the competitiveness of national industries in international markets.

3) Reinforcing and linking institutions engaged in environmental research, promotion, and support for public and private environmental management. In Chile there are still not many bodies with a background in environmental research, development, and technology transfer to domestic industry, and those that do exist are often running below capacity, lack coordination, and have little tradition of working together, either because some are recent creations or because cofinancing schemes at public level (mainly competitive funding for projects) have not stimulated broader recent efforts to achieve adequate links between these meso-level institutions; on the contrary, in some cases these schemes seem to encourage fragmentation. Networking between these institutions must be stimulated and they must learn to address the productive sector in a more coordinated and efficient manner. Another good practice to promote is the regular exchange of experience in successful cooperation between these institutions and industry, as well as groups expressing public opinions and the media. In this sense, information has all the qualities of a public asset, and the state, in its third field of functions described above, should actively support its diffusion.

It might be argued, incidentally, that although many problems persist on Chile's current environmental policy agenda and

still await solution, this may turn out to be an excellent opportunity to avoid the past mistakes of public environmental administrations in other countries, which in practice have been real obstacles to implementing high common standards of competitiveness and environmental sustainability. In other words, Chilean environmental policy still has many challenges to tackle and problems to solve, but having come so far in its design and regulatory framework it should not constitute an obstacle to achieving the best international practice in this field.

Section 2 will describe the current legislative and institutional framework of recent Chilean environmental policy, its antecedents, economic context, principles, scope, operation, and decision-making mechanisms. It will also examine the current status of two key environmental policy instruments: the design and implementation of environmental standards, notably for water resources, and the system of environmental impact assessment (SEIA).

Section 3 will analyze current Chilean environmental policy, considering the actors at the macro-, meso-, and microlevels, their strategies, contexts, and interactions. This analysis will be illustrated by an appropriate environmental problem, in this case forest certification.

Finally, Section 4 will single out some critical aspects and consider how environmental trends in external markets might be combined effectively with domestic regulations to drive environmentally sustainable processes and technologies which, in years to come, will lend a competitive edge both to companies and to the country as a whole.

2. The legislative and institutional framework of Chilean environment policy

Chile is certainly a "latecomer" in environment policy and in the development of institutional capacity to design and administer this policy. Since the early nineties, when the opposition alliance succeeded the military regime, explicit reference has been made to environmental issues when formulating public priorities. However, the ruling coalition recognized that the administration of environmental affairs is embedded within an agenda embracing several other problems that also require appropriate solutions, e.g. poverty and improvements in education, health, and basic and industrial infrastructure (Escudero, 1996).

If we look back over the milestones to date, we find sound evidence for this belated entry of the environmental question into the public agenda: It was not until the end of Patricio Aylwin's government, in 1993, that the country was given an explicit formulation of fundamental environmental policy, which took effect in 1994 as a Framework Law ("Ley marco"). This Law marked the beginning of a complex process, with the establishment of new standards, regulations and more specific environmental instruments, and it was not until January 1998, when the government issued the first official document on strategic targets for Chilean environment policy, that 14 environmental issues were identified in fairly general terms for the country to tackle in the medium term.²

2 These topics are: Integrated water resource management; conservation and sustainable use of biodiversity; definition of the regulation and management of renewable natural resources; environmental certification for Chilean products; territorial management and planning; quality of urban life; environmental policy for the mining sector; energy

Similarly, environmental awareness is new in Chilean society. It began to make itself felt in the latter half of the eighties, when newly arising problems became visible, e.g. air pollution in Santiago,³ the saturation of rivers and bays due to water pollution, and conflicts about the collection and disposal of household garbage and industrial waste in the country's biggest cities. However, it was not until the early nineties that the environmental debate began to affect public opinion, as new environmental problems continued to emerge while older ones grew critical. Moreover, democratic transition opened up more channels of public information (Rodgers et al, 1998)

2.1 General antecedents and economic context

For a better understanding of how environmental concerns are integrated in the country's main strategy to enhance national competitiveness, it is worthwhile placing

and the environment; recovery of environmental debt; commitment to global environmental concerns and their implications in Chile; supervision and enforcement of environmental regulations and standards; environmental education and changing cultural patterns; collisions and overlaps between private rights and public environmental interest; environmental considerations in designing economic policy instruments. Section 4 gives more details about nine of these points.

3 Estimates suggest that industry and public transport release approximately 16 metric tons of particles per day into greater Santiago's atmosphere. Industry adds about another 110 tons of SO_x per day. Particulate concentration in Santiago averages over 100 micrograms per cubic meter per day. On critical winter days this index can surpass 300, while the standard permitted in the United States is 50 (quoted in Silva, 1997).

them in rough context, starting from the development strategy adopted by Chile by the mid- seventies. Earlier than anywhere else in the region, this strategy with its strong neoliberal bias was used to deregulate markets and unilaterally open up the economy to international trade.

This first stage ended abruptly with the collapse of the economy between 1981 and 1982 due to the country's excessive foreign debt (mainly the private sector) and a drop in the investment rate (under 15% of GNP) which, combined with steep rises in international interest rates, inhibited any new influx of external capital and threw the current and capital accounts deficit, already high, so off-balance that a deep crisis hit the national financial system, leading to an economic contraction of more than 14% of GNP.

From that point onwards the military regime, upholding the neoliberal principles of deregulation and open trade, adopted a strategy based on boosting exports by promoting a high exchange rate, direct benefits to the export sector (such as direct draw-back mechanisms), as well as wage, fiscal, and monetary policies that prioritized the control of inflation, which fell during that decade to annual levels of between 12 and 20%, significantly lower than those registered in the previous decade.

By the end of 1997, as a result of this strategy which the democratic governments essentially continued, the Chilean economy had witnessed thirteen consecutive years with average GNP growth rates of around 7% per annum, constituting the best period in its economic history this century. The investment share of product grew from 17.1% in 1986 to 28.3% in 1996. Savings likewise increased from 11.5% of GNP to an average of 24.8% in the period between 1990-1996. Inflation, meanwhile, exhibited

annual 1-digit rates from 1994 onwards, and is presently at an annual level of around 5%.

As the strategy intended, exports of goods and services became a driving force in the economy, reaching an average share of 36% of GNP in the period 1990-96, calculated on the basis of constant 1986 prices (Meller and Sáez, 1996, in Rodgers et al., ILO, 1998).

Export stimuli combined with the neoliberal view that markets are the sole guiding forces of the economy, while the state is relegated to subsidiary roles and its regulatory function pruned to a minimum, meant that the exporter dynamic shifted massively toward natural resources or commodities with an intensive input of these resources, in sectors where the country enjoyed either comparative advantages of a static nature (Pietrobelli, 1992) or advantages created several decades ago as a result of medium-term initiatives (Castillo et al., Cepal, 1995; Pérez-Aleman, 1997).

Excluding services, which in 1996 accounted for 20% of total exports, exports of merchandise in 1996 broke down according to the following pattern: 57% natural resources, 32.8% manufactures intensive in natural resources, and only 9.5% other manufactures. Another indicative fact for that same year is that, although more than 3,600 different Chilean products were exported, the top ten (essentially products related to mining, forestry, fishing and fruits) accounted for no less than 56% of the total value of exports.

In recent years this highly specialized pattern of products primarily for export has considerably increased pressures on the country's existing natural resources. Not only is this a threat to prospects for sustainable economic growth, given a foreseeable loss of productive potential for both

renewable and non-renewable natural resources and a growing impact on employment and incomes, but in addition to this the environmental degradation caused by overexploiting these natural resources could exert a negative impact on the health, productivity and quality of life of the human population and on the biodiversity of ecosystems, leading to environmental distress which, if it can ever be reversed at all, will call for a very expensive and slow process of repair (for further details see Silva, 1997). Even the government has recognized this in defining it as one of the 14 components of the future environmental agenda (CONAMA, 1998).

This intensive exploitation of renewable natural resources (in Chile's case mainly forestry and fishing, whose direct contribution to GDP is almost 8%) not only poses a severe threat to environmental standards and to the sustainability of the country's road to growth; in more immediate terms, it undermines the acceptability of Chilean products in the international markets at which they are targeted.

Most of these primary exporter industries also present investment structures with clear environmental impacts, either due to the size of the projects (frequently mega-projects worth over US \$500 million), or to pronounced interaction with the ecosystems where they are located, or specifically (in forestry and fishing), to the way they can affect the existing stock of renewable natural resources (Scholz et al., 1994).

The above reasons suggest that environmental debate should not focus only on topics of more immediate visibility to civil society, such as urban contamination and public health, but also on how the country's renewable natural resources are exploited and on the larger investment projects, most of them concentrated in sectors

with a great environmental impact, such as mining, forestry, fisheries and power generation. As the following sections will show, current regulations also seek to reflect these priorities.

2.2 Historical regulations and current legal framework

Chilean legislation includes laws on conserving natural resources and sanitary regulations on protecting environmental health which date back to the earliest decades of the present century. However, these regulations were never part of a single or consistent legal corpus. As a result, they were inorganic in character, dispersed across different sectors and subject over time to successive modifications, and during recent decades there was such widespread public and private ignorance about their applications and consequences that they were rarely observed, while enforcement and monitoring suffered from evident deficiencies. (CONAMA, 1998)

With this legal framework, public institutions devoted to environmental matters were on the whole scattered and poorly coordinated. No major changes occurred in this overall situation until 1990, except for an explicit reference in the Political Constitution of 1980 (still valid) to the citizen's right to live in an unpolluted atmosphere, and to the state's duty to guarantee this right and to conserve the environmental heritage. In spite of all this, the only step taken by the military regime to comply with this constitutional obligation was the creation in 1984 of the National Ecology Commission with a remit to formulate a national environment policy, a task it never completed. (Silva, 1997)

As there was no explicit legal hierarchy or institutionalized remit for carrying out the

state's obligations as enshrined in the Constitution of 1980, when the democratic government took power in 1990, it undertook to build the legal and institutional foundations for a fully-fledged environment policy, and also to generate technical capacities in public administration and channels of participation for citizens to voice their concerns about the serious problem of pollution and the overexploitation of renewable natural resources, which the state had accepted until then as the necessary price to pay for targeted production and export growth, as reflected in the military government's economic strategy. (CONAMA, 1998)

In March 1994 (a few days before Mr. Aylwin's administration came to an end), the Environmental Foundations Act (LBGMA) came into force. This law constitutes a first reference point in a new judicial order governing the country's environment. It establishes guiding principles for regulating various conflicting interests, based on the premise that no activity may be carried out which violates environmental sustainability. The law itself does not cover specific issues; rather, it sets up a functional framework and institutional responsibilities, as well as principles and procedures for applying present and future environment legislation.

2.3 Driving principles and selected instruments of environment policy in Chile

Seven principles inspired the formulation of the LBGMA and, in consequence, the current framework for Chilean environment policy. These were:

1. **Gradual approach:** This principle establishes that managing the environment should be implemented step

by step, given that reversing any degradation and reconciling "progress" with conserving the environmental heritage may call for more far-reaching interventions than those triggered by short-term measures.

2. **Realism:** The objectives of environmental administration should be compatible with true capacity and resources available to the state to perform regulatory and monitoring functions. Although the perspective is different, this principle ultimately has similar practical to the gradual approach described above.
3. **Prevention:** The aim is to avert environmental deterioration before it occurs by means of appropriate environmental education, ex-ante systems of environmental impact assessment for all new activity or investment, pollution prevention schemes and a clear demarcation of responsibilities.
4. **Polluter pays:** This is the principle that whoever potentially creates environmental damage must take account, in pricing the goods or services they wish to produce, of the cost of investments and measures required to counter pollution or to meet the standards laid down in the regulations.
5. **Responsibility:** This complements the previous principle by stipulating that anyone responsible for environmental damage must compensate the victims and restore the polluted medium (soil, water, air, other).
6. **Efficiency:** This urges that policy measures to combat environmental degradation should incur minimum social cost, giving preference to market-driven instruments and avoiding increased pressures on the state budget.

7. Civic participation: This outlines the need to encourage the direct participation of those affected and of different stakeholders in decisions concerning the approval, rejection or regulation of projects and initiatives that may cause an environmental impact, and to ensure regular channels for environmental information and education.

The gradual, realistic and efficient components are clearly intended to preclude fundamentalist approaches to environmental regulation and ensure that some consideration be given to existing state capacity for action on environmental matters, while reaffirming the central pillars of the competitive strategy adopted by the country in the recent past: sustained economic growth, commitment to market mechanisms as the main instrument for allocating resources, and a strictly subsidiary role for the state, with explicit limitations on its size and a strong emphasis on its efficiency. As we shall see below, this self-imposed restriction on the public actor has been the cause of harsh criticism when evaluating the effectiveness of Chilean environment policy, given the size and power of the companies and investors involved in recent conflicts. On the other hand, it might also be argued that without these principles of political moderation and pragmatism, conflict triggered by abrupt measures might in many cases have precipitated a legislative impasse rather than a solution.

Practice around the preventive principle starts with the LBGMA itself. This establishes the duty to provide an environmental impact assessment report for any investment project, public or private, whether it is based on national or foreign capital, if it exceeds a certain financial volume or envi-

ronment threshold⁴. The purpose of this evaluation is to ensure that any costs necessary to accomplish environmental standards and minimize impacts on third parties are covered. The system of environmental impact assessment (SEIA) is described in detail in the Act, and so far it is the principal instrument of environment policy in Chile. Besides improving the environmental standards of the projects, it is hoped that the SEIA will accumulate a base of institutional knowledge. Moreover, the SEIA is expected to act as a safeguard which helps to strengthen Chile's competitive credentials in world markets (Silva, 1997).

The principles of responsibility and polluter pays are intended to ensure that any agent failing to comply with environmental targets internalizes the costs incurred, rather than leaving this to the state. The law is clear that whoever causes the pollution should pay the costs of repairing the damage and preventing future pollution or environmental degradation. In practice, however, it is not always easy to establish who is responsible for particular environmental damage, which means that responsibility is often evaded. To reinforce these principles, two additional policy instruments have been proposed, similar to traditional "end-of-pipe" command and control practices: one, a classic stick-and-carrot scheme, is for companies to sign voluntary agreements individually or collectively, whereby the authority refrains from collecting duties or applying sanctions as long as industry implements an

⁴ The typology of projects subject to SEIA is described in detail in the SEIA regulation. Depending on their nature and the media and processes involved, there are many different threshold values which determine whether the project must be submitted for assessment.

environmental program previously drawn up by both sides. The second instrument is to generate a market mechanism in the form of tradable pollution permits. The first step in this direction has been to impose a legal duty to declare emissions, in this instance atmospheric particles and arsenic in Santiago's Metropolitan Region (Escudero, 1996). However, the rare international experience which has been gained with these types of instrument shows that, although they work in theory, their administration and control is not at all simple, so that they seem unlikely to be retained in coming years.

Finally, the principle of civic participation amounts initially to the creation of advisory boards at both national level and in each of the country's thirteen Regions. These are formal platforms of consultation and support for the National Environment Commission CONAMA. These advisory bodies consist of university scientists, researchers from independent centers, employers' and workers' representatives, NGOs and the government. The president of the national advisory board is the State Secretary of the Presidency, who is also president of the directive board of CONAMA. In the Regions, each board is chaired by the respective Head of Regional Government (*Intendente*). This principle has also influenced the decision structure defined for CONAMA under the LBGMA, which assigns most decision-making to the regional levels, thereby fostering a decentralized structure in a state with a strong centralist tradition.

The Regions have so far displayed different degrees of progress in consolidating their institutional agencies and adopting specific schedules for regional environmental policies (CIPMA, 1988). At present many critics argue that, on the basis of

recent experience, it is not enough to set up institutional channels for civic participation if these are not flanked by systematic mechanisms. Across a broad range of issues, the lack of method tends to create considerable frustration among stakeholders about the decisions which are ultimately adopted. This applies both to the resolution of environmental conflicts and to polling opinions prior to defining or improving standards, laws and instruments of environmental policy.

2.4 Creation and functions of the National Environment Commission CONAMA

The main institutional provision contained in the Environmental Foundations Act (LBGMA) was the creation of a National Environment Commission, or CONAMA. This commission is a decentralized public agency whose basic functions are:

1. to propose and coordinate public administration in the design and implementation of environmental policies and specific mechanisms;
2. to operate the SEIA;
3. to coordinate the generation of environmental regulations and the definition of regular and special programs, including their terms of implementation; and
4. to promote the participation of the private sector and civil society in environmental issues.

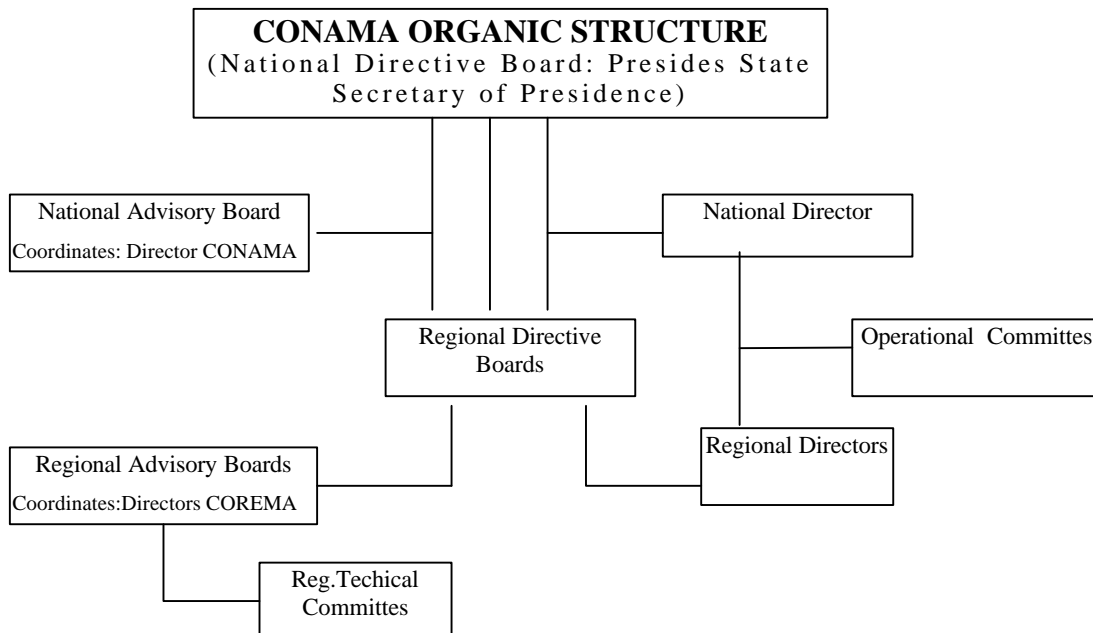
It is important to note that CONAMA's role in generating environmental regulations and standards is basically to coordinate the state apparatus, since approval is a matter for the different Ministries, through their own technical and legal departments. Reflecting these functions, CONAMA takes the form of an inter-ministerial

committee whose main decision-making body is the Board of Directors, consisting of 13 ministers and chaired by the State Secretary of the Presidency. The latter is a minister who might be defined as head of the President's technical cabinet and whose task is to coordinate government action across the different ministries and public services. The Executive Director of CONAMA acts as secretary of the Board of Directors.

At regional level CONAMA is organized through Regional Environmental Commissions, or COREMA, which are semi-autonomous. Each has its own Board of

Directors which, reflecting the structure of the national Board, is chaired by the Head of Regional Government (*Intendente*, designated by the President in each Region) and consists of the regional ministerial secretaries, four elected consultants for the Regional Council and the Regional Director of CONAMA, who acts as the COREMA secretary.

The decisions taken by the national and regional boards find expression in agreements, which are then complemented by instructions which each member passes on to the organisms within his or her remit.



Regional implementation of national board agreements is coordinated by each COREMA Director. We can see from this that CONAMA is a technical government agency which channels public participation towards elaborating and recommending agreements which are then approved by the appropriate board at national or regional level. To perform these functions, it is assisted by advisory councils and a national

staff composed of around 45 professional and managerial employees and about 20 technical and administrative employees across the country. In practice, the team is somewhat bigger thanks to third-party or loan-financed support personnel, mostly specialists, sometimes working with CONAMA on the basis of international agreements on technical cooperation.

Nevertheless, this is a small work force to tackle the wide-ranging tasks of coordination and administration expected of the Commission. Since its creation, therefore, CONAMA has been provided with additional resources from credits and international grants. The main source is a World Bank credit worth US\$11.5 million, effective since 1993, for developing environmental institutions in the public sector. The priorities of this program, due to culminate in 1998, are: to support CONAMA's Strategic Plan in the fields of environmental legislation, SEIA administration, environmental education, coordination with other public agencies and reinforcement of the executive tier; and to strengthen environmental institutions in those sectors regarded as high-priority, i.e. forestry, mining and manufacture.

Another large operation was concluded with the IDB through the Multilateral Investment Fund (MIF). It is a grant for US\$2 million, and unlike the World Bank credit, it is intended, via CONAMA, to build private institutions to train and assist industries in promoting and implementing standards and regulations now and in the immediate future (Escudero, 1996).

It is essential to realize that the responsibility for monitoring compliance with environmental standards and laws lies either with the regional agencies of public administration, such as regional environment and health authorities, municipalities, or marine inspectorates, or with sectoral agencies such as the National Fishing Agency, National Forestry Corporation, Agricultural Agency, General Water Authority, etc.).

The conception of CONAMA as a coordinating body for environmental policies whose enforcement and supervision is the direct responsibility of the appropriate

sectoral and territorial agencies has particularly attracted the interest of other latin american countries like Guatemala and Bolivia, whose governments are just beginning to implement environmental policies. It is a model which taps sectoral resources from different ministries and draws on mechanisms which facilitate the representation of diverse opinions in society by means of advisory bodies, systematically incorporating different components into the environmental programs and regulations which are adopted. (Zazueta, 1995)

In the case of CONAMA, given limited staff and resources, a first challenge has been to address domestic and international pressure for more civic participation by fostering the creation of spaces for dialogue and thereby helping people to recognize environmental reforms as opportunities rather than threats.

However, Chile's inexperience in dealing with environmental conflicts in both the public and private arenas, the very magnitude of these conflicts, the frequently asymmetrical balance of power between the stakeholders involved, and a wide lack of leadership training among CONAMA staff when it comes to the knowledge and skills required to drive civic dialogue, have combined to raise questions about the legitimacy of existing channels for public participation, and often the frustration runs as high as the expectations.

The design and structure of CONAMA have enabled it to fulfil its function of identifying inter-sectoral and inter-territorial problems and also of monitoring these. However, a recurrent problem is posed by the high transaction costs incurred by coordinating a number of outside agencies, especially cohesion has to be created around the action of different bodies. Evidently, too, there is limited capacity

to drive dynamic decision-making and to resolve conflicts and differences between the various actors.

2.5 Status review of environmental policy: two examples

To illustrate in more concrete terms how public environmental administration has evolved in Chile, this section will briefly describe two key environmental policy instruments and some recent advances that have been made. The first example refers to the design and implementation of environmental standards, which are basic regulatory instruments in any environmental policy. It would exceed the scope of this document to address the full diversity of these norms, and so we will confine our remarks to the specific case of water resources in the context of industrial activity. The second example relates to the SEIA, the most important preventive instrument for which present legislation provides.

a) Environmental standards for water

The LBGMA attributes a responsibility to CONAMA to coordinate the various processes aimed at devising new standards and modifying existing ones. Standards are the principal regulatory instrument applied by public environmental administration. Environmental standards may be primary, i.e. serve the protection of human health, and in this case they are uniform throughout the country; or they may be secondary, i.e. protect other components of the environment, and these can be restricted to specific territories.

According to CONAMA (1998), the pollution of water resources in Chile is primarily caused by the direct discharge, without previous treatment, of used house-

hold water and industrial liquids residuals (ILR) to the surface of rivers and the marine coast. A second, derived source of pollution are diffuse discharges from agricultural and forestry activities that indirectly enter surface or subterranean water bodies.

There are 27 significant hydrographic basins in the country. Water courses here receive the types of discharge mentioned above. Those recording higher levels of pollution are located close to the largest cities: the basins of Elqui (IV Region), Aconcagua (V Region), Maipo and Mapocho (Metropolitan Region), Rapel (VI Region), Maule (VII Region), Biobío (VIII Region) and Valdivia (X Region). As for marine waters, the main problems are concentrated along the coasts of Valparaíso–San Antonio, through the Río Maipo with discharges from the Metropolitan Region where over a third of the country's population live, and Concepción–San Vicente, through the Río Biobío.

Chile's lakes are concentrated in the south, and most of them do not yet show signs of eutrophication, which results from the excessive input of nutrients and an accumulation of heavy metals. (CONAMA, 1998; Mideplan, 1998)

Despite broad but fragmentary legislation, most of it local in scope (municipal ordinances), and the long-standing Sanitary Code regulations, enforced by the Ministry of Health, which in the main date back to the first half of the century, the following standards for water quality and emissions applied until the adoption of the LBGMA and the subsequent creation of CONAMA:

- Chilean Standard NCh 777, 1971, issued by the General Water Authority: regulates water quality requirements for sources of the drinking water supply.

- Chilean Standard NCh 1.333, 1978, issued by the General Water Authority: defines water quality requirements for specific uses: human consumption, animal consumption, irrigation, recreation and aquatic life.

- Temporary Standard, 1992, issued by the Health Supervisor: concerns discharges of liquid residuals to surface bodies of water. When the LBGMA was drafted in 1994, the distinction between environmental quality standards and emission standards as direct regulatory instruments applied by the environmental administration created an opportunity to supplement the older regulations laid down as described by the Sanitary Code, Mining Code and municipal ordinances.

CONAMA channeled its response through the Prioritized Regulation Programs (PPN), where new regulations are prepared and existing ones revised in priority areas defined on an annual basis. By 1998, 22 regulations had been prioritized and established in the first three PPN (period 1996-1999). Analyzing these programs, we observe that the major prioritization factor in the first PPN was the availability of information on which to base implementation. The tendency in the second PPN was then to extend the discussion to new problems where, even if information was deficient, there was at least agreement from the regulatory perspective about the urgency of tackling the issue, studies having cast light on the unresolved aspects. In the case of the third PPN the tendency was to provide a supporting framework for other environmental administration instruments, in particular the environmental Rehabilitation Plans for the Metropolitan Region and Talcahuano, PRAT. (CONAMA, 1998)

As for water, the first PPN (1996) prioritized primary water quality standards, the

discharge emission of liquid residuals (ILR) into sewer systems, and the discharge of liquid residuals into surface waters. In addition, six related secondary norms were prioritized, regulating chromium, molybdenum, other heavy metals, detergents, sulfates, and silts, among other pollutants.

The second PPN prioritized quality standards (as a complement to emission targets) for water courses and surface water bodies, and quality standards for irrigation water. The third PPN prioritized, among other things, discharge standards for ILR in sewer systems, and standards for marine waters in the Region of the Biobío (where Talcahuano is located).

However, only three norms had been approved by the first half of 1998: one on noise; one on primary air quality and particulate matter; and one on ILR. The latter was to be the first new regulation governing water resources, and as it is directly linked with industrial activity, a theme of concern here, we will consider its content and scope.

The regulation governing ILR discharge to sewer systems entered force during the second half of 1998. It stipulates that new industrial activities are obliged to comply with its provisions and sets a compliance deadline of one year for industries which discharge ILR into sewer networks if they already have treatment plant, and two years for industries without treatment plant.

Moreover, it stipulates that ILR must not contain radioactive, corrosive, poisonous, infectious, explosive or inflammable substances, and it limits the daily discharge with regard to oil, fats, aluminum, ammonia, arsenic, boron, cadmium, cyanide, copper, total and hexavalent chromium, hydrocarbons, phosphorous, mercury, manganese, nickel, leads, foams, solid

silts, suspended solids, sulfates, sulfurs, zinc and temperature.

The regulation provides that the silts or sludge generated by ILR treatment must not be discharged into the sewer system or any other site if they do not meet prevailing standards for solid residuals. It also defines maximum volumes for daily average discharges in relation to network capacity, and this must be agreed in each case with the local water company.

Monitoring compliance with these standards is the task of the water companies⁵, which also have the right to suspend the collection of ILR if this compromises the quality or continuity of the public service. The Health Supervisory Body (as the public entity which regulates the operations of the water companies) is empowered to inspect and enforce compliance with the regulation.

Finally, it should be mentioned that the regulation on pollutant discharges of liquid residuals to surface waters (which complements to above regulation on discharges into sewer networks) was heading towards definitive adoption during the last quarter of 1998.

This extremely brief review of advances in the design and implementation of environmental standards for water and its use eloquently illustrates two things: first, that the process of designing environmental regulations is structured around prioritized schedules, that it is consistent at national level, and that it takes account of for and mechanisms of consultation which, however effective, do exist and function, al-

lowing CONAMA to accumulate institutional know-how in an attempt to promote good practice as well as simple success factors. The second thing revealed by this example is that the process of generating environmental regulations in Chile is extremely slow. The reasons are probably multiple, and many can be attributed to external organisms rather than CONAMA. However, as part of its task as an interdisciplinary coordinator, this Commission should consider improving the process of establishing environmental regulations, since these instruments are key to promoting integrated environmental management among local companies.

b) System of Environmental Impact Assessment (SEIA)

The LBGMA created the SEIA as its main instrument for preventing environmental damage or industrial non-compliance.

The Environmental Impact Assessment is a compulsory evaluation study, or declaration in the case of smaller investments. Its approval has to be obtained before a project can be launched, be it public or private, financed with national or foreign capital, as long as any process, substance or effect is involved (such as gas, liquid or solid emissions, or noise) which may have an impact on the environment.

Submission of an EIA study is obligatory if any project component or process is likely to reach or exceed a value or scale defined in the corresponding regulation.⁶

5 Known in Chile as "empresas sanitarias". Currently they are beginning a complex privatization process which as a first step entails the sale of the water companies operating in the most populated Regions: V (Valparaíso), VIII (Biobío) and the Metropolitan Region (Santiago).

6 It contemplates minimum physical indexes for: aqueducts, reservoirs, siphons, drainage systems, drying surfaces, dredged defenses, power generation, central transmission lines, atomic reactors and related facilities, airports, terminals and roads or railroads, ports, navies, real estate projects in urban development, mining, dry extraction, pipelines, gaseoducts or similar, diverse industrial facilities (minimum limit determined by in-

Projects on a scale which falls below all the indexes laid down in the regulation may opt to submit an EIA declaration or a voluntary EIA study.

The SEIA is administered by CONAMA and the power to approve or reject a study or declaration lies with its regional bodies, the COREMAs (see section 2).

Besides assuring the environmental quality of investment projects, the SEIA is expected to create a base of institutional knowledge for CONAMA, at the same time acting as a credential for Chilean products and services in the international markets.

The SEIA operated in voluntary form between 1990 and 1994. By January 1999, 836 studies and 232 declarations had been presented. Of this total, 553 were approved, 412 went to review or appeal, 66 were rejected, and the remainder were withdrawn.

To date, the total volume of investment registered under the SEIA amounts to US\$38.5 billion. It breaks down mainly into the following sectors: mining (38.3%); real estate/tourism (9.9%); industrial manufactures (9.8%) and forestry (7.5%).

Once projects are approved, the LBGMA holds the COREMAs responsible for coordination and monitoring. Currently that work entails a range of difficulties due to the meager capacity of most COREMAs

and the limited support they can expect from the national body. The National Center for the Environment (Cenma), a joint initiative implemented in 1997 by CONAMA, the University of Chile and Japanese cooperation, is expected to provide support for this function. (Cenma, 1998)

The principal criticisms raised about the SEIA to date concern, firstly, the time taken to approve studies. Many investors regard the process as a bureaucratic brake on the mood of investment in the country, even though the regulation itself stipulates clear conditions for approval. In spite of this, files are left waiting in the in-tray while officers wait for more details, a practice which makes a nonsense of the established terms. The second criticism relates to the bigger projects, where environmental impact is usually higher. These frequently unleash differences of opinion in the weak regional structures of CONAMA, the COREMAs, between powerful investors and groups representing various interests. This situation is analyzed in more detail in the following section, which considers different actors and their strategies in the light of environmental problems (government, enterprises).

3. Actors and their strategies towards Chilean environmental policy

This approximate evaluation of the impact which present Chilean environmental policy is exerting on the competitive strategies of both companies and the country as a whole will draw in simplified terms on a framework of categories developed for national case studies by the Environmental Policy Research Unit at the Free University of Berlin (Jänicke and Weidner, 1995).

stalled power or average consumption of fuels), tanneries, agroindustries, slaughterhouses, facilities and cattle stables, development projects and forest exploitation, cellulose plants, wooden factories, exploitation, cultivation and transformation of hydrobiological resources, production, storage, transport, disposition or recycling of corrosive toxic, explosive, radioactive, inflammable or reactive substances, projects of environmental reparation, execution of works in parks or natural protected areas, application of chemical products in urban and rural areas.

This approach distinguishes between the following components, which interact in any system of environmental policy and which are recognized in chapter 37 of Agenda 21 as decisive elements in a country's capacity to develop productive patterns of sustainable development (cit. in Jänicke, 1997). They are:

- 1) actors,
- 2) policy strategy,
- 3) structural framework conditions,
- 4) the situational context, and
- 5) the environmental problems.

Given the purpose of the present work, specific markets or sectors will not be considered (even though the tools would perfectly enable us to do this). Rather, we will look in general terms at the first four components and the way they interact, trying from a national perspective to identify possible incentives or conflicts introduced by environmental issues into the competitive strategies of economic agents and into the competitive performance of the country itself. The fifth component will be approached through a specific problem: the primary certification of forest products (i.e. forestry exploitation patterns). As a spin-off, some arguments may well emerge for the debate about the present effectiveness of Chile's environmental instruments, although that is not the purpose of this analysis.

3.1 Actors and Strategies

Five main actors can be identified on the Chilean stage when we talk about high standards of competitiveness and environmental sustainability. They are: i) the government, responsible for the design and the implementation of policy instruments; ii) the public authorities responsible for monitoring compliance with environment

regulations; iii) NGOs with environmental concerns; iv) chambers of industry and companies, and v) other civil society groups.

a) The government

Although the current basis of government environmental policy was described in section 2, along with the guiding principles, the framework legislation (LBGMA), institutionalized support and regulatory and preventive instruments, it is worth commenting here on aspects of government action aimed at promoting competitiveness on the basis of sustainable productive patterns. These are:

a.1) attempts to internalize environmental costs: current environmental law obliges economic agents to internalize the costs of pollution or environmental degradation, by making them pay in full for preventive measures and making those responsible foot the bill for repairing environmental damage. However, the difficulty of attributing responsibility for real or potential environmental damage, coupled with other weaknesses and institutional inexperience, has meant that in practice cost internalization is at most partial. Market instruments to reinforce this strategy, such as the tradable emission permits, are still under review, as it is not entirely clear how easy they will be to apply, given limited international experience in this field. On the other hand, the problem of internalizing the costs of environmental prevention should in theory have been solved by requiring a COREMA to approve an environmental impact assessment provided by a company manager or investor. In practice, if a project entails a major impact the complex bilateral negotiation game is usually easy to win, with a rather weak

regional public officer sitting on side of the desk opposite highly competent professional staff hired by powerful private investors. These tensions are often reflected within the state apparatus itself, where we find the conflicting aims of promoting and facilitating productive investments while seeking to prevent their environmental impact. This is exacerbated by the fact that regions tend to be responsible for the latter policy, and central tiers of government for the former.

a.2) growing public expenditure on environmental measures: there are different estimates of the total public expenditure devoted to environmental measures. During the launch phase of CONAMA and the rehabilitation plans formulated to combat pollution in specific areas, the Aylwin administration probably spent US\$33 million, more than five times the total expenditure of the military regime on environmental matters (WIR estimate in Silva, 1997). However, this figure rises significantly if we consider all public spending on environment-related programs. For instance, in 1991 total public expenditure on environment-related measures rose to US\$185 million (Solari, 1993, quoted in Rodgers et al., 1998). In any case, whichever statistical source and methodology is used, it is clear that the state had to increase environmental spending significantly as the only way to deal with problems which have grown more acute in recent years, such as Santiago's air pollution, water pollution in the north of the country due to extensive copper mining, and the need for reforestation and soil remediation in arid lands.

State action has not, however, been confined to alleviating the worst environmental degradation. Two government

agencies set up to promote company management, have devoted growing portions of their budget to subsidizing technical assistance for small and medium enterprises in matters of environmental management and technologies (Corfo), and providing detailed information about environmental requirements in destination markets for exported products (ProChile). As environmental questions were raised about the use of copper in pipes and ducts (and almost half the domestic output of this metal is still in state hands), Fundación ProCobre played an active role in the debate and in the search for new uses, financed by contributions from the state company Codelco. Public resources have also been channeled into encouraging upstream efforts in R&D, technology transfer, creation of know-how and even the temporary stimulation of domestic supply in immature markets (for e.g. laboratory analysis, environmental audits) using the network of public technology institutes (Intec, Infor, Inn, Ifop and Ciren), the Mining Research Center Cimm, Fundación Chile, and more recently, the National Environment Center, Cenma. Most of the money from public resources for these pre-competition environmental measures is decided on the basis of competitive funds, and the institutes are required to submit, among other things, a project business plan which envisages at least some future leverage of resources from the private sector.

In spite of this range of government action on the environmental front, evident deficiencies persist. One is the reduced commitment to research which can guide strategies and priorities in the field of public administration. This has resulted in a lack of basic information for decision-making in different environmental fields of public administration and also in the man-

agement of other R&D institutions when they need to define and prioritize their focal themes. The second deficiency concerns an apparent lack of communication between the institutions which finance and develop pre-competitive and R&D projects related to the environment. The massive orientation of resources toward competitive mechanisms has strengthened this tendency, with different institutions vying for scarce funding. There is little incentive, therefore, to cover the transaction costs incurred by promoting and managing joint or even interlinked initiatives.

a.3) moves toward flexibility, decentralization and coordination in the environmental administration: the LBGMA proposes various environmental policy instruments whose use depends not only on environmental criteria but also on economic, technological and social factors. The express intention here is to avoid the classic rigidity that characterizes most "command and control" instruments, especially in technological matters. Other features, such as CONAMA's decentralized structure, the promotion of voluntary agreements between the environmental administration and industry, and direct interaction between regulators and local management, should encourage "stick and carrot" schemes to induce companies to comply with environmental standards. However, the first wave of regulations to be triggered by the LBGMA have only just entered force, and it is too early to judge.

As for intragovernmental coordination, in the LBGMA and CONAMA's statutes regulators placed particular emphasis on establishing mechanisms for permanent coordination with the entire spectrum of public bodies responsible for various policy and sector regulations, and also with

authorities in the economic arena. The latter was to be facilitated by an environmental coordination unit at the Ministry of Economic Affairs, which would, for example, maintain regular links with Corfo, ProChile and the technological institutions. It was this unit which generated the National Secretariat for Cleaner Production in early 1998.

a.4) accession to international agreements: since the environment has become a major focus of international relationships, the Chilean government has recognized the need to regulate problems such as the use of international territories, the depletion of common natural resources, activities which pollute or threaten the human environment, trade and international traffic. It endorses the view that every country bears responsibility for the common human heritage and therefore has environmental rights and duties which may affect its relationships with other nations (Squire, 1996).

Given the strong integration of the Chilean economy in the international markets, the democratic government has acceded to and participated actively in most international agreements. In very broad terms, the international agreements to which Chile is a party can be classified in three chronological groups:

- *Long-standing:*

Antarctic Treaty (1961), Washington Convention (1967), Agreement on the Preservation of Antarctic Species (1971);

- *Signed by the military regime:*

SOLAS (Safety of Life at Sea, 1974, and later amendments) and CITES (International Trade in Endangered Species, 1975), Regulation on Whaling (1979), Bonn Convention (1981), Protocols on protecting and combating pollution in the South-East Pacific (1986);

- *Signed since 1990 (democratic regime):* Montreal Protocol (1990, Chile having participated actively in its preparation) and later Vienna Convention, Basle Convention (1992), UN Framework Convention on Climate Change (1992), Commission on Sustainable Development (Río, 1992), Biodiversity Convention (Río Summit, 1992), Agreement on the development of Andean towns and the protection of South American llamas (1994), United Nations Convention on the Law of the Sea (1994), Convention to Combat Desertification, Agenda 21 action plan, and various bilateral agreements

The government recognizes that commitment to these international treaties has replaced the vacuum in domestic legislation which persisted for so many years in some fields.

b) Public environmental regulators

Chilean environmental policy draws a clear distinction between the function of designing and promoting measures on the one hand and supervision and monitoring on the other. In this field, CONAMA merely administers the SEIA, which is intended to prevent environmental damage. All responsibility for supervising environmental regulations and penalizing non-compliance lies with decentralized state agencies, some of them attached to the Ministry of Health, and others based in a particular sector, such as forestry, agriculture, mining, fishing or water resources. The municipalities have powers to inspect activities and impose sanctions and may allocate penalties for environmental non-compliance. In Chile public agencies are known for their commitment to legislation and relatively low levels of corruption. This is borne out by rankings which give the country the best showing in the region.

However, decentralized structures are often hampered by excessive bureaucracy when more than one agency is involved, or if non-specialist bodies are expected to administer different environment regulations (the case of the municipalities). Rather than ensuring better environmental supervision, this tends to foster confusion and excessive delays, ultimately encouraging irregularities.

We should mention three initiatives launched by CONAMA to improve environmental supervision procedures. The first one is a training module for public officials included in the Action Program financed from the World Bank credit. The second, more recent, is the promotion of voluntary agreements, the aim being to bring together industry, departmental inspectors and environmental institutions in pursuing a timetable for the gradual implementation of environmental standards. This initiative forms part of the CONAMA-MIF Project which operates with a grant from the IDB. Moreover, the Ministry of Economic Affairs, with support from the German GTZ, has set up the National Secretariat for Cleaner Production which has been working within CORFO since mid-1998. The Secretariat is intended to serve as nexus toward the private sector to promote the concept of clean production, based on preventive principles, eco-efficiency and voluntary agreements by industry. Finally, the third initiative has been the creation and launch of the National Environment Center, with backing from Japan and the University of Chile. Its main functions are to generate and improve the quality of environmental information, to build technical capacity for the design of environmental standards and instruments, to act as a reference center laboratory analysis, and to offer broad technical sup-

port to public and private organisms in any task of environmental concern.

c) environmental NGOs

There is wide consensus about the important role played by some environmental NGOs during the eighties, at a time of what we might call extremely weak environmental policy. Most of them represented or were financed by international ecological organizations. According to Silva (1997), the origins of the ecological movement in Chile date back to 1963, when the Committee for the Defense of Flora and Fauna, CODEFF, was founded. Its essential remit was to preserve the biodiversity, and for many years it was able to draw on exclusive international support (including from UNEP). Only in the last few years has it enjoyed indirect support from the state.

Some years later the Institute of Ecology was born, and it tried to influence the authorities to set up a regulatory environmental framework in Chile during the military regime (Silva, 1997). The Research and Planning Center for the Environment (CIPMA) has been another reference body in the Chilean environment landscape since it was founded in the early eighties. Its primary activity is the production and organization of information about environmental aspects of the economy, above all designed to promote environmental regulations and administration at local levels (Zazueta, 1995).

The Institute of Political Ecology (IEP) was founded in 1987 with a political perspective and an orientation toward research, the dissemination of its findings and ecological action. At present its agenda focuses above all on pushing for channels of civic participation at the level of local actors. It is one of the four organizations

currently supporting the civic network Sustainable Chile.

Similarly to the IEP, several environmental NGOs which emerged in the late seventies and early eighties developed more radical environmental perspectives along the line of a "new left" (Silva, 1997), while CIPMA has maintained its mediating role in the search for consensus between various stakeholders and in drawing up a public agenda for the environment since the early nineties. Like other, smaller NGOs CIPMA has recently been developing an active advisory and training role on environment issues for employers' associations. At the technological and scientific level, there are very few university centers geared to environmental research, and this reflects the institutional weakness described under a). We should mention, among others, the Centro Eula at the University of Concepción, devoted to applied research around the basin of the Río Bio-bío, and on other issues there is the research into environmental economic policy conducted by Osvaldo Sunkel at CINDA (Inter-University Development Center), which has attracted more attention abroad than at home. (Min. Economy, 1997)

d) Companies

d.1) companies with a demand for environmental technologies and services:

Among large companies, environmental concern certainly began before the current legislation came into force. Two factors would have been key in this: economic globalization and opening up to foreign investment. In mining, big investment projects financed by external capital began setting precedents in innovative environmental management in the latter half of the eighties. In many cases an adequate environmental strategy was seen as a necessary

condition to acquire finance. Something similar occurred, although on a smaller scale, with capital intensive investments in extractive industry and primary processing based on other natural resources (e.g. cellulose, timber, salmon industry, agro-industry).

The biggest domestic companies, led by the state mining companies Codelco and Enami, have increasingly applied environmental management technologies in the last decade, building capacities and earmarking resources to resolve pollution problems, especially treatment for liquid effluents and gaseous emissions. It is noticeable that "end-of-pipe" modifications to industrial processes often preceded the introduction of new environmental standards in the legislation. (Chilean Foreign Investment Commission, 1998)

Similarly, it is interesting to note what has been happening in companies which export resource-intensive products or non-commodities such as salmon, wines or processed timber products, and more recently the agro-industries. The requirements of external markets have compelled most companies in these sectors to introduce environmental management for such key aspects of their activity as ingredients, processing and packaging. (Scholz, 1994)

The ISO 14000 framework is now also encouraging these industries to eliminate environmental problems further upstream, i.e. during the cultivation or extraction of the natural resources they use. This demonstrates that companies are not waiting for domestic legislation to be introduced before displaying their own competitive response to the demands of destination markets.⁷

⁷ By January 1999, only 4 companies had been certified under the ISO 14000 series. All of them are certified under ISO 14001.

However, there is also a less idyllic side to managerial behavior. There are at least two arguments to consider here. First, the size and lobbying capacity of major companies and investors means that –while an investment project or expansion to production is awaiting EIA approval – the relatively weak regional COREMAs often come under fire from several quarters, even from within the public administration itself. This inevitably affects the due process of technical validation. In the same spirit, we should recognize that the public environment institutions still suffer from clear technical weaknesses. One sign of this is that the COREMAs often have to request extensions to the deadlines laid down in the law for the approval or rejection of EIA reports when the projects concerned are fairly complex. These delays are grist to the mill of company or investor lobbyists.

The second problem is that the great majority of SMEs have not yet developed the capacities they need for environmental management, and it is unlikely that they succeed in the near future. With the exceptions of Asexma (exporters of non-traditional manufactures) and Fepach (export-driven agrofood processing industries), most associations of SMEs have not so far encouraged their members to improve their environmental performance or to make use of the public subsidies and technical assistance available. On the contrary, they tend to adopt a defensive line toward CONAMA and other public regulators. A more constructive approach to environment issues is gradually taking hold, with

All of them are large forest and cellulose companies: Santa Fe S.A., Monte Aguila S.A., Millalemu S.A. and Linacel S.A. Among them, only Monte Aguila is certified for forest exploitation.

the support of more recent private institutions which manage public resources earmarked for technical assistance, such as Propel (Latin American Center for Eco-efficient SMEs) and Cepri (Center for Industrial Productivity), an umbrella for various bodies. Because relatively small companies are not very well informed about environmental regulations and their implications, they are often tempted to invest in oversized or inappropriate technologies, spurred on by commercial consultants, or else seek to evade standards by means of irregular practices, frequently undiscovered because of the poor supervisory capacity of local agencies, especially areas where resources are meager.

The informal economy still accounts for a significant number of outfits in sectors such as food processing or electrical maintenance, although their numbers are now falling as various promotion programs enable them to formalize their activities. While they remain informal, these companies face a more complex situation, since they are not eligible to apply for the programs and measures designed to offer technical assistance. Although in the main this sector is not causing serious pollution, in some cases it does generate nuisances at local level, while workshops are often a health risk to those who work in them. Being informal, they are excluded from preventive inspection.

Finally, in spite of declared government interest, financing SME investment in clean technologies remains an unresolved problem. For companies of this kind, whose revenues are usually US\$1 million per year or less, access to credit is always difficult, but with investments of this type the difficulty is compounded by the lack of knowledge which most bankers have of the subject. This encourages them to demand

even more exorbitant guarantees than usual.

d.2) companies supplying the environmental markets: The recent normative framework and growing demand for environmental technologies and services have stimulated the emergence of a domestic environmental market which in 1992 was estimated to be worth US \$560 million a year, making Chile the largest environmental market in the region relative to the size of its economy. However, the same estimates suggest that imports account for 89% of this market. If this is correct, the aggregate value of domestic supply is only US\$60 million. In relative terms, this is comparable with Argentina, Brazil and Mexico, but higher than Colombia and Venezuela. (Source: US-Aid, in Barton, 1998)

There is no doubt that in recent years some NGOs, but above all new environmental consultancies, have established positions in the environmental services market mainly due to the state demand for studies and the requirements of the SEIA.

e) Other actors

Other civil society actors are only just beginning to enter the environmental debate in Chile. In general, these are campaign groups composed of people directly affected by specific situations. They have usually been stung into action by projects which might cause environmental deterioration or threaten their security, health, or cultural heritage.

One example of this focused on the project to build the Ralco hydroelectric power station, undertaken by the powerful Chilean/ Spanish company Endesa. The Pehuenche community on the upper Biobío river has been resolutely opposed to the

project, which promised major improvements to the security of the electricity supply for the entire central region of the country, where about 90% of the country's population is concentrated. The families concerned rejected government offers to buy their land, insisting that these had a sacred meaning for their people.

The situation created within the government structures involved. In fact, the Commission of Support to Indigenous Towns (Conadi) had to be re-appointed soon after this episode to make it easier to transfer the land required to carry out the investment. This drew strong criticism from environmental conservation organizations, concerned about the project's impact on a vast ecosystem. This reflected the objections originally raised made by CONAMA, causing further tensions the government.

There have been similar cases, although smaller in impact, where groups of affected residents have organized to boost their negotiating power in the face of investors, and once the EIA report has been approved they have been able to obtain financial compensation. There have also been cases of citizens motivated purely by an awareness of what they perceive as an environmental threat, such as the nuclear tests in French South Pacific. Apart from these isolated cases, however, there is a virtual absence of wider debate about environmental economics. In part at least, this can be ascribed to a lack of public and private actors whose function is to inform the community and prepare the mechanisms for discussion.

A recent initiative worth mentioning because of its possible consequences in the future is the civic network "Sustainable

Chile"⁸, set up in 1998 by the NGOs Renace, IEP, the Latin American Observatory of Environmental Conflicts, and the Universidad Bolivariana. This network brings together opinion makers around an Advisory Council, and its first task has been to draft a proposal called "Toward a sustainable Chile", with a timetable for regional tasks and targets up to the year 2020. This will be debated with the authorities, relevant actors and general public. Their work, however, is still at an early stage.

As for the media, their role has been rather secondary, with a clear bias in economic journals toward the interests of investors. The information provided lacks deeper, critical analysis.

3.2 Framework and context

In analyzing environmental aspects of the competitive challenge in Chile, the key contextual elements to bear in mind are, first of all, growing environmental requirements in destination markets for domestic exports; secondly, the internationalization of the domestic economy; thirdly, mounting civic awareness of the environmental problems and risks which certain productive activities pose for their immediate and not so immediate environment; and fourthly, the growing international dimension to regulations and commitments, which have increasingly fuelled a need for governance around global environmental problems.

Although each of these factors has exerted a consistent influence on the strategies adopted by the diverse actors, we should not ignore events which "temporarily determine the situational context" (Jänicke,

8 Community-based network "Sustainable Chile/Chile sustentable".

1997), in which environment elements play a relatively pronounced role, affecting actors and strategies to a greater or lesser degree.

a) Environmental standards in destination markets: If environmental requirements in destination markets are making an impact, this is undoubtedly due in part to the fact that the costs associated with the rejection of a product are much greater than the costs of supplying it, because rejection is a setback to international market positioning, often carrying an entire national sector along with it (consider, for example, wines, fruit, wood or salmon), incurring sometimes substantial reputation costs and possibly infecting other destination markets.

So far, export companies, their associations and some technical support institutions have developed two major responses to the problem: first, the promotion of environmental audits, or systems of environmental management, aimed in some cases at certification under ISO 14000; and second, the introduction of self-regulation mechanisms, either at the level of export consortia or, for smaller companies, in collaboration with public agencies like ProChile or Corfo. In this way, environmental issues have played a part in the broader arena of quality control and assurance for domestic products targeted for export. This tendency is borne out by empirical evidence that market-opening processes encourage economies with lower environmental standards to improve them in order to become more competitive in international markets. The view nevertheless persists, especially among industrial chambers and associations, that most environmental objections raised about Chilean products in external markets are motivated by protectionism

rather than any real problems or risks. This has prompted companies and employers associations to call on public organizations to devote more effort to supporting exports through an external network which would prevent and discredit such practices, even though they realize that the measure is unlikely to be effective and unbureaucratic. It would doubtless be preferable to pre-empt the problem by consistently meeting the requirements of these markets in terms of product ingredients, processing and packaging and, in some instances, desirable productive and extractive processes.

b) Internationalization of the economy: The progressive internationalization of the domestic economy has facilitated the promotion of better practices in environmental management, as already mentioned, with foreign companies setting a significant example to the major domestic companies, often in advance of national legislation. Among SMEs in tradable sectors where Chile currently enjoys some competitive advantages, the increasing mobility of managers and technical teams, whether on business or technological missions, has equally given them experience of international best practices in environmental matters. Adoption in these sectors, however, has nevertheless been rather slow for the reasons described above.

c) Evolution of domestic consumption patterns: Public awareness of environmental risks and impacts has been influencing a progressive change in consumption patterns, especially for products of selective consumption, where the domestic market is beginning to discriminate against or in favor of products labeled, for example, as "biodegradable" or "ozone friendly". However, and in spite of a recent

law to protect consumers' rights, the information they usually receive about the environmental quality of products they consume is confused. There are plenty of claims that products are "ecological" or "environment friendly", and this makes it necessary to establish clearer rules on eco-labeling and take advantage of this consumer awareness in order to promote the adoption of cleaner production processes by industry. Moreover, although environmental regulators now confront more active environmental protests from the community, they are also having to face public criticism that the most visible problems do not seem to be leading to any definitive solutions.

d) International agreements: Growing consensus among the international community about the need to prevent global damage to the environment has forced the government, conscious of major Chilean involvement in international markets, to subscribe to most of these initiatives, and in consequence to formulate proposals for implementing these agreements. In cases with a more immediate potential impact for the country (the Montreal Protocol, for example) the Foreign Ministry has played a more active role in the appropriate forums for such matters, as well as in cases which concern national economic interests (such as the restrictions which the European Union was considering on the use of the copper in constructions).

3.3 A specific problem: forest certification

In order to illustrate the roles and attitudes adopted by specific actors to a specific environmental problem, this section will examine the background to a survey of

opinion carried out recently in Chile about the certification of sustainable management and exploitation patterns in forests.

As a general rule, certification systems (quality, environmental, etc.) are voluntary and are inspired by market mechanisms when consumers reward environmental behavior on the basis of reliable information. In Chile's case adopting these systems could contribute to providing better information to consumers and improving the image of products, which in turn would boost these products on the international markets. Environmental certification, in particular, benefits from the existence of a quality system which is internationally accepted, and can therefore overcome potential restrictions to trade induced by isolated environmental objections.

In general terms we can distinguish between two approaches to certification. The first option focuses on environmental management within a company, covering a spectrum which includes environmental certification for everything from inputs and services to waste management and complete process management (ISO 14000). The second approach centers on product eco-labeling, for example, the German Blue Angel launched in 1971. (CONAMA, 1998)

In the case of forestry in Chile, one of the first problems is how to set up a standard of primary certification, focusing on the handling (or exploitation) of forest resources, which would enhance the market image of derived products (cellulose, paper, lumber). Although the four Chilean companies certified under ISO 14000 work in the forest sector, only one of them included forest management in its certification process. Chile has 13.4 million hectares of natural, or native forests, of which 7.1 million hectares are rated as having

productive potential. The country also has about 1.9 million hectares of forest plantations, mainly pine (70%) and eucalyptus (25%), both species of very rapid growth. These plantations have received considerable state support, with about 800,000 hectares subsidized between 1980 and 1997.

Overexploitation and the degradation of Chile's natural forests has been caused by both traditional and more recent pressures. Traditional factors include consumption of firewood, forest fires, the demand from wood processing industries, and the rural practice of combined pasture. These traditional pressures have increased in recent years. The new factors relate to the way development patterns have been evolving in the sector. First, native forest must compete for space against a forest industry based on monocultures and fast growth, fundamentally geared to cellulose production. Second, international demand for pulpable raw timber has increased the pur-

chasing power of small owners whose subsistence patterns of exploitation have been leading to the gradual deterioration and destruction of the forests without appropriate resource management techniques.

In this context, we should examine the attitudes of the various actors to the potential for establishing a certification system which could help to limit the negative effects of several of these factors, both traditional and new. A study carried out by the Forest Institute (Infor) and CIPMA identified the opinions and arguments of different groups and relevant actors with regard to forest certification, its merits and which kind of system to favor. Among its conclusions, the study highlights the favorable attitudes of intermediate purchasers of products toward the end of the production chain, such as publishing houses and department stores. These are the producers who are located close to the final consumer. The principal findings are summarized in the following table:

Actors' attitudes to forest certification

Groups and Sectors	Attitude	Arguments
Governments	The voluntary nature of certification limits its effectiveness. Active promotion of its use does occur nevertheless (e.g. Holland)	To improve forest sustainability. To strengthen the competitiveness of national producers in external markets
International organizations (IDB, World Bank, UN)	They have not developed concrete measures to promote certification. They support it verbally	Sustainability of growth patterns
NGOs	Favorable to FSC. They promote its use	Because FSC considers stricter environmental and social criteria
Consumers	Sensitive to the environmental aspects, but not very informed about what exactly forest certification means	Either because it has not been in existence long or because of poor information about certification
Distributors at the end of the chain	They promote the use of FSC	Social and consumer recognition
Companies which buy forest products	They promote use of forest certification, they prefer integrated single system FSC-ISO	They understand the behavior of the forest companies, but at the same time they are pressed by consumers and NGOs
Forest companies	They see certification as a cost burden. They prefer the ISO or EMAS system to FSC	Systems of environmental administration are less demanding than FSC in terms of forest handling practices.

EMAS: European Union Eco-Audit

FSC: Forest Stewardship Council. Forest certification established in 1994 as international standard.

Source: Summarized from the journal *Ambiente Ahora*, CIPMA, 1998

As we see from this case, attitudes to the environmental certification of forest handling are not completely polarized, but there are no further initiatives at present. The situation indicates a relatively frequent phenomenon in the use of voluntary instruments, which is that the industries con-

cerned (in this case forest companies) will only advance in the desired direction if other domestic players or external clients exert definite pressure, so that companies see non-certification as a threat to their operations.

In the absence of an appropriate regulatory framework (in Chile the Native Forest Act intended to regulate the sustainable exploitation of this resource has been virtually blocked in its passage through parliament for more than two years), the public actor will be expected to take more vigorous action to promote or address the demands of other stakeholders with regard to forest certification, generating information, and channeling cooperation with the forest companies towards this end.

4. Future challenges in Chile's environmental agenda

As was pointed out in the preceding sections, in spite of the fact that Chile's present environmental policies display, in their principles and instruments, elements that would encourage an invigoration of the competitive capacities of both the country and Chile's businesses, the evidence shows that any broad application of these principles and the effects anticipated from them has been limited by the presence of imperfections on the part of both market and state, i.e. shortcomings in the areas of learning costs and capital recovery times.

In the absence of direct competitive pressures, the effects on company performance of introducing clean technologies and environmental management are for the most part not perceived as entailing direct benefits for the operational efficiency of the companies, but are instead seen as an allocation of resources with opportunity costs regarding other elements of their short-term production and marketing strategies. Concepts like clean production or eco-efficiency which cast the competitive

challenges posed by quality, productivity, and sustainability in an integrative light of are as yet not very widely diffused among the business community, especially at the SME level. Another factor that has contributed to the slow advance of environmental concern within the productive sector is a delay in the implementation of environmental norms provided for the programs prioritized since 1995.

On the other hand, large companies dependent on natural resources, especially renewable ones, have only partial and relatively short-term visions of the challenges of sustainability associated with their exploitation patterns.

4.1 14 topics and three fundamentals underlying the invigoration of Chile's environmental policy

In 1998, the government addressed 14 topics considered as strategic priorities of environmental policy in Chile; the government has committed itself "generate the guidelines for dealing with the problems sees as the major environmental topics of concern to citizens." (CONAMA, 1998)

Of these 14 topics, at least nine must be regarded as closely related to the challenges of competitiveness. These are:

a) **Integrated management of water resources:** This includes the improvement of current regulations and incentives for the efficient and sustainable administration of this basic resource for productive and human activities.

b) Definition of political and administrative systems for renewable stocks of natural resources:

Such systems are to be oriented in such a way as to impart to the economic activities associated with them an effective regulatory framework (for example, the implementation of the law on native forests and improvement of the law on fisheries) with a view to permitting and promoting their sustainability.

c) Certification and accreditation of the environmental quality of Chilean products:

The aim is to improve the quality of information for local consumers on the features and environmental effects of products as well as to bolster their introduction to international markets.

d) Territorial planning and regulation of land use:

What is meant here is the need to regulate the relationship between productive activities and alternative uses of land. This is relevant to regulating positive and negative externalities between these two factors as well as their impact on the regional economies.

e) Environmental policy in mining:

Aimed at formalizing this for the first time as well as to enforcing compliance with the current environmental standards in this vast sector.

f) Energy and environment: To coordinate future energy requirements with environmental patterns in energy generation and improvements of the efficiency of energy use.

g) Control and implementation of current environmental regulations: It is recognized that some current control mecha-

nisms are precarious and inadequate, the need to modernize them is stressed.

h) Compatibility between and limits to private rights and the public interest in the environment:

This outlines the need to systematically establish a set of criteria to harmonize the development of free private initiatives, reflected in new investments and growth of economic activity, with the public interest in the environment, linked with the issues of sustainability and the population's quality of life.

i) Introduction of environmental considerations in economic-policy instruments:

This refers to the need to incorporate environmental incentives in fiscal instruments (for example, public budget, prioritization of public investment projects, taxes, subsidies), monetary policies (interest rates, exchange rate). Since this is an official document, it constitutes a significant signal in the debate, until now nonexistent, at the government level.

It is symptomatic that almost all of the topics addressed in this public document are connected with the improvement of the regulatory framework of environmental policies. Only in point c) on environmental certification is mention made of mechanisms of a voluntary character, but ones that likewise have regulatory effects in markets.

In fact, the full development of the inspirations and purposes of Chilean environmental policy has as its necessary condition improvement of the system of regulations. However, that condition needs to be complemented by a second high-priority axis of reforms and improvements corresponding to the invigoration of public environmental institutions.

It is evident that even the most complete or sophisticated regulatory framework does not guarantee good results per se. Public institutions and services should be able to demonstrate both monitoring and enforcement capacities. The effectiveness of more sophisticated instruments such as tradable emission certificates or even SEIA and environmental standards depends on the existence of regulatory competences on the part of public actors, otherwise they will prove imperfect, ineffective and tend to lack transparency. This implies not only an active and efficient inspection capacity, it also implies the design, monitoring, governance, and articulation capacities characterized in Section 3.

In the same way, the other functions present in CONAMA, such as 1) ministerial coordination; 2) strengthening of cohesion in the public sector; 3) identification and monitoring of cross-sectoral environmental problems; 4) promotion of best practices and incentives for industry compliance with environmental standards, and 5) its function as a channel for citizens' opinions and interests, will be difficult to carry out in the context of the current limitations of this entity in terms of both the quantity and the capacities of its staff. Based on the high transaction costs and externalities associated with their operation, efforts directed toward strengthening CONAMA's capabilities should have priority in any redirection of public resources.

The third axis of future challenges facing environmental policies concerns the need for improvement of articulation among institutions oriented to research, technology transfer, and promotion of the environment. The role of private entities or public-private partnerships such as busi-

ness associations, foundations, universities, R&D centers, technology transfer antenna, or technology institutes, should not be just to collaborate in the design phase and improvement of the regulation system but also in diffusing and supporting initiatives like ecolabeling, environmental certification, or other solutions in technology and environmental industrial management. A broader role of this sort has been proven to be decisive both to induce the formation of shared visions in society and to build the capacities of public and private actors to adapt their behaviors and strategies in such a way as to combine sustainability and environmental acceptability requirements with the exigencies of international competitiveness (Porter and Van der Linde, 1995)

A critical factor for this institutional mesospace concerns its financing. Chile, perhaps in more marked form than most other countries in the region, has privileged in the last years the use of competitive mechanisms to allocate funds to support institutions on a fixed-term basis. These funding mechanisms have among other advantages the ability to stimulate the competition to conduct relevant research, discouraging self-referential research, and stimulating the capacity to leverage collateral funds from private sources. As a disadvantage, however, they could bias the work of these institutions toward short-term activities, and when incentives for articulated and combined work are not at issue, they can favor the fragmentation of work, which, in the case of small and weak institutional networks such as those in Chile, could introduce inefficiencies, due to lack of critical masses or synergies. It is necessary to introduce corrective mechanisms for these tendencies in order to en-

courage greater articulation and correct any bias against medium-term R&D efforts. (Echeverría, 1998)

4.2 Some specific recommendations

The invigoration of the critical aspects identified in the previous point (regulatory framework, public institutions, and mesospace) requires the explicit will of the public actors to advance reforms to strengthen and to deepen already existing initiatives as well as an explicit commitment and active participation of the other actors. The following are specific proposals for stimulating and accompanying that process. The list does not seek to be exhaustive, although achieving these goals will contribute to progress in some or all of such critical aspects.

Improvement of the administration of the Environmental Impact Evaluation System (SEIA): There is no doubt that this instrument should play a relevant role in improving the effectiveness of Chilean environmental policy, as well as to ensuring the environmental sustainability of the pattern of economic production adopted. Despite the fact that the design of the SEIA was guided by the basic principles that oriented also the main normative, thus far its operation has been faced with multiple unresolved difficulties stemming from institutional inexperience in the matter, and accentuated by inadequate operational resources at both the regional and the national level; this usually contrasts with the strengths and competences of the speakers from the investor side, especially in the case of larger projects, which because of

their size are often supposed to have significant environmental impacts. There is a need to endow the regional public bodies and decision-makers with more technical capacities and to prioritize technical criteria for the case that discrepancies should materialize between the regional and central levels. The argument that more technical stringency would deter FDI reveals a rather static and short-term view of the matter. On the contrary, though not decisive, it could help to upgrade the investment portfolio by means of attracting more technology-based projects with more incorporated knowledge, that usually have greater irradiation effects on the local economy.

Amplification and invigoration of channels of civic participation: This is an aspect that has been under consideration since the conception of CONAMA, but it is of very limited scope in practice.

NGOs that once represented the main civic voices have gradually been reorienting their capacities toward enterprises as customers of their information services and technical consultancy. This new facet can be considered very positive. In fact, some authors refer to it as a superior stage in the maturation of these organizations (Jänicke, 1997).

However, in the case of Chile this has meant a weakening of their role as channels of civic expression. Then, without abandoning the current tendency to approach the business sector, they should renovate their civic representativeness in the advisory levels of CONAMA. Also, NGOs, together with the authorities, should contribute to improving the effectiveness of public participation which has

proved decisive in other countries. That would contribute to a better understanding among the civic society of environmental topics and their relevance for economic development and competitiveness as regards the sustainability of development patterns.

Invigoration of programs of technical environmental assistance to SMEs and better coordination of control, monitoring and municipal services:

The subsidies for external consultancy services on environmental management and pollution prevention not only provide access to management and technological solutions for small businesses, which usually have no internal competence regarding these topics; they also help to correct a severe market imperfection of environmental technologies, corresponding to the asymmetries of information between suppliers and potential customers, as explained in Section 3.

Considering only formal firms, the SME represents 98.7% of the enterprise universe associated with environmental issues in Chile. (Corfo, 1998). It is important to ensure the consistency and effectiveness of such programs to facilitate optimal coordination with the control and environmental inspection services. The same is true for the case of the respective entities that assist the informal sector.

CONAMA should in this case, since this is part of its main mission, induce this coordination and propose the regulations, or even legislative changes, necessary to give consistency to functions of control and promotion.

Remarkable cases of public-private partnership in cooperation with small firms already exist in Chile. One of the better-known cases is the conversion of Santiago's bakeries from firewood to gas, elimi-

nating an important fixed source of particulate material and at the same time improving the operational profitability of these SMEs. A key factor in this experience was the coordination between the monitoring agency (SENMA) and the promotion agency (Sercotec) as well as the relatively easy access to the loans needed to finance the change of technologies. Another less well-known experience is that of small proprietors of native forest in the IX Region of the Araucanía. This project, carried out with contributions of Corfo, the German DED cooperation service and the proprietors, made it possible to coordinate the promotion agency (Sercotec), the corresponding municipality and the National Forest Corporation (Conaf, forest inspection service), in a combined action plan that have facilitated the formal startup of these small entrepreneurs and the sustainable management of their forests. The project encouraged them to join forces to develop a joint business plan that thus far has had very good results. This case shows that what is required, more than legal reforms, is the will and a partnership between institutions and enterprises, independent of their size or condition.

Diffusion of successful managerial experience as regards environmental administration:

In Section 3, in delineating the managerial strategies and the framework conditions of Chilean environmental policy, emphasis was placed on the role of external markets and the openness of the local economy as catalytic agents in introducing good management practices in larger companies mainly related to the primary (natural-resource intensive) export sectors and then gradually irradiating out toward most exporting enterprises.

In 1997 more than 203,000 companies registered formal operation in sectors with potential environmental impact⁹. Among them, not more than 2,600 could be considered large enterprises (Corfo, 1998), and probably not more than 3,000 export relatively often. Thus it is clear that still the great majority of these companies (probably over 90% of the total) are still far from becoming major environmental concerns. Two simple reasons help to explain this relative marginality: first, the lower pressure from external markets (in contrast to the case of investment projects in natural resource-intensive commodities, perhaps the strongest pressure has come from the international financial markets); and second, the above-mentioned delay in implementing the regulatory framework, due rather to coordination and bureaucratic obstacles than the principle of gradual approach incorporated in the law. This has caused broad misconceptions and, among small managers, a comprehensible apprehension to be ahead with a problem that still does not appear relevant, either for the side of their direct destination markets or for the side of internal environmental regulation. However, just as was the case in the industrialized countries, and in particular in Europe, it has been proven that both factors have played a relevant and synergic role (Zito and Egan, 1998).

The experience of the pioneer companies could and it should be used by environmental control and promotion institutions, to diffuse good practices and technically eco-efficient solutions. This last concept is

of particular importance for the diffusion of successful experiences among companies, because it validates the fact that the pollution-prevention strategies could contribute to achieving productivity gains, starting with more savings in inputs and energy. The business associations, just as was the case with SOFOFA, the chamber of industry and commerce in Chile, with support of international cooperation (German CDG and US Aid) could, through the EP3 diffusion program, assume a relevant function in encouraging the dialogue between companies, technological institutions, promotion agencies, CONAMA and public services responsible for monitoring and control as a means of diffusing and transferring successful managerial experience in this matter.

Design and implementation of programs for financing environmental investments and factory relocation:

Although soft solutions based on a more efficient use of inputs and eco-efficient productive practices have great potential for application in Chile, in many other cases companies will have to renew their technologies to achieve both competitive performance and acceptable environmental. Current SME-driven technical advisory programs are supporting this process during the preinvestment phase, guiding companies in the design of cost-efficient solutions. However, it is often happens that these efforts end up not materializing for lack of effective financing schemes for such technological improvements. In view of the presence of externalities (in general, the social benefits of an environmental investment are significantly greater than their private benefits) the government, through the Ministry of the Treasury, recently signaled its agreement with credit programs with preferen-

⁹ In 1997, 526,920 formal enterprises registered operations in Chile. The number shown above corresponds to the total number of firms in the following sectors: farming, fisheries, manufacturing, construction, transportation, restaurants and tourism services.

tial interest rates and special guarantee schemes which actually could be considered an important sign given the high level of orthodoxy prevalent in Chile in credit issues. As is well known, these credit lines will be operated by the banks, which, in absence of special conditions, will be unable offer loans of any significant volumes due to the relatively high transaction costs of each loan operation in relation to its value and the difficulty involved in assessing with certainty the direct benefits of the investments.

The relative situation for the relocation of companies located in saturated areas or with critical levels of pollutants is similar. The most important case concerns Santiago, a city declared to be a "saturated area" in an ordinance of CONAMA of 1997. This means that new fixed sources of atmospheric emissions cannot locate here unless some of those already in operation diminish their emissions or are relocated outside the capital. Also, the city's new regulatory plan establishes a minimum radius of distance to downtown for the operation of fixed sources. Then, in both cases, the support for rational relocation of industries presents significant externalities which [?should validate] the design of special financing conditions.

Accreditation systems for consultants and technology suppliers: Since consultancy markets and environmental technologies for companies are relatively recent in Chile, is necessary to improve information in order to avoid eventual opportunistic "free-rider" behaviors such as supplying services without a minimum of professional and technical backup. This problem affects mainly companies of smaller size, since large companies gener-

ally have generally dealt with well-known acknowledged international technology suppliers. Thus, it should be convenient to promote initiatives oriented to improve the market information and accredit the local environmental advisory services. A positive initiative regarding to this point has been the so-called "clearing houses" currently being developed by some NGOs. Also, Conama and the Secretary of Clean Production, should play an important role in this.

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COMPETITIVENESS AND ENVIRONMENTAL POLICY IN THE REPUBLIC OF KOREA

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1. Introduction

The Republic of Korea has experienced a dramatic economic transformation over the past three decades despite its relatively unfavorable initial conditions, including a poor endowment with natural resources and war-ridden depreviation in the 1950s. Its astonishingly high sustained economic growth has been recently characterized in the development literature as a "Miracle" (Worldbank 1993). But it may be more aptly described as "condensed growth"¹, which abridged the normal development process by omitting or delaying the adjustments that accompany economic growth.

If one seeks to measure the country's past development mainly relying on economic performance data, Korea seems to be a remarkable model for later developing countries, since it has succeeded in alleviating poverty through rapid industrialization and now finds itself on the road to becoming an advanced industrialized country. But in appraising this rush industrialization since the 1960s on a somewhat broader socioeconomic basis, it is rather difficult to speak of a "Model Korea" in spite of the World Bank's favorite repre-

sentation of Korea as a model country marked by "growth with equity." It becomes far more difficult and complicated to judge this issue, if one tries to overview the Korean development process from the perspective of quality of life or sustainable development. Even the World Bank was unable to find Korea's economic development model to be environmentally friendly, and it has, in its otherwise vast literature on the Korean economy, as yet refrained from comment on the environmental aspects of Korea's rapid economic growth.

As a matter of fact, Korea has lagged far behind in its recognition of environmental problems, and it is only very recently that the government has begun to respond to public demand for a cleaner environment. The process of industrialization in Korea was, unlike the case of the Western countries, planned and tightly controlled by the government. In the early stages of industrialization, the government guided the direction of the industrialization process to the extent that it virtually chose the industries to be created as well as the participants in such industries. It was a highly authoritarian and repressive government, which had powers that went far beyond that wielded by Western democratic governments. And the ambitions, preferences, and even prejudices of the government were crucial in determining the trajectory of the country's rapid development.

When it embarked on the industrialization process with the first five-year economic development plan in 1962, maximizing the economic growth rate was given the highest priority as "the" national goal (You 1995). So the stage was set for a path of high economic growth at higher social and environmental costs.

¹ This description is very widely used in reform discussions since the later 1980s in Korea. It implies a verification of A.Gerschenkron's hypothesis(1962) that the speed of industrialization in an underdeveloped country is usually much faster than that of advanced countries. In Japan K.Ohkawa used the expression *compressed growth* in the same context. Cho 1994, p.5

In the following two decades, the attitude of the government toward the environment remained basically the same. Under an authoritarian regime wholly bent on economic growth, it was virtually impossible to disseminate information on the environmental degradation and its long-term effects on the quality of life of the population. It was even dangerous to engage in some political action aimed at changing the course of development toward an environmentally friendly path. Although no reliable data exist on the state of the environment during this period, it is quite obvious that excessive environmental damage occurred here. It was only after the beginning of the democratization process in the later 1980s that the government undertook efforts to put into place any mentionable environmental policy.

In this contribution I will try first to give an overview of the environmental problems in Korea in relation to economic strategies and industrial structures and then to comment on the ongoing controversies about the (non-)applicability of the Environmental Kuznets Curve in the Korean case. Following this macroscopic overview on rapid economic growth and its environmental consequences, I will describe somewhat schematically how the main actors in Korea have responded to environmental challenges since later 1980s. After a brief review of the development of Korean environment policy, the current structure of environmental administration and laws will be illustrated. In the same manner the citizen's environmental movement will be dealt with, and then a somewhat detailed illustration will be given of the recent environmental behavior of industrial firms under changing internal and external circumstances, especially concerning the introduction environmental

management system(ISO 14000) including a case study. This will be concluded with remarks on the question why we cannot be sure that Korea will follow a sustainable development course in the near future by learning from its past mistakes as well as from the experiences of OECD countries.

2. Rapid Industrialization and Environmental Challenges in Korea

2.1 Rapid Economic Growth and Structural Transformation

Korea is one of the world's most densely populated countries. Its population grew rapidly after liberation from Japanese colonial rule, from 15 million in August 1945 to 21 million in 1948 and nearly 43 million in 1989. But the country managed to control the 3 % annual growth rate in 1960 down to a figure of less than 1 % after 1989. The population is expected to rise to 47 million by the year 2000, and its 51 % will live in the six major cities.

In spite of this, GNP per capita grew very rapidly from \$67 in 1953 to \$1000 in 1977, \$2,000 in 1983, \$5,000 in 1989, and then in 1995, just before Korea became a new member of OECD, the figure went beyond a nominal \$10,000, the level the United States achieved in 1978, Japan in 1984, and Taiwan in 1992.

Korea's rapid industrialization during the past thirty years has been astonishing by any standard. An export-oriented growth strategy, tremendous investment in heavy industries in the late 1960s and 1970s, and policies fostering the growth of Korean companies into large conglomerates combined to make South Korea into an

**<Table 1> Change of Industrial Structure in Korea
(Share of GDP at current prices, %)**

Industry	1962/66	1970	1980	1990	1995
Agricul. forestry & fishing	39.6	26.6	14.7	8.5	6.2
Mining & Manufacturing	18.7	22.5	29.7	29.6	29.8
Maunufacturing only	16.8	21.0	28.2	28.8	29.4
Constr/ electr/ gas/ water	4.5	6.6	10.1	13.5	13.4
Other Services	37.2	44.2	45.5	48.4	50.6

Source: the Bank of Korea

advanced industrializing country within three decades(Cho 1994).

During these years the Korean economy experienced major structural change. After a period of relatively labor-intensive growth (1962-1971), basic industries like iron and steel, nonferrous metals and some chemicals grew rapidly from the beginning of the 1970s, and the drive into heavy and chemical industries accelerated up to the early 1980s. In the first half of the 1980s machinery, electrical machines, shipbuilding and the automobile industry were among the major rapidly growing industries, whereas the less pollution-intensive industries such as beverages, tobacco, and textiles grew slowly. In the second half of the 1980s and early 1990s, the former industries grew continuously and their share in industrial production already surpassed 30 % in 1989.

2.2 The Current State of Environmental Quality in Korea

The rapid growth achieved in Korea with this industrial transformation was purchased at great environmental costs, which were most visible from the early 1980s. The drive to “rush to industrialization” has polluted air unbearably in major cities and industrial areas. And streams, rivers, and

soils were badly polluted by acid rain, chemicals and chemical fertilizers.

Since for 20 years environmental concerns were never considered in its economic development plans, Korea experienced the *classical* degradation of the environment through industrialization. It is very difficult to show the environmental trends since the beginning of industrial take-off owing to lacking data in the earlier period and still existing vast discrepancy between official environmental statistics and perceived real situation².

As there is no alternative information other than the official one, I will describe in the following some recent environmental trends according to the officially published information³.

2.2.1 Air Quality

A recent survey on overall air pollution in Korea shows that there has been improve-

² There exists only one critical report „Pollution Map of Korea“(1986) on the environmental situation in 1970s. It was prepared by dissident’s group and published with the recommendation words of Korean Archbishop Suwhan Kim. Time-series of some major environmental statistics are currently available since 1980. Environmental statistics in Korea is still very incomplete in scope, not to mention its quality. It covers less than 50% of OECD standards for the present.

³ For more detailed statistical information, see MOE 1998, MOE 1999 and OECD 1997

ment. The concentrations of sulfur dioxide and total suspended particulates were found to be on the decline, but the concentration of NO₂ and ozone was found to be rising slowly.

Sulfur dioxide: SO₂ pollution has been declining in Seoul and Pusan since 1990, as the use of low-sulfur oil has expanded and the use of LNG is now required by law. In Seoul the concentration of sulfur dioxide has actually been falling since 1980, when it peaked at 0.094ppm. By 1988 there was a dramatic decline as the sulfur dioxide concentration level fell to 0.062ppm. The decline has continued, reaching 0.051ppm in 1990 and 0.008ppm in 1998. Though the level of sulfur dioxide concentration was in line with the level of 0.015-0.023ppm recently recommended by the WHO for every city, no Korean city is able to meet short-and long-term air-quality standards. The sulfur dioxide concentration is generally high in winter and low in summer in large cities such as Seoul and Pusan. Sulfur dioxide pollution in industrial cities such as Ulsan, on the other hand, is hardly influenced at all by changes of season.

Total Suspended Particulates: The concentration of total suspended particulates (TSP) in major cities has been steadily declining. In Seoul the concentration level reached a peak (183) in 1986; however, it steadily declined to 140 in 1990 and 57 in 1998, which is well below the annual environmental quality standard of 150. In 1998 the corresponding figures for Pusan, Taegu, and Ulsan were 74, 72 and 72 respectively, all of which were also well below the environmental quality standard.

Acid Rain: The acid-rain problem was most serious in Pusan, where the recorded pH value was 4.7 in 1998. The situation in

other cities except Taigu was not much better, since the pH values measured were below 5.6 according to new weighted statistics in 1998.

Other Pollutants : NO₂, O₃, and CO levels in major cities in 1998 revealed that the environmental quality standards were generally met, though O₃ levels had increased slightly over the previous years in Seoul, Pusan, Kwangju, and Taejon. But these pollutants are problematical, as these go more frequently beyond the hour-based standards because of rapidly increasing cars.

The concentration of NO₂ decreased slightly in Seoul, Pusan, Taejon and Ulsan in 1998, while the concentration of CO rose slightly only in Taegu.

The concentrations of lead (Pb) and cadmium (Cd) in the atmosphere in major cities declined or remained at about the same levels as the year before.

2.2.2 Water Quality

The levels of pollution in the main tributaries of the four largest rivers had been improving from the record high values noted in 1988, but water shortage compromised the rivers' natural ability to clean themselves, causing concentrations of various pollutants to rise again. Although overall water quality recovered sharply, the water quality at some points along the Nakdong and Youngsan Rivers remained at grade III. Due to tremendous investment in environmental infrastructure since the beginning of the 1990s, the Kumho River, a branch of the Nakdong River, Anyang Stream, a branch of the Han River, and Mushim Stream, all three of which had been major sources of pollution, have seen their water quality improve somewhat, but

the water pollution remains still the most difficult trouble for the government.

2.2.3 Soil Contamination

Soils in Korea are in general still suitable for agricultural activities, but the cadmium concentration on agricultural land is 10 percent higher than the background concentration. The concentration levels of heavy metals in the soil in the vicinity of inactive or abandoned ore mines is actually 300 percent higher than those in agricultural or residential areas, since most of these mine operations were established before the 1970s, when there were nearly no environmental regulations in place.

2.2.4 The Quality of Coastal Waters

The water quality along Korea's coasts has been maintained at Grade II (COD 2mg/l or less) since 1991. On average, the waters along the coasts of Cheju Island are the least polluted of all. Compared with the coasts of Cheju Island, the average level of water pollution along the coast of the East Sea is higher. The water quality of most coastal waters was found to be improving. However, as the concentration levels of nutrients such as T-N and T-P, which are major pollutants causing red tides, far exceed the standards for sea-water quality.

Parallel to the above which is directly based on the official statistics, one can also read recent environmental trends in Korea indirectly through the government's actual policy responses.

In spite of a recent declining trend in sulfur dioxide concentrations, the increasing number of cars in Korea, which reached 10 million in 1997, has led the government to tighten measures to reduce vehicle and industrial pollution through fuel substitu-

tion and low-emission diesel and electric vehicles.

Efforts to reduce per capita water use are focusing on a variety of measures to improve water-use efficiency. Ongoing new investment in sewage treatment aims to increase the ratio of treated to untreated water from the current 42 percent treatment ratio to a ten-year goal of 80 percent by 2005.

Soil contamination and cleanup are receiving increasing attention following passage of the Soil Protection Act of 1996, which placed emphasis on developing ways to clean up the 140 abandoned mines, 100 landfills, and 60 military storage areas in Korea. The new act calls for development of criteria for soil cleanup and remediation and adoption of a "superfund" to carry out the work. In addition to these measures to reduce national pollution, regional pollution problems are challenging the Korean government increasingly; these include air and water pollution from North Korea, acid rain from China, and pollution of the Yellow Sea.

2.3 Rapid industrialization and Environmental Degradation

The environmental Kuznets curve(EKC) describes that while economic growth may lead to increased degradation, other factors may cause an eventual downturn, as income levels increase continuously. But not all economists accept this hypotheses as a general metaphor for the relationship between income level and the environmental quality. Keneth Arrow, Nobel laureate in Economics remarks recently that while these inverted-U relationships do indicate that income growth may associated with

improvement in some environmental indicators, “they imply neither that income growth is sufficient to induce environmental improvement in general, nor that the environmental effect of growth may be ignored, nor indeed, that the Earth’s resource base is capable of supporting indefinite economic growth” (Arrow et al 1995).

After the above described environmental trends, it may be tempting to verify the EKC hypothesis in Korean case. But unfortunately it is almost impossible to test it statistically because of the lacking time series data, as was mentioned before. But Kim(1999) has successfully demonstrated that the inverted U-shape story did not happen to Korea during the period 1980-95 by making use of index of environmental pressure. And he also shows that each of four types of pollutants(CO₂,SO₂, NO₂ and BOD) had different trajectory because different economic activities and government regulations have influenced each emission to a different extent, so that it is difficult to discern the existence of a Kuznets curve by observing one or two pollutant emissions.

So it may be asserted that Korea was no exception to the East Asian pattern of rapid industrialization without any environment concerns(O’Connor 1996), and did without the latecomer’s advantage.

3. Environmental Policy in Korea

3.1 Development of Environmental Policy in Korea : An Overview

3.1.1 Environmental Policies in the 1960s and 1970s

The backbone of environmental administration was formed by the legal and regulatory measures taken since the 1960s. As early as 1963 Korea enacted its first basic statute regulating environmental policy, the Public Nuisance Prevention Act⁴. At that time, however, there was little concern about environmental quality and this act was introduced more with an eye to attracting foreign investment and played no role in preserving the environment at that time. Actually it was not implemented until 1969, when the associated regulations were adopted.

As rapid industrialization and urbanization since the 1960s made the quality of the environment deteriorate rapidly, especially from the mid-1970s on, the government was pressured to take measures to handle emerging environmental problems. The government’s response to such pressures was to enact a new law, the Environment Conservation Act (ECA), effective on July 1, 1977. The ECA, Korea’s first piece of comprehensive environmental legislation, introduced many important features of environmental management such as

⁴ In contrast to this is the common view in the Korean literature such as Chung/Jeong(1994), Eder(1996:15) found the origin of Korean environmental law in the 1961 New Forest Law, which began a major national reforestation program.

promulgation of environmental standards, environmental monitoring, setting and control of emission standards, and administrative regulation and criminal sanctions for violations of environmental regulations. The Act was thereafter several times amended. Though it could thus create a set of criteria and sanction schemes to deal with environmental problems, the government chose not to implement the measures prescribed by the ECA, mainly owing to the fear that strict implementation of the ECA could burden the economy and slow the pace of economic growth. In fact, the government did not even establish the administrative infrastructures that were necessary for the implementation of the ECA. The ECA had remained dormant until a major policy change was made in the early 1980's, when an amendment of the Korean Constitution introduced the right to a safe environment as a basic human right.

3.1.2 Environmental Policies in the 1980s

The declaration of Environmental Rights in the new Constitution and the establishment of the Environment Administration (or the Office of Environment) in 1980 were a major development in the environmental policy in Korea. But the task of this newly established, subcabinet agency of the Ministry of Public Health and Social Affairs was still narrowly defined, and its function was restricted to prevention of environmental pollution, leaving many environment related functions to the other government agencies.

In spite of lacking cohesiveness of environment policy which had caused serious coordination and cooperation problems, in addition to its low priority and weak capacity, the environmental policies of the

1980s differed substantially from those of the 1960s and 1970s in two important aspects: First, the regulation system became more extensive and sophisticated than before. Among the newly introduced regulations was the Environment Impact Assessment (1981), the Effluent Charge System (1983), and the creation of an Anti-Pollution Fund (1986) aimed at assisting investment in effluent-abatement facilities. Secondly, and more importantly, some actual efforts were made to implement at least some elements of the law, unlike the 1960s and 1970s. Some of the changes in relation to the implementation of the law were as follows: 1) Along with EA, local arms were established to deal with local environmental problems, 2) research on the nationwide state of the environment was initiated, 3) an effluent charge system was implemented to force firms to pay for effluents they emit, 4) a large public investment was made to build effluent-abatement facilities such as sewage treatment plants and clean incinerators, 5) firms that emit large quantities of effluents were forced to build their own abatement facilities, 6) the government began with a gradual substitution of low-sulfur fuel.

It appears that the efforts of the government during the 1980s to control pollution managed to bring about some visible successes. For instance, the air quality in most large cities, measured in terms of the percentage of toxic elements such as sulfur dioxide, carbon monoxide, and nitrogen dioxide was improved during this period. However, the measures taken in 1980s were not sufficient to restore the balance between economic growth and preservation of the environment. It was generally criticized that the charges for effluent emissions were far lower than the levels that reflect the true social costs, and public

investment in pollution abatement was highly insufficient. There remained many environmental areas still to be addressed by the government.

3.1.3 Environmental Policies in the 1990s

As the continuing rapid economic growth raised people's incomes and political liberalization began, the demand for a better quality of living also grew in Korea. The government was gradually pressured internally into introducing more stringent environmental norms and investing more for environmental improvement. In order to cope with the above-mentioned coordination problems and strengthen the enforcement capacity of the environmental authority, the EA was upgraded to the semi-ministerial level ("HwanKyung-Chur") and given the name Ministry of Environment(MOE) in 1990, and was again upgraded into a real Ministry ("HwanKyungBu") in 1994. Now the Minister of the Environment was a member of the cabinet chaired by the President. But in spite of its upgraded position, the authoritative capacity of the Ministry remains still limited mainly to the affairs concerned with pollution prevention.

In July 1990, the National Assembly passed a set of completely new environmental statutes as a replacement for the Environmental Conservation Act. These statutes included the Basic Environmental Policy Act (BEPA), the Air Quality Preservation Act, the Water Quality Preservation Act, the Noise and Vibration Control Act, and the Toxic Chemical Control Act. Furthermore, in March 1991 the National Assembly enacted the Excretion and Animal Waste Disposal Act, and again in December 1991 the National Environment

Conservation Act and the Environment Enhancement Expense Burdening Act were passed by the National Assembly. With this series of enactments, Korea had an almost complete portfolio of sophisticated environmental statutes (25 Acts)⁵.

In 1995 the government provided "Green Vision 21" which recognized the urgent serious effort to improve the Korean environment and presented an ambitious timetable for the improvement of the environment. After this had found support in March 1996 in the "Presidential Vision for the Environmental Welfare," a Mid-term Comprehensive Environmental Conservation Plan was made by the MOE in 1997⁶.

3.2 The Environmental Administration in Korea

Since Korea is ruled by a presidential system, most environmental policies have been proposed by the MOE and the President takes major responsibilities in policy decisions and implementation. As is the case in many countries, many other ministries and agencies are involved in the making of environmental policy, and the administrative functions are increasingly shared by regional offices and local governments in Korea. The six Regional Environmental Branch Offices were established in 1986 and upgraded to the Regional Environmental Offices in 1990 have been the key organizations handling the affairs of regional environmental management. As administrators and staffs of the Regional

⁵ For the list of these laws, see OECD 1997 pp40-42 and MOE 1999 p.39 and the following section of this paper.

⁶ See the homepage of Korean Ministry of Environment(MOE) at www.moenv.go.kr for the plan.

Offices are appointed by the central government and there is little room for local governments and residents to communicate with the offices, they have often been criticized as an inefficient system incapable of giving sufficient consideration to regional particularities and the needs of local residents sufficiently.

Although the environmental administration in Korea is still highly centralized, some institutional rearrangements have been made recently for regional environmental management (Jeong 1997). Legally, the authorities in charge of regional environmental management had been shared by the local/provincial governments and the national government. Due to the governmental policy of centralized control and the weak managerial capacities of subnational governments, however, the subnational government authorities had played very limited roles in the implementation of environmental policy until mid-1992. In 1992 a number of environmental responsibilities were devolved upon city/provincial governments as the part of effort to decentralizing environmental management. The devolved responsibilities include (1) issuing permits on the establishment of various pollution sources (i.e., air pollution, water pollution, solid waste, noise pollution), (2) compliance monitoring and enforcement, and (3) the imposition and collection of various fines, etc. Considering the weak managerial capacities and vulnerable financial status of subnational government, many environmental experts were warning against the rapid devolution of environmental responsibilities.

3.2.1 Environmental Administration in the Central Government

The Ministry of the Environment (MOE) is the headquarters of environmental preservation efforts. It is responsible for the formulation of policies and planning such as a Mid-term Comprehensive Plan for environmental improvement aiming to preserve the natural environment and to prevent environmental pollution. Of the ca. 1,300 staff members with MOE, about 400 officials are now working at the headquarters. central organization has a number of subsidiary organizations under it: the Central Environmental Dispute Settlement Commission, the National Institute of Environmental Research, the Environmental Officials Training Institute, the Korea Environment Institute, four Environmental Management Offices for each of the four major rivers (Han, Nakdong, Keum and Youngsan), and four Regional Environmental Management Offices under each of the Environmental Management Offices.

a) **The Central Environmental Dispute Settlement Commission** : Under Article 2 of the Environmental Dispute Settlement Act, the MOE oversees a Central Environmental Dispute Settlement Commission located at headquarters as well as Regional Environmental Dispute Settlement Commissions in Seoul and in the nation's six largest cities and provinces, the task of which is to settle disputes over environmental pollution. There are 18 staff members working for the secretariat of the Central Environmental Dispute Settlement Commission to handle paperwork for dispute settlements. The Central Environmental Dispute Settlement Commission consists of seven members including the chairman.

b) **The National Institute of Environmental Research**: The institute is respon-

sible for supporting the Ministry of the Environment in the formulation of environmental policies through surveys and studies, research, tests and assessments related to the prevention of environmental pollution. This institute was separated from the National Health Research Institute in July 1978 as a specialized research institute on the environment. With the inauguration of the Environment Administration in 1980, the institute was transferred to the Environment Administration. The institute consists of four departments, two sections, one research center and four water-quality inspection laboratories, with a total of 214 staff members employed.

c) **The Environmental Officials Training Institute:** In response to rising demands for environment-related administrative work and specialization and diversification of environmental administration, there has arisen a need to strengthen education and training programs for environmental officials. A training department established in January 1990 under the National Institute of Environmental Research was expanded in January 1990 to become the Environmental Officials Training Institute. This institute is responsible for the education and training of government environmental officials, private-sector technicians, and environmental managers.

d) **The Korea Environment Institute:** An MOE think-tank, it not only develops and evaluates environmental policies, but also reviews environmental impact assessment. It was formed in September 1997 from the Korea Environment Technology Research Institute, which was established in 1993.

e) **Environmental Management Offices :** In order to delegate some of the environmental responsibilities of the MOE, the Environmental Management Office was

established under the MOE. The Environmental Management Office has four Regional Environmental Management Offices under it. The Regional Environmental Management Office came out of the Environment Monitoring Management Office, which was established in July 1980. Also under MOE, there are two semi-private, commercial organizations, the Environment Management Corporation and the Korea Recycling Corporation.

Related Ministries :As environmental policies relate to a wide range of activities, the government's environmental administration is splitted among a number of ministries, as the <Table 2> shows. Especially owing to its narrow functional definition, and as an inheritance from its earlier institutional structure, MOE in Korea must coordinate with other ministries and administrative bodies responsible for environment-related policies. Though the task of MOE widens gradually, it plays still a minor role in the policy decision in the cabinet which is dominated by economy related ministers. According to the Basic Environmental Policy Act, the major environmental policy decisions must be coordinated by **the Environmental Conservation Committee**, which is chaired by the prime minister and to which ministers of MOE and other environment-related ministries and representatives of nongovernmental organizations. This committee is responsible for developing and coordinating comprehensive mid- and long-term conservation plans, deciding on annual priorities of environmental conservation projects and allocating the environmental budget, supporting the popular environmental conservation movement, and reviewing other environmentally important issues.

<Table 2> Environment-Related Administration of the Central Government

Ministry of Science & Technology	<ul style="list-style-type: none"> o Coordination of nuclear safety control o Establishment and implementation of measures aimed at preventing radioactivity o Regulations on transportation, handling and disposal and treatment of nuclear and radioactive industrial wastes
Ministry of Agriculture & Forestry	<ul style="list-style-type: none"> o Measures for agriculture and forestry pollution o Planning and technical guidance on the development of agricultural water
Ministry of Commerce, Industry & Energy	<ul style="list-style-type: none"> o Import/export of toxic substances and import restrictions on industrial wastes o Allocation and management of industrial sites o Supply of low-sulfur oil o R&D on new and alternative energy o Safety management of nuclear power generators and disposal and treatment of nuclear wastes
Ministry of Construction & Transportation	<ul style="list-style-type: none"> o Formulation and coordination of a comprehensive plan for national land use o Designation of areas subject to the National Land Use and Management Act o Designation of areas where development is restricted o Establishment and coordination of a comprehensive plan for water-resources development o Management of rivers, reclamation and use of rivers and lakes o Type approval and performance tests of motor vehicles o Designation and development of tourist attractions
Min. of Labor	<ul style="list-style-type: none"> o Countermeasures against occupational diseases and improvement of working conditions
Ministry of Culture & Sports	<ul style="list-style-type: none"> o Designation, protection and management of national monuments such as rare plants, animals, etc.
Ministry of Maritime Affairs & Fisheries	<ul style="list-style-type: none"> o Protection of marine resources and countermeasures against marine pollution o Reclamation and management of public sea waters o Countermeasures against pollution of coastal waters o Supervision and prevention of marine pollution
The Office of Forestry	<ul style="list-style-type: none"> o Formulation of Basic Forestry Plan o Protection of wild animals and restrictions on hunting o Protection of forests and supervision of activities destructive to forests
Agriculture Promotion Administration	<ul style="list-style-type: none"> o Improvement of agricultural land and provision of guidance on soil improvement

Source: MOE 1999, p.35

3.2.2 Environmental Administration at the Regional/Local Level

When the Environmental Conservation Act was enacted in 1977, the responsibilities for implementing environmental policies were given to local governments. But the EA, when establishing the six regional environmental offices in 1986, gave the major task of implementing regulations to these offices. Only in 1992 were all of the responsibilities of monitoring and enforcing environmental regulation delegated to the provincial governments. Since a series of water-pollution accidents since 1991, responsibilities for environment policies are beginning to be shared by the Environmental Management Offices and provincial governments based on the location of emission sources. And most implementation tasks have been further transferred to local governments. Now, together with the Environmental Management Offices under the MOE, local governments are responsible for regional environmental management within their jurisdiction.

Local governments carry out tasks delegated from the Minister of the Environment, in addition to their own work. The major tasks of the provincial/local authorities are developing and implementing re-

gional environmental protection within their jurisdiction, providing water supply services and installing and operating sewage and waste-water treatment facilities, preparing environment impact assessments and ex-post evaluations, monitoring violations of permissible emission standards and illegal emissions and discharges, and conducting activities associated with nature conservation and design and management of regional parks.

As the administrative task for environmental conservation continues to increase, the environmental administrative organization of local governments has been expanding rapidly in the 1990s. And along with the increasing importance of the environmental administration, the status of the environmental department has risen also.

In addition to various Environmental Protection Departments in every local government, including cities, counties, and districts, which are responsible for administrative environmental work, the provinces as well as six metropolitan areas operate their own Health and Environmental Research Institutes, which monitor pollution levels and are responsible for conducting tests and inspections within their own jurisdictions.

<Table3>

History of Sharing Enforcement Responsibilities in Environmental Administration

	Issuing Permits		Monitoring/Enforcement		Administrative Measures	
Before '84.2.	Provinces		Provinces		Provinces	
'84.3.- '86.11	Provinces		Provinces	- Major Industrial complexes, - Specific Toxic Materials, - Type 1-3 Emission Sources in Industrial Complexes	Provinces	
			Central Task-forces			
'86.12-91.3	Regional branch offices	Pollution Sources in Industrial Complex Specific Toxic Material Sources	Regional branch offices	Sources in Industrial Complexes Specific Toxic Material Sources - Type 1-3 Sources outside industrial complex	Regional branch offices	Sources in Industrial Complexes Specific Toxic Material Sources Large Dust Sources(ex cement factories)
	Provinces	- Sources outside Industrial Complex	Provinces	- Type 4-5 Sources outside Industrial Complex	Provinces	- Sources outside Industrial Complex
'91.3.- '92.7	Regional Environmental Offices	Sources in Industrial Complexes Specific Toxic Material Sources - Large Dust Sources(ex;cement factories)	Regional Environmental Offices	Sources in Industrial Complexes Specific Toxic Material Sources - Large Dust Sources(ex;cement factories)	Provinces	
	Provinces	- Sources outside Industrial Complexes	Provinces	- Sources outside Industrial Complex		
'92.7-'94.5	Provinces		Provinces		Provinces	
After '94.5	Environmental Management Offices	Sources in Industrial Complexes Specific Toxic Material Sources - Large Dust Sources(ex;cement factories)	Environmental Management Offices	Sources in Industrial Complexes Specific Toxic Material Sources - Large Dust Sources(ex;cement factories)	Environmental Management Offices	Sources in Industrial Complexes Specific Toxic Material Sources - Large Dust Sources(ex;cement factories)
	Provinces	- Sources outside Industrial Complexes	Provinces	- Sources outside Industrial Complexes	Provinces	- Sources outside Industrial Complexes

Source:Jeong (1998), p. 282

3.3 Environmental Laws and Regulations

3.3.1 Development of Environmental Laws

Article 35 of the Korean Constitution states that all people have the right to lead a life in a healthy and pleasant environment, and the government and people should make efforts to conserve the environment. The same article stipulates that “the contents and exercise of environmental rights shall be decided by laws, thereby assigning these environmental rights to environmental laws. Environmental laws can thus be regarded as laws that specify people's rights as guaranteed by the Constitution, namely, the right for people to live pleasant and safe lives in a sound and healthy environment. That is, people have a basic right to clean water, clean air, and the natural amenity of the land.

As was seen above, the formation and development of environmental laws and regulations are often closely related to the public perception of environmental problems in Korea. Environmental problems began to emerge in the 1960s when the country started to pursue ambitious industrialization with the launch of the first Five-year Economic Development Plan. To address environmental problems arising from industrialization, the Public Nuisance Prevention Act was enacted in 1963. This Act consisted of 21 articles, all of which were lacking in regulatory measures and practicability. The act was drastically revised in January 1971 to introduce permissible emission standards and a discharging facilities permit system. As the economy continued to experience rapid growth, public concerns about environmental pol-

lution grew. The Public Nuisance Act was replaced with the Environmental Preservation Act on December 31, 1977, with the objective of preventing environmental pollution. To this end the government also introduced new systems to help cope with environmental problems more actively and comprehensively, viz. the Environmental Impact Assessment, environmental standards, and restrictions on the total volume of pollutants. However, due to the ever-worsening environmental conditions caused by heavy industrialization in the 70s-80s, measures that could deal with each source of pollution separately were needed to effectively address acute environmental problems. Against this backdrop, the Environmental Preservation Act, enacted in 1977, was broken down into six laws on August 1, 1990: the Basic Environmental Policy Act, the Air Quality Preservation Act, the Water Quality Preservation Act, and the Noise and Vibration Control Act.

A number of new environmental laws have been enacted more recently: the Soil Preservation Act, which aims to prevent damage to human health and the environment due to soil contamination and to properly control and preserve soil; the Drinking Water Act, which aims to control the quality of bottled water; and the Underground Living Space Air Quality Control Act, which aims to control air pollution of underground spaces such as subway stations. As of 1998, there are 25 environmental laws under the jurisdiction of the Ministry of Environment.

3.3.2 Key Points of Environmental Laws

The Basic Environmental Policy Act(1990) can be regarded as the basis of all environmental laws. The Act clarifies the main objectives and basic directions of policies for the nation's environmental preservation goals and provides core principles for environmental policy. It declares that both harmony and balance between humans and the environment are essential to the health of nation, cultural life, conservation of national territories, and sustainable development. The act also clarifies the polluter-pays principle as the main principle of pollution control.

Other individual laws are more detailed and specified as regards specific areas or sectors of the environment, according to the objectives of the law.

The Natural Environment Preservation Act calls for protecting the natural environment from any artificial damage and preventing the extinction of endangered species through preservation of biological diversity.

The Air Quality Preservation Act and the Water Quality Preservation Act were enacted to help prevent damage to people's health and the environment due to air and water pollution. To this end, the laws set specific standards for pollution emissions and impose charges for the pollutants that are discharged. These laws are most closely related to the environmental problems that are felt by the general public.

The Noise and Vibration Control Act was passed to control noise and vibration levels and thus prevent any damage or harm to the environment or its inhabitants (including people) due to excessive noise and vibration from factories and construction sites, etc. The act on the Treatment of Sewage, Night Soil, and Livestock Waste-

water aims to efficiently control the treatment of these pollutants. The aim of the Waste Management Act is to control household and industrial wastes efficiently. The Act Relating to the Promotion of Resource Saving and Reutilization promotes recycling and enhances resource saving. The Toxic Chemicals Control Act was passed to establish a comprehensive management system for toxic chemicals and to strengthen and improve the safety-inspection program. In this way the act addresses the problems caused by the considerable increase in quantity and variety of toxic chemicals following Korea's rapid industrialization and economic growth.

The Promotion of Waste Treatment Facilities and Local Communities Act, the Environmental Impact Assessment Act, the Water Supply Act and Sewer System Act all are supposed to contribute to improving public health and creating a clean and healthy environment.

3.3.3 Other Laws Related to the Environment

Environment-related laws of other ministries have also a significant bearing on environmental issues. Pollution and environmental destruction can be minimized only when their environmental impact is assessed at the initial stage of planning of a development project.

With environmental problems having emerged as the greatest global challenge currently facing humanity, domestic and international environmental laws are being legislated with increasing frequency.

There are more than 50 such laws under more than 15 ministries in Korea. The fact that environment-related laws are dispersed across many ministries has given

rise to many efficiency- and coordination-related problems, as was mentioned above. And as policy directions of different ministries may also differ, conflict and friction between ministries result.

3.4 Environmental Expenditure by the Government

3.4.1 The Government's Environmental Expenditure

Since the beginning of the 1990s, the government's environment expenditure has increased rapidly, especially investment in environmental infrastructure. The government budget for the environmental sector has increased five-fold from 457 billion won in 1991 to 2.539 trillion won in 1997. The share of the total national budget allocated to the environmental budget increased to 2.57% in 1997 from 1.16% in 1991, and the percentage of GNP also rose to 0.58% from 0.21% during the same period. The Ministry of Environment's own budget increased to 1.802 trillion won in 1997 from 139.6 billion won in 1992. Water quality concessions, which were introduced in 1992, increased to 686.7 billion won in 1997 from 212.5 billion won in 1992.

3.4.2 Environmental Expenditure by the MOE

With an eye to efficient management of financial resources for environmental investment, the Special Account for Environmental Improvement was introduced on January 1, 1995, and thereafter tax revenue

sources have been expanded and the tax system has been improved. The budget for the 1997 Special Account increased 32.4% over 1996. A total budget of 792.1 billion won was allocated to the account, including 258.9 billion won transferred from the general account and 70 billion won in loans transferred to the Special Account from fiscal financing. Revenue from the Special Account increased to 463.1 billion won in 1997, an increase of 29% over the previous year. However, revenues from other sources still account for a significant 42%, or 328.9 billion won, of the total budget for the Special Account.

Expenditures for 1997 are composed as follows: 272.3 billion won for the tap-water supply system, including the construction of a water purification system; 296.1 billion won for the improvement of sewage and waste-water treatment facilities; 271.7 billion won for the construction of waste treatment and recycling facilities; 6.3 billion won for the conservation of the natural environment, including biological diversity management and pollution prevention in closed mining areas; 8.9 billion won for air-quality preservation, including an air-pollution monitoring network; 133.5 billion won for the development of environmental policies and technologies, including HAN (Highly Advanced National Project) environmental engineering technology development, environmental industry development and the construction of a comprehensive environmental research complex; and 91.4 billion won for environmental management and others.

<Table 4-1> Environmental Budget of the Central Government Account

(Unit : 100 mil. won)

	1991	1992	1993	1994	1995	1996	1997
Total environmental budget	4,570	5,819	6,919	11,232	17,394	21,979	25,359
Total National budget (percentage of the total budget)	393,669 (1.16)	438,421 (1.33)	511,879 (1.35)	644,575 (1.74)	745,344 (2.33)	853,083 (2.58)	985,933 (2.57)
* GNP (percentage of GNP)	2,142,39 (0.21)	2,387,04 (0.24)	2,655,17 (0.26)	3,037,72 (0.37)	3,489,79 (0.50)	3,734,81 (0.59)	4,368,70 (0.58)
Min. of Environment	2,718	1,396	1,887	4,716	6,729	8,967	10,802
Min. of Const. & Transp.	1,752	2,148	2,382	1,916	3,016	3,753	4,070
Min. of internal Affairs	0	2,125	2,500	3,690	4,721	5,578	8,467
Min. of Agricul. Fishery	0	0	0	0	400	400	400
Min of Economy and Finance	100	150	150	910	2,528	3,281	1,620

<Table4-2> MOE Budget by Sector

(Unit : 1 mil. won)

	1996	1997	difference	%
Total	885,071	1,080,203	195,132	22.0
Piped Water Supply	244,153	272,327	28,174	11.5
Sewage and waste-water treatment	237,520	296,079	58,559	24.7
Waste treatment	187,998	271,734	83,736	44.5
Preservation of natural environment	4,282	6,281	2,000	46.7
Air-quality preservation	9,968	8,945	-1,023	-10.3
Environmental and technology policy development	123,293	133,463	10,170	8.2
Environmental management, etc.	77,857	91,374	13,517	17.4

Source:MOE 1999

3.4.3 Fiscal Transfers to Local Governments

3.4.3.1 Financial Resources for Transfers to Local Governments

As a means of transferring financial resources of the central government to local governments, the Special Account for transfers to local governments was introduced in 1991. Certain construction projects for water pollution prevention began to be financed through this account. The

use of transfers to local governments is restricted to five types of project under Article 4 of the Special Account for Transfers to Local Governments Act: water pollution prevention projects, road construction, rural development projects, youth education programs, and balanced regional development projects.

In 1991, the year in which the system was first introduced, revenues for the Special Account for the transfers to local governments came from various sources, as provided for under Article 5-1 of the Act Relating to the Adjustment of National and Local Tax: 100% of telephone taxes, 15% of liquor taxes, and 50% of taxes gained

from excess land ownership were transferred to local governments. In 1992 transfers from the liquor tax were raised sharply to 60%. In 1994, in order to offset losses incurred when the oil tax and passenger-car tax were separated from the local tax to become a transportation tax, the percentage of the liquor tax to be transferred to local governments was raised to 80% from 60%, and was raised again in 1997 to 100%.

With tax revenues rising, financial resources continue to increase, and more funds are being allocated to environmental improvement projects. Funds for the water pollution prevention project, among others, saw a noticeable increase since 40% of the Rural Development Tax was added to the fund starting in 1995. In 1997 the related laws were revised again to provide an additional 10% of the liquor tax for water pollution prevention projects and to raise the amount allocated to water pollution prevention projects from 17% to 24.5%.

3.4.3.2 Financial Resources for Water Pollution Prevention Projects

Financial resources for water pollution prevention projects increased to 686.7 billion won in 1997 from 221.6 billion won in 1992, thanks to institutional improvements like transfers to local governments. 1997 saw a sharp increase in transfers for water pollution prevention projects due to the additional 10% of liquor tax and a rise in the percentage of allocation.

Until 1994 only four major projects - construction of sewage treatment facilities, replacement of sewage pipelines, construction of night-soil treatment facilities, and river-water purification projects - had been subsidized. In 1995 the construction of sewage systems in rural areas was added

to the list of projects subject to subsidy, and in 1997 the construction of collective livestock wastewater treatment facilities was added as well.

4. The Popular Reponse to Environmental Challenges in Korea

Numerous polls conducted around the year 1990 show that clean water and air have become the most important public concern in Korea today (Koo 1996). Since their material well-being, especially that of the middle class has improved, people are no longer concerned about having sufficient food, clothing, and housing. As Norman Eder (1996) rightly notes in his study on Korean environmental management, "Nowadays no issue is spoken of more often than the condition of Korea's natural environment."

4.1 The Present Situation of Korean Environmental NGOs

According to the recent annual report "1999 Environmental White Book" published by the Ministry of the Environment, there were 440 environmental NGOs in Korea as of April, 1999. These are classified in three categories, depending on whether the organizations were legally registered with or permitted by the responsible ministry for certain activities. Of these, 119 are environmental NGOs registered with the government, 271 are unregistered environmental groups, and 50 are unregistered groups originated from other social movements, but now active in significant environmental activities.

Among these various groups, the following can now be regarded as leading environment NGOs in Korea (Eder 1996):

The Korea Federation for the Environmental Movement (KFEM) is registered, has now more than 50,000 members and

national-wide 26 branches. KFEM is the country's oldest and largest environmental NGO. Its roots lie in the Anti-Pollution Movement Association, Korea's first purely environmental activist group. It publishes *Environmental Movement*, with a circulation of 20,000.

The Baedal Eco-Society, now Green Korea is an unregistered environmental group with an annual budget of \$600,000 and 10,000 members. It has fifteen chapters around the country and headquarters in Taejeon. Its purpose is to give a greater degree of scientific credibility and "substance" to the Korean environmental movement.

The Citizens' Council for Economic Justice is unregistered. With its annual budget of \$625,000 and 10,000 members, it promotes nonviolent approaches to a variety of issues, not just environmental. Its Center for Environmental Development works toward putting environmental issues into their proper social and economic context.

It is not easy to describe the ideological characteristics and political directions of the activities of environmental NGOs on the whole, but we can classify Korean environmental NGOs in five categories based on their activities, as follows (Kang 1994): Some organizations perceive environmental issues in relation to the structural contradiction of our society (contradictions of monopoly capitalist society, and contradictions involved in the division of Korea) and pursue anti-nuclear, anti-pollution movement in the name of the cause of national democratic movement. They have been always critical of the government's development-oriented policies. Recently they have gradually begun to go along with citizen's movements, moving away from their traditional stance of struggle and charges. This shows that the character and

direction of the environmental movement has been changing along with the social change of the 1990s. The representative organizations in this category are the Korea Action Federation for Environment, the Youngkwang Green Club, the Youngduck Committee for the Boycott of the Building of Nuclear Waste Land, and the Green Transportation Movement, etc.

There are some organizations for the conservation of nature. They are involved in activities of the so-called 'New Village Movement'(Seamaeul Woondong), which was initiated in the early 70s by the Park military government. They are established, funded, and controlled by the government and are depoliticizing the structural and political character of environmental issues by campaigning for nature conservation. The representative organizations are the Korean Central Council for Nature Preservation, the Korea Environmental Preservation Association, the Korean Council for Wild Animal Preservation, etc. In 1990s there emerged a new style of NGOs which also emphasize the ecological protection of nature, such as the Friends of Nature, the Love of Nature Association.

Some organizations are working for environmental protection by means of changing lifestyles. Distinct from other organizations, these are active not solely in environmental issues, and they are more versatile and inclusive. They carry out various kinds of action such as citizens' environmental education, the establishment of a system of counterinformation, international solidarity, critical action against the government's environmental policies by highlighting the disputed points of those policies, etc. These include citizens' organizations, youth organizations, religious organizations, labor unions and peasant

organization like YMCA, the Citizens' Coalition for Economic Justice, the Consumer Union of Korea, the Women's Association for Democracy, etc. Though some organizations are weak in their actions and relatively narrow in their scope of action, they have a latent potential as environmental movements because of their wide range of activities and comprehensive area of work.

There are some local environmental organizations whose central concerns are local environmental issues. Some of those are expanding their area of concern even to environmental education and the recycling movement, even though they were motivated by the preservation of the upper stream of a river for drinking water or the boycott of expanding pollution facilities. Those are the Council for the Relief of Nakding River, the Citizens' Association for the Environment of Kunsan/Okgu Region, the Association for Environmental Preservation, etc. The number of these organizations are increasing, but many organizations are suffering from vulnerable finances, poor leadership, failure to continuously develop the tasks of action, so that most of them deserve hardly their name.

Lastly, there are groups of experts and research institutes which are exploring alternative environmental policies for resolving environmental issues. Among those, three organizations, the Environment & Pollution Research Group, the Korea Eco-Club, and the Environmental Policy Research Institute, have a close relationship with environmental NGOs. Apart from these, many organizations are emerging, but most are organizations that support the government or are dependent on government projects.

4.2 The Development of Korean Environmental Movements

The history of environmental movements in Korea began with collective action by local victims of negative environmental states of affairs. It is not unproblematical to define such actions (which, by their nature have no continuity and organization) as social movements, but Korean environmental movements have grown out of this sprout. It was later combined with an organized effort through the establishment of Pollution Research Institute(1982). Since 1988 the movements has expanded to encompass civic movements. The history of the Korean environmental movements can be divided broadly into four periods(Koo 1996 and 1998, Jeong/Lee 1996)

4.2.1 The First Period (1961-1980)

The first Korean environmental action was recorded in 1966, an anti-air pollution protest against a thermoelectric plant in Pusan. While the industrial complex had grown rapidly, the environmental movement was still led by scattered groups of local residents suffering from industrial pollution. The government's policies at this period were simply to ignore calls for environmental protection, pointing to the cause of economic growth. The government in this period completely favored industry by quashing local residents' complaints, denying compensation, and the simple use of police force and blockades. Sometimes partial compensation or relocation of residence was negotiated by the government, but always with very favourable terms and results for big industry. Judicial satisfaction was possible, but the many difficult steps and difficulties discouraged most local-level pollution vic-

tims. The result was that industrial complexes recklessly spread air pollution, water contamination and industrial waste, ultimately to levels endangering the health and lives of both employees and residents. The Korean government enacted the "Environment Preservation Act" in 1977, which laid the ground for systematic environmental-protection measures and it also announced the "Charter of Environmental Protection" in 1978. But the environmental movement was harshly suppressed by the government. And only individuals, not groups, were allowed to negotiate with polluting industries for financial compensation and legal settlements.

There was virtually no citizens' environmental organization, except "official" ones. This was the dark period of the environmental movement, harshly suppressed by government and not receiving broad social support.

4.2.2 The Second Period (1980-1987)

In the new era called the "1980 Spring of Seoul", after the assassination of President Park in October 1979, environmental protection was for the first time constitutionally guaranteed, and the Administration of the Environment was established. This new agency began to address the accumulated environmental problems and to respond to public demands, which led to an improved social atmosphere for the activity of the environmental movement. Actually, during the period between 1980 and 1987, the environmental movement gained momentum on an increasingly extensive scale. As urban residents were becoming aware of the value of a clean environment and the redressing necessity, the environmental

movement inspired participation among the general public.

The environmental movement at this period is mainly led by social activists. But environmental organizations were still unable to transcend local conditions and each group's simple concern for its own immediate interests. Though local residents and activists often raised political issues, their lack of technical expertise could not dovetail into government protocols. Furthermore, vested interests and the conservative press had no problem weakening activist clout and thwarting their success. However, the movement's dogged existence continued to invigorate citizens' environmental activities.

Though it cannot be asserted that citizens' movements during this period had much effect on government policy, there were some successful cases. The Ulsan and Onsan residents' environment movements had forced the government to involve itself in the investigation of polluted areas, and this at last resulted in a relocation of inhabitants. The "Protect the Youngsan River" campaign in 1983 was a partial success and led to the abandonment of a plan for the Jin Ro Wine Company to establish itself there.

4.2.3 The Third Period (1987-1992)

The year 1987 is a milestone for Korean democracy. Thanks to the success of the democratization movement, freedom of speech was bolstered in June 1987 and further accelerated by the 1988 Seoul Olympic Games. The environmental-movement activists took full advantage of this opening and democratizing atmosphere to enhance public environmental awareness and to attract numerous professionals. Many citizens joined the movement, and the government's suspicion of

environmental activism began to fade. Also, professional environmentalists and scientists brought new authoritativeness and credibility to environmental activism, and the press stepped up its coverage of environmental issues.

But in this period the thrust of the environmental had evolved from mere local victim support to mass public education and calls for antipollution vigilance. And the movement was very "local", with few international contacts. The government was in a wait-and-see mode, not actively involved in helping pollution victims, and citizens had to rely on the movement's capacity to monitor and correct industry's abuses.

The environmental movement had grown rapidly by the end of the 1980s. This rapid growth of environmental organizations was invoked also by the big environmental incidents. In 1989 one water-quality analysis showed heavy metal and water contamination in four large rivers. And again in 1990 there arose several incidents of drinking water contamination. The activities of environmental organizations and the media on these very visible pollution incidents awakened public awareness and drew nationwide attention and condemnation.

In this period the environmental movement began to influence public policy and the movement had proceeded increasingly from fighting for victim compensation after the incidents to fighting for prevention of potential dangers. In the beginning of this period, the government merely responded to environmentalism, without offering support or even much attention. Since the government still viewed environmental activism negatively, it simply sought to ignore the movement. The mass media also tended to limit the scope of

environmental exposés, reducing them to shocking but short-lived feature articles without any productive in-depth analysis. But ever-stronger green voices and ever-increasing media attention eventually led the government to respond to public opinion and alter its policies. Professionals worked to reduce dangers and guide public participation in policy-making. Thus numerous development plans for nuclear and solid waste disposal sites and golf courses were postponed and some were canceled. The environmental movement at this period made the government realize the importance of citizens' participation in the environmental-policy arena.

4.2.4 The Fourth Period (1992 - Present)

With the partial implementation of local autonomy in 1991 and the 1992 UNCED in Rio, the citizens' environmental movement in Korea expanded greatly, unifying and reaching out internationally. From their early protests against water pollution and nuclear waste disposal, the environmental movements changed their focus to international and global issues and began considering Green Capitalism.

The UNCED in Rio in 1992 had a great impact on the Korean Green movement. Green activism moved on a grander scale, no longer limited to Seoul now but expanding rapidly into a nationwide network of organizations. Renaming of the organizations, expanded interests in global issues, and emphasis on public education characterize this period. As Korean environmental organizations shared common interests with foreign environmental activists, they have tried to build network to address global issues as well as domestic ones. Religious groups have also dramati-

cally changed their attitudes toward environmental tasks. In particular, Catholic, Buddhist, and YMCA groups were actively involved in public environmental education, critical reviewing of government policies and organizing help for victims. Strongly influenced by the 1992 UNCED in Rio, the environmental movement was able to gain public support by releasing environmental information and blocking further business and government development plans that might endanger the environment. The loss of valuable natural resources caused by the destruction of the environment led people to coalesce together with environmental activists to form their own eco-plans, rejecting the government's technical, shortsighted solutions. The Korean government's attitude shifted positively, embracing the citizens' movement. At last, the Korean government's intransigence and suspicion gave way to free exchange of information with an eye towards regulation, and in 1992 it adopted an environmental policy-making process that was based on the opinions of its citizen stakeholders.

It is remarkable that environmental activists are beginning to involve themselves in the government's policy making and their organizations often collaborated with them to further the greater public interest in this period.

The following <table5> summarizes the main characteristics of the environmental movement in Korea.

<Table 5> Characterization of Korean Green Movement

	Ist period	2nd Period	3 rd Period	4th Period
Participants	victims	victims and third parties	victims and third parties	general public
Timing of action	after incident	after incident	after/before incident	after/before incident
Sphere of activity	localized	Localized	regional	national and global
Target of activity	polluter	polluter and government	Government and polluter	Public and government
Major activity	Ulsan area protest	Onsan area protest	Anti-nuclear movement	Education, monitoring and participation
Impact on government policy	none	Little	A little on implementation	Much on formulation and implementation

Source: Jeong/Lee 1996 and Koo 1996

4.3 Evaluation of the Korean Environmental Movement

The Korean environmental movement embarked under the repressive conditions of an authoritarian regime that gave its highest priority to a rapid economic growth that paid almost no heed to the environmental consequences. As we saw in the above, in the early period economic compensation was the only motivation for the victim protest. During the second and third periods, the environmental organizations recruited heavily among democratization or anti-government activists. But many early activists showed a tendency to utilize the movement to achieve their own political ambitions. Sometimes fights over hegemony, funds, and membership among environmental organizations hindered cooperation among them. Even though it did not take long for the Korean environmental movement to awaken public awareness and begin to alter government policy processes, it has been able only gradually to gain public credence and bring about the participation of environmental scientists,

doctors and lawyers, and their professional organizations in the movement since 1990. The Korean environmental movement still has numerous shortfalls. First of all, most of the organizations are financially weak and headquartered in Seoul. The Greens have failed until now to mobilize massive public participation nationwide. There is no doubt that the Korean environmental movement will continue to expand its activities, and thus Korean citizens will have the more opportunities to speak out, participate actively in the public policy-making and implementation processes, and ultimately even press for governmental reforms. But in order to influence government policies effectively by means of an alternative strategy and workable solutions, expertise in the latest scientific knowledge and policy menus are badly needed. And close links and networking with international environmental organizations will build up their capacities and prove very helpful in gaining a positive influence on Korean government policy.

5. Industry's Response to the Environmental Challenge in Korea

5.1 Industry's Changing Attitude

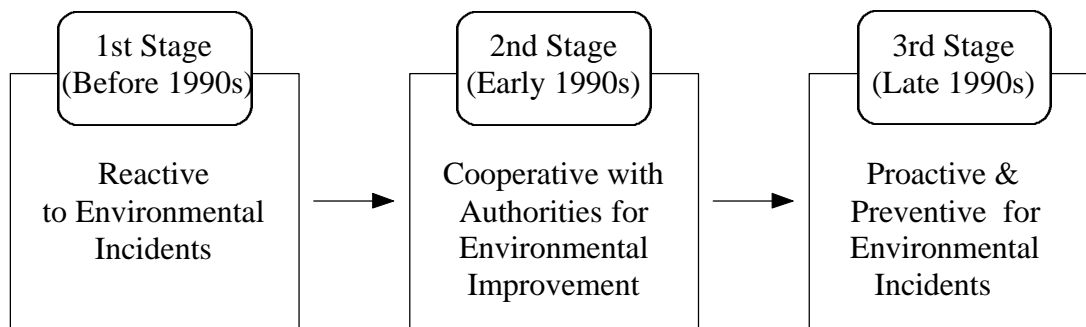
Witnessing the growing domestic concern about pollution incidents and environmental degradation caused by industry and increasing international environmental pressure, many businessmen in Korean industry are being slowly led to consider the environment as one of the key parameters for their business decisions, and have begun to adopt environmental-management systems in their practice since the early 1990s. Furthermore, companies have recognized the necessity for the establishment of a comprehensive and systematic environmental management and are now moving to the proactive stage. The changing industrial response to environmental issues in Korea can be described summarily as in Figure 1.

The industry's response to environmental issues as a whole in Korea can not be said to have been adequate, but recently companies are actively adopting environmental programs in their business management.(Lee et al 1999). There exist various internal driving forces(self-awareness, image enhancement, good relationships with stakeholders) and external ones (trade barriers, public opinion, legislation, pressure groups) for and against moving toward becoming a greener company. Most companies in Korea perceive environmental challenges as external pressures.

5.2 Response to ISO 14000 in Korea

Since 1994 the Korean government has been actively tracking global trends in standardization, such as ISO 14000 activities. The government's concern about ISO 14000 as a trade barrier was the driving force. Two similar acts on environmentally friendly companies, one pushed by the Ministry of Commerce, Industry and Energy (MOCIE) and the other by the Ministry of Environment(MOE), encourage companies to enlist in a voluntary permit program under which they provide extensive information on their production input, processes, and output of materials, resources, and chemicals. If a company is accepted in the program, it is not subjected to spot enforcement checks for three years. Korea is one of the 36 officially "p" (participating) members of ISO/TC 207, which has been working on the ISO 14000 series. Unlike many other countries in which the private sector takes the initiative, the government has played the major role in adopting EMS in Korea. During the incipient stage, the Korea Industrial Advancement Administration(KIAA), under the umbrella of MOCIE, was in charge of ISO matters. Under the superintendent of KIAA, the Task Force for International Standardization of Environmental Management (TFISEM) was separately established within the Korea Employer's Federation (KEF) at the private level. A number of experts from various organizations of private companies, nongovernmental organizations, and the academy have participated in six sub-committees of ISO/TC 207.

Figure 1 . Stage of Responding to Environmental Issues by Korean Industry



Source: quoted from Lee et al (1999, p.53)

KIAA has embarked on a pilot program for the experimental accreditation of EMS on the basis of ISO/DIS 14001. For the first pilot program, 41 companies were selected in April 1995 for a one-year-long guidance and auditing process. Following successful experimentation, the second pilot program started in early 1996 and the formal accreditation scheme was formulated and implemented in October 1996. In the meantime the Korean Accreditation Board (KAB) was founded as a private organization which plays a key role for accreditation and registration. And the task of monitoring the ISO 14000 series was also transferred from KIAA to the Korean National Institute of Technology and Quality (NITQ) in the process of governmental reorganization.

KAB, the only accreditation body in Korea, is similar to that of JAB in Japan. As a nonprofit private organization established in September 1995, KAB is in charge of accreditation and registration of quality- and environment-related matters in the same way that JAB is⁷.

⁷ On the short comparison between accreditation scheme in Korea and Japan, see Lee et al 1999 pp.54-56. A detailed analysis of ISO 14001 implementation process was done by M.Mohammed (see *Environmen-*

Korean industries have been making far quicker responses to the environmental-management system standard (ISO 14001) than they did to the quality-management systems (ISO 9000 family). This is the case for both organizational establishment (accreditation/certification/auditor training) and company-level implementation.

The experience from the Uruguay Round and the ISO 9000 family influenced this process. Korean companies are worried that the ISO 14000 series could turn out to be a trade barrier just like the Uruguay Round.⁸ Perceiving that an early response to these international standards is desirable for corporate competitiveness, many leading companies in Korea have tried eagerly to introduce EMS as soon as possible. It is also recognized as part of green marketing strategies, through use of the certificate for corporate image promotion.

The Korea Chamber of Commerce and Industry(KCCI) recently established a "Civil Environmental Management Pro-

tal Management Vol. 25 No.2 pp. 177-188)

⁸ This is so in Korea, in spite of the explicit introductory statement of ISO 14001, "These standards are not intended to be used to create non-tariff trade barriers..."

motion Center”(Lee 1997), which aims to promote industry’s environmental management and has published ‘The Industrial Charter for Environmental Management’ and ‘Action Principles’. KCCI plans not only to strengthen education and publicity but to help firms break bottlenecks in establishing EMS.

Until June, 30 1999, 348 Korean companies had acquired the ISO 14001 certificate⁹. Typically following industries have been fast in certification: export-oriented industries (i.e. electronics), environmentally sensitive industries (i.e. chemicals), and construction industries, the corporate image of which are important both domestically and internationally (i.e. construction firms)

Obviously, there are different reasons for the companies’ acquisition of EMS certificates. The Doosan Group, which was beleaguered with a poor environmental image due to the phenol leakage accident at Nakdong River in 1991, has now appeared as one of the most environmentally friendly companies in Korea. The company adopted the “Integrated Environmental Control System” which is a preventive diagnostic program aiming to continuously improve the environmental performance of their operating sites. And recently most sites of that business group have acquired EMS certificates to enhance their environmental image. A number of export-oriented large companies among leading groups like Samsung, Hyundai, LG, Daewoo have also been very keen to be seen as environmentally friendly enterprises and acquired EMS certificates as a response to potential trade barriers.

To illustrate the problems faced by implementing firms, let us take a look at the experience of the biggest steel company in Korea, POSCO.

EMS Implementation in POSCO:

POSCO at a relatively early point of time placed great emphasis on environmental protection. In the middle of the 1990s, it changed its management policy from a focus on simply meeting regulatory restrictions to actively promoting proactive measures and continuous improvement to cope with the global environmental challenges. The company's medium- and long-term environmental plans include increasing environmental investments on a scale of several hundred million dollars through the year 2003 and minimizing the discharge of pollutants and curtailing energy consumption by improving its operational practices. In line with these plans, the company in 1995 enacted the "POSCO Environmental Policy". Although POSCO has a well-compiled environmental code of practice with stringent regulations and public concerns, the company became aware of the necessity to introduce the emerging EMS for coping with rapidly growing environmental challenges. On this necessity, POSCO established its EMS, based on ISO 14001 standards, and acquired the official certificate through formal inspection by an authorized certification body in 1996. At present, POSCO is releasing its environmental information on its Internet web site (www.posco.co.kr).

⁹ Korea ranks as the 7th in the iso 14000 world. Most updated information on the number of accreditation in international comparison is available at the internet site www.ecology.or.jp

<Table 6> Number of Certified Companies in Korea

<i>Year</i> <i>Firm Size</i>	1994	1995	1996	1997	1998	1999 (Jun 30)	Total
Large	3	12	71	66	17	6	169
Small/ Medium	-	2	25	52	29	47	108
Total	3	14	95	118	65	53	348

Source:Korean Accreditation Board (1999.7)

<Table 7> Number of Certified Companies classified by industry

	~ 1995	1996	1997	1998	1999 .6	Total
Electro/Preci.Ma/Med/Opt	4	13	27	14	9	67
Construction	3	14	18	13	18	66
Chemistry	2	17	15	8	3	45
Machinery/Equipment	-	12	15	-	2	29
Food/tobacco	-	6	3	6	8	23
Tansportation Equipment	2	4	12	1	1	20
Pulp/paper	-	5	5	3	-	13
Others	6	24	23	20	12	85
Total	17	95	95	65	53	346

Source:Korean Accreditation Board (1999.7)

In the process of establishing an EMS in POSCO, following problems were raised (Kim, 1996) :

(a) Even though POSCO's top management is proactively committed to the introduction of EMS and runs its business in an environmentally friendly manner, there is still limited motivation for all employees to participate fully in these environmental programs.

(b) Many POSCO employees feel overburdened by the documentation work required by ISO. It is one of the pressing issues to be resolved in establishing and implementing EMS.

(c) A considerable number of employees do not really feel that EMS is an appropriate approach for enhancing the company's value-added effectively.

Though it can be said that Korean companies are actively trying to catch up with the

international movement towards an environmentally sustainable globe, there are a number of obstacles in implementing environmentally friendly management systems in Korean business. In response to the emerging environmental challenges, it is now very important for business to consider environmental management in order to improve their environmental performance. Considering that only changing the traditional corporate paradigm will enable people to become part of the environment rather than its exploiters, substantial change in the framework of business management is an essential requisite to business operations for a more environmentally benign economic system.

Recently the notion has gained increasingly recognition among enlightened managers that improving environmental performance or the development of innovative

and cleaner technologies can provide a competitive advantage. This emerging environmental-management paradigm has evolved through a different set of forces from the previous paradigm: ecological degradation and the scientific evidence for it, environmental directives pushing for change, and the business response. (Lee 1997) But it is widely pointed out that EMS is inadequate for improving companies' environmental performance because the establishment and operation of EMS does not in itself guarantee better environmental performance. Therefore it seems that the real challenge for Korean companies must be to make efforts to improve their environmental performance through taking on of an environmental mindset, engaging in substantial environmental investments, and developing a comprehensive managerial regulatory framework.

6. Concluding Remarks

Increasing public demand for a better environment and global environmental discussions have recently led the Korean government to change some of its policy objective towards a harmony between economic growth and preservation of the environment. It has established necessary regulatory and institutional mechanisms and is pursuing more effective enforcement.

But there still remains much to be done for the country's sustainable development and the greening of its industry.

First, even though public awareness of the environmental challenges in Korea has been improved, it is still at the infant stage in terms of becoming part of daily life. More problematical is that the strategic priority of the environment is still far be-

hind the level required in all sectors of the government and businesses.

Second, regulatory frameworks are still based on the 'command-and-control' approach. Also, many legal standards are set up on the normative basis without careful deliberation of their practicability in complying with the requirements. Third, Korea has developed some technologies for end-of-pipe treatment of air, waste water and solid wastes, but cleaner technologies for preventive environmental improvement are highly underdeveloped. As a result technical expertise is largely insufficient, and core technologies and facilities are now heavily dependent upon imports from advanced countries.

Fourth, like many other countries, Korea's small and medium-size companies are also highly deficient in their ability to implement appropriate environmental management.

As I asserted in the above, Korea has experienced classical environmental degradation owing to rapid industrialization, which was rightly described as "poisoned prosperity" (Eder 1996), and environmental pollution worsened dramatically till 1980s, with no serious political effort to improve it. Only increasing local pressure and public protest after frequent environmental accidents, especially in the later 1980s could force the government to pay more attention to the environment and to begin taking some real protective measures for the environment. Already early in the 1980s, though without any substance, the necessity of balancing or harmonizing the economy with the environment was listed as one of many targets in the economic development plan, but it was not until after the Earth Summit (1992) that the environ-

mental issue became a government-wide economic issue.

So in the presidential "Green Vision" of March 21, 1996, in which the overstrained ambition to build an Eco-Model Country was declared, „the integration of environment and economy“ was introduced as the second of the five basic principles. But it should be noted that it was never a brave act of green enlightenment, just as the other presidential welfare visions declared around this period were not, either. It was rather a forced reflex of both people's increasing environmental needs and a slow recognition of, or a passive adjustment to, the view gaining worldwide currency that environmental preservation and economic development should proceed hand in hand (OECD 1993, Worldbank 1993). Even this kind of political gesture has now been lost unfortunately in the new government's effort to manage the current economic crisis since December 1997. So the prevailing motto is the well-known export drive, which reminds us the old motto "strengthening competitiveness at all costs", and "growth first, clean later". Interestingly, in contrast to the whole negligence of environmental concern on the government side, there continues to be an unabated corporate industrial movement towards the green management system in Korea, especially among export-dependent big firms.

It is difficult to see when the Korean economy will seek orientation in sustainable development, but it may be expected that this is unlikely to be initiated by the government, and it more apt to stem from external pressure and more be driven by the private and nongovernmental sector.

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