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The Greening of Business in Mexico

David Barkin

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◆ Acknowledgements

The opportunity to systematically explore the nature and extent of environmentalism in corporate Mexico offered an ideal opportunity to bring together the disparate strands of two decades of work. José Luis Villicaña generously opened the doors of the corporate world to me more than 15 years ago; since then, his friendship, confidence and trust have been valuable assets that have made me a better scholar of corporate matters and a more effective analyst. While at the Ministry of Foreign Relations, Victor Lichtinger invited me to examine the impact of the US environmental movement on Mexican organizations, and he later helped expand my horizons by inviting me to participate in some of the activities of the Commission on Environmental Cooperation. The World Resources Institute invited me to join a team to reflect on the complex environmental effects of the internationalization of finance in Mexico. Several years of teaching graduate students in business planning created the unique opportunity to challenge them to examine the reality behind the corporate image; Rosa María Velazquez, from the Oaxaca Technological Institute undertook a lengthy research project to document the process of institution building. The Mexican Training and Education Center for Sustainable Development (CECADESU), part of the Secretariat for the Environment, Natural Resources and Fishing (SEMARNAP), acquainted me with many institutional facets of the process to which few outsiders are privy. Unknowingly, overcoming the hermeticism and outright hostility of many of the key private sector actors was in itself an initiation under fire that forced me to learn personal and research skills that have proved invaluable in developing more effective strategies for communication and project implementation that some community groups in Mexico are now using.

David Barkin
July 1999

◆ Summary/Résumé/Resumen

Summary

Trends in the 1980s associated with economic liberalization, export-oriented growth and foreign direct investment stimulated a vigorous debate in Mexico about their effects on the environment. While some argued that firms would adopt cleaner technologies others stressed the likely environmental and social costs. By providing an overview and assessment of the corporate response to environmental concerns, this paper looks at what actually happened in the 1990s. It identifies some of the main initiatives which have been taken in such areas as cleaner technology and environmental certification, and also the various institutions which are taking a lead role in promoting corporate environmental responsibility. In addition to assessing the scale and effectiveness of these developments, the paper analyses the implications for environmental protection and corporate environmental responsibility of broader trends associated with the dominant pattern of economic growth.

In the wake of the Earth Summit (1992) and the North American Free Trade Agreement (1994), there has been a flurry of institutional activity in Mexico to encourage business corporations to improve their environmental performance. Some significant initiatives have been taken by firms to improve environmental management. Perhaps more important for the long term is the fact that a fairly comprehensive set of institutions—private, public and regional—is now in place which is stimulating private sector responses in the field of corporate environmentalism.

This scenario of incipient but positive technological and institutional change is confronted by another in which some firms are tinkering with improvements in environmental management, making highly exaggerated claims and disregarding crucial aspects related to monitoring and independent verification. The paper questions the content of "corporate environmentalism", suggesting that it has focused much too narrowly on technical "end-of-pipe" solutions to reduce waste streams rather than more thorough-going restructuring to improve community health and safety and the quality of life more generally.

Of particular concern are the environmental and social effects of trends associated with the dominant economic strategy being pursued in the country. This strategy has encouraged investment in highly polluting industrial activities and the siting of firms in urban areas with weak infrastructure, planning systems and fiscal regimes. The drive to rapidly "modernize" and develop certain economic sectors such as tourism has favoured private interests at the expense of both community groups and a developmental approach that balances economic, environmental and social considerations.

The analysis reveals a complex scenario of advances and retreats. As in the rest of the world, with greater information about the effects of industrial production and increased concern for the quality of the environment, more public pressure is being placed on business for responsibility. In return, markets require greater consideration of these effects and reward some of the participants handsomely. However, the increased volume of production, the trend towards more production for international trade, and the changing composition of output all conspire to

intensify pollution while shifting towards greater use of scarce natural resources. Aggravating the problem is the accelerating tendency towards regional concentration with its associated ills of urbanization.

The heightened visibility of corporate campaigns to publicize their individual and collective efforts for environmental responsibility is a direct response to citizens' demands for greater regulation. In Mexico, the active process of private institutional development to forestall public sector action has been warmly welcomed by a government committed to restraining its intervention in the economy. While there have been some successful new partnerships, and important advances in the dissemination and application of technological remedies for some particularly egregious examples of industrial contamination, the overall quality of the environment is deteriorating as a result of the present strategy of development with the ensuing pattern of social polarization.

Corporate programmes for self-regulation have created the impression of important advances. The marketplace and consumer demands are playing a significant role in creating opportunities for producers to behave responsibly while increasing their profitability. This is particularly true of products whose environmentally benign qualities can be readily identified and marketed, as is the case of organically grown agricultural produce and environmental services, such as ecotourism. Inevitably, there is an element of confusion in the process of informing and educating the public and in cultivating new demands, but some Mexican producers have clearly embarked upon ambitious programmes to take advantage of this trend. Given the present-day conditions of heightened international competition, however, it is likely that some players will choose the less costly route of "greenwashing" in place of genuine environmental responsibility. It is the difficult task of an informed environmental and consumer movement to insist that corporate efforts to promote environmental responsibility are more effective.

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Résumé

La libéralisation économique, la croissance axée sur les exportations, les investissements étrangers directs et les tendances qui y ont été associées dans les années 80 ont suscité un vif débat au Mexique à cause de leurs effets sur l'environnement. Si certains estimaient que les entreprises devaient adopter des techniques moins polluantes, d'autres insistaient sur les coûts environnementaux et sociaux probables d'un tel développement. En analysant tout le spectre des réactions des entreprises aux préoccupations écologiques, ce document examine aussi ce qui s'est réellement produit dans les années 90. Il recense les principales initiatives prises pour recourir à des techniques moins polluantes, instaurer un label de fabrication écologique, ainsi que les diverses institutions qui jouent un rôle de premier plan en incitant les entreprises à assumer leurs responsabilités en matière de protection de l'environnement. Outre qu'il évalue l'ampleur et l'efficacité de cette action, l'auteur analyse les conséquences de tendances plus générales, liées au type dominant de croissance économique, sur la protection de l'environnement et l'attitude des entreprises envers l'environnement.

A la suite du Sommet de la terre (1992) et de l'Accord de libre-échange nord-américain (1994), il y a eu un débordement d'activité institutionnelle au Mexique destinée à encourager les sociétés commerciales à améliorer leur performance environnementale. Des sociétés ont pris des initiatives importantes pour améliorer leur gestion de l'environnement. Et, ce qui est peut-être plus important à long terme, il existe maintenant une gamme assez complète d'institutions— privées, publiques et régionales—qui incitent le secteur privé à se montrer plus soucieux de l'environnement.

A ce scénario d'un changement technique et institutionnel embryonnaire, certes, mais positif, s'en oppose un autre dans lequel quelques entreprises n'apportent que des retouches cosmétiques à leur gestion de l'environnement tout en prétendant en faire beaucoup plus et en négligeant des aspects cruciaux liés au contrôle et à l'indépendance de la vérification. L'auteur conteste qu'il y ait conversion réelle des entreprises à l'écologie et explique que, au lieu de procéder à une restructuration profonde pour préserver la santé et la sécurité de la collectivité et, de manière générale, améliorer la qualité de la vie, elles ont limité leurs ambitions à l'application de solutions techniques juste bonnes à réduire les déchets en fin de chaîne.

Les tendances liées à la stratégie économique dominante du pays ont des répercussions écologiques et sociales particulièrement préoccupantes. Cette stratégie a consisté à encourager à investir dans des activités industrielles très polluantes et à implanter des entreprises dans des zones urbaines mal équipées, sans système d'aménagement ni régime fiscal solide. La hâte à moderniser et à développer certains secteurs économiques, tels que le tourisme, a privilégié les intérêts privés aux dépens à la fois des collectivités et d'un développement attentif à l'équilibre entre l'économie, l'environnement et le social.

L'analyse révèle un scénario complexe, fait de progrès et de reculs. Comme partout ailleurs dans le monde, le public, mieux informé des effets de la production industrielle et plus soucieux de la qualité de son environnement, fait davantage pression sur les entreprises pour les obliger à se comporter en citoyens responsables. En conséquence, les marchés exigent que ces effets soient mieux pris en considération et récompensent largement certains des participants. Cependant, l'augmentation du volume de production, la tendance à produire davantage pour le commerce international et les changements qui s'opèrent dans la composition de la production, tout cela conspire à intensifier la pollution et pousse à consommer davantage de précieuses ressources naturelles. Une concentration régionale de plus en plus rapide et les maux de l'urbanisation qui l'accompagnent ne font qu'aggraver le problème.

La visibilité accrue des campagnes menées par les entreprises pour faire connaître les efforts qu'elles déploient, individuellement et collectivement, pour assumer leurs responsabilités environnementales est une réponse directe aux citoyens qui réclament une réglementation plus stricte. Au Mexique, le gouvernement, désireux de restreindre ses interventions en économie, s'est réjoui de constater le développement actif des établissements privés et de les voir devancer l'action du secteur public. Si l'on a vu se former récemment quelques partenariats heureux et assisté à des progrès importants dans la diffusion et l'application de solutions techniques à des exemples particulièrement monstrueux de contamination

industrielle, la qualité générale de l'environnement se détériore à cause de la stratégie de développement actuelle et engendre une polarisation sociale.

Avec les initiatives d'auto-régulation prises par certaines entreprises, on a pu croire que des progrès importants avaient été accomplis. Les exigences du marché et des consommateurs jouent un rôle important en donnant aux producteurs la possibilité d'adopter un comportement responsable tout en augmentant leurs profits. Cela vaut particulièrement pour les produits dont les qualités environnementales peuvent être facilement identifiées et commercialisées, comme c'est le cas pour les produits agricoles cultivés de manière organique et les services liés à l'environnement comme le tourisme vert. Il est inévitable qu'en informant et en éduquant le public, en entretenant de nouvelles exigences, naisse une certaine confusion, mais certains producteurs mexicains se sont engagés résolument dans des programmes ambitieux pour tirer profit de cette tendance. Cependant, vu la concurrence internationale acharnée qui règne aujourd'hui, il est probable que certains acteurs préféreront une conversion de façade à l'écologie qui ne leur coûte guère à une attitude vraiment responsable envers l'environnement. C'est à un mouvement éclairé de consommateurs et d'écologistes qu'il revient la tâche difficile d'insister pour que les efforts des entreprises soient plus efficaces en matière de protection de l'environnement.

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Resumen

En los años 80 las tendencias asociadas con la liberalización económica, el crecimiento enfocado en la exportación y la inversión directa extranjera, espolearon un vigoroso debate en México sobre los efectos que estos tendrían en el medio ambiente. No obstante algunos sostenían que las empresas adoptarían tecnologías más limpias otros hacían hincapié en los posibles costos ambientales y sociales. Ofreciéndonos un cuadro panorámico y una evaluación de la respuesta empresarial ante las preocupaciones sobre el medio ambiente, este documento examina los hechos tal cual se dieron en los años 90. Identifica tanto algunas de las iniciativas principales encaminadas a lograr una tecnología más limpia y la certificación ambiental, así como las instituciones que han tenido un papel pautador en fomentar el sentido de responsabilidad empresarial en relación con el medio ambiente. Además de evaluar la escala y efectividad de estas acciones, el documento analiza las implicaciones que las tendencias más difundidas asociadas con la pauta dominante de crecimiento económico tendrían sobre la protección ambiental y la responsabilidad empresarial en favor del medio ambiente.

A raíz de la Cumbre de la Tierra (1992) y del Tratado de Libre Comercio de América del Norte (1994), se ha producido una oleada de actividad institucional en México para incitar a las corporaciones empresariales a que saneen sus operaciones en beneficio del medio ambiente, y algunas compañías han tomado ciertas iniciativas importantes para mejorar el manejo ambiental. Pero tal vez más primordial para el largo plazo es el hecho de que ahora existe un conjunto de instituciones—privadas, públicas y regionales—bastante integrales que están estimulando respuestas del sector privado en el terreno de protección al medio ambiente por parte de las empresas.

Este escenario de incipiente pero positivo cambio tecnológico e institucional se ve confrontado por otro en el que las compañías hacen pequeños ajustes para mejorar el manejo ambiental, adjudicándose exagerados honores y dejando de lado los aspectos cruciales relacionados con el seguimiento y la verificación independiente. El documento cuestiona el contenido del "ambientalismo empresarial", sugiriendo que se ha actuado con un enfoque de mira demasiado estrecha en soluciones técnicas apaciguadoras para reducir los caudales de basuras en lugar de una reestructuración más concienzuda para mejorar la higiene y la seguridad de la comunidad, asimismo que la calidad de vida más en general.

Lo que más preocupa son los efectos ambientales y sociales de las tendencias asociadas con la estrategia económica dominante que se persigue en el país. Tal estrategia ha atraído la inversión en actividades industriales altamente contaminantes y la localización de empresas en las zonas urbanas con infraestructuras, sistemas de planificación y regímenes fiscales débiles. El empuje de "modernizar" y desarrollar rápidamente ciertos sectores económicos como el turismo, ha favorecido los intereses privados a expensas, tanto de los grupos comunitarios, como del enfoque de desarrollo que brinda equilibrio a las consideraciones económicas, ambientales y sociales.

El análisis revela un escenario complejo de avanzadas y repliegues. A la par que en el resto del mundo, con más información acerca de los efectos de la producción industrial y la mayor preocupación por la calidad de nuestro entorno ambiental, la presión pública sobre el empresariado en busca de una respuesta responsable de protección del medio ambiente, ha aumentado. A su vez, los mercados necesitan mayor consideración de estos efectos y compensar generosamente a algunos de los participantes. Pero, el creciente volumen de producción, la tendencia hacia aumentar la producción para el comercio internacional y la composición cambiante de la producción, conspiran en conjunto para intensificar la contaminación mientras se vuelcan hacia el uso de escasos recursos naturales. Para agravar el problema, la tendencia se acelera hacia la concentración regional, con los males de urbanización que le acompañan.

La marcada visibilidad de las campañas empresariales para hacer publicidad de sus esfuerzos individuales y colectivos de actuación responsable en favor del medio ambiente, es respuesta directa de las exigencias impuestas por los ciudadanos para que se establezca una mejor reglamentación. En México, el proceso activo de desarrollo institucional privado para prevenir las acciones del sector público ha sido muy bien acogido por un gobierno comprometido con restringir su intervención en la economía. Si bien se han dado algunas nuevas asociaciones satisfactorias, y se han logrado importantes avances en la diseminación y aplicación de remedios tecnológicos para algunos ejemplos especialmente atroces de contaminación industrial, la calidad general del medio ambiente es de deterioro, como resultado de la estrategia presente de desarrollo con la subsiguiente pauta de polarización social.

Los programas corporativos para la autorreglamentación han creado la impresión de avances importantes. Tanto el mercado como las demandas de los consumidores juegan un papel importante en crear oportunidades para que los productores se comporten de modo responsable mientras incrementan sus ganancias. Este hecho es particularmente cierto en el caso de los productos cuyas cualidades benignas al medio ambiente pueden identificarse y comercializarse con facilidad, como es el

caso de los productos agrícolas orgánicos y los servicios ambientales como el ecoturismo. Inevitablemente, hay un elemento de confusión en el proceso de informar y educar al público, así como en cultivar las nuevas demandas, pero algunos productores mexicanos se han embarcado claramente en programas ambiciosos para sacar ventaja de esta tendencia. Empero, dadas las condiciones actuales de competencia internacional intensificada, es probable que algunos actores escogerán la ruta menos costosa de "reverdecimiento" en lugar de la genuina responsabilidad de salvar y proteger el medio ambiente. Atañe a un movimiento de consumidores y protectores del medio ambiente, la tarea de insistir en que sean más eficientes los empeños empresariales para fomentar la responsabilidad de protección del medio ambiente.

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◆ Abbreviations and Acronyms

AMHSA	Steelmaking Division of GAN
BCSD	Business Council for Sustainable Development
BECC	Border Environmental Cooperation Commission
BFI	Browning-Ferris Industries
CANACO	National Trade Association
CANACINTRA	National Association of Manufacturing Industry
CCE	Business Coordinating Center
CEC	Commission for Environmental Cooperation
CEPDES	Center of Political Economy for Sustainable Development
CESPEDES	Center for Private Sector Studies for Sustainable Development
CFE	Federal Electricity Commission
CIEN	Clearinghouse for Eco-efficiency for Business
CONIECO	National Council of Ecological Industrialists
DDT	Dichloro-diphenyl-trichloroethane (insecticide)
FIDE	Fideicomiso para el Ahorro de Energía (Trust Fund for Energy Savings)
GAN	Grupo Acerero del Norte
INE	National Instate of Ecology
IPN	National Polytechnic Institute
ISO	International Standards Organization
ITESM	Technological Institute of Monterrey
NADBank	North American Development Bank
NAFTA	North American Free Trade Agreement
NIMBY	not in my backyard
PAN-USA	Pesticide Action Network
PCB	Polychlorinated biphenyl
PROFEPA	Office of the Federal Attorney for Environmental Protection
PVC	Polyvinyl chloride (type of plastic)
RAPAM	Red de Acción Sobre Plaguicidas y Alternativas en México
Red Mocaf	Mexican Network of Peasant Forestry Communities
SEDUE	Ministry of Ecology and Urban Development
SEMARNAP	Secretariat of Environment, Natural Resources and Fishing
TNC	transnational corporation
UAMX	Universidad Autónoma Metropolitana Xochimilco
UNIDO	United Nations Industrial Development Organization
WBCSD(-LA)	World Business Council for Sustainable Development (Latin America)

INTRODUCTION

The advent of environmental consciousness in the business community in Mexico is relatively new. As institutions were reshaped in the mid-1980s, pressures on the environment intensified. The economy rapidly opened to the global market, and local institutions responded to the demands of international capital, inducing a dramatic increase in foreign investment. Trade barriers and tariff rates fell, destroying protected sectors serving the domestic market and stimulating export-driven producers. The growth in international trade and investment along with the rising dominance of unregulated markets provoked a vigorous debate about their effects on the environment: defenders of the process like Bhagwati (1993) argued that specialization and competition would lead to the development and adoption of cleaner and more productive technologies with enormous gains to all participants, while nay-sayers like Daly (1993) voiced concern about the impact of unrestrained capital movements. Environmental non-governmental organizations (NGOs) went further, predicting tremendous damage to the environment exacerbated by the effects of the heightened social polarization (Barkin, 1998). The debate was "Mexicanized" as the large environmental NGOs in the United States sought out sympathetic supporters in nascent local environmental groups who might spark opposition to the proposed free-trade agreement (Barkin, 1994; Mumme, 1993).[1] Although the environmental movement was strengthened as a result, the pace of opening to the global market did not slow and Mexico entered the North American Free Trade Area in 1994.

With a change in administration in 1994, the Mexican Ministry of Ecology and Urban Development (SEDUE) was transformed into the Secretariat of Environment, Natural Resources and Fishing (SEMARNAP). A quasi-independent National Institute of Ecology (INE) was also created, as a centre for reflection on policy formulation and an apparatus for its implementation. These developments reflected a belated official recognition of the need to strengthen institutional capabilities in the face of growing challenges to the environment, which were presented by a more permissive investment climate, increased demands for natural resources and deteriorating quality of the environment. Two particularly glaring problems were influential in galvanizing public opinion and spurring governmental action: (i) the incapacity to confront severe air pollution problems in the Mexico City metropolitan area; and (ii) the international attention turned to the neglect of the environmental crisis in communities on both sides of Mexico's northern border with the United States.

These pressures were institutionalized with the signing of the environmental side agreement of the North American Free Trade Agreement (NAFTA) in 1993. This protocol provided for the creation a trilateral Commission for Environmental Cooperation (CEC), to be headed by the ministers of the agencies charged with overseeing environmental affairs in Canada, the United States and Mexico. The Commission was to handle complaints from grassroots organizations about the impact of the integration process. The new body was granted independent investigative authority to determine whether environmental legislation in the

[1] At this early point, the international environmental movement had an important impact on the policy debate in Mexico because they explicitly sought out local counterparts or even created new Mexican organizations to ensure consideration of their concerns.

member countries was being adequately enforced. In addition to being empowered to conduct investigations in response to citizen complaints about violations of local norms, the CEC has initiated its own studies of the overall impact of integration on environmental conditions in general.

At the same time, the Border Environmental Cooperation Commission (BECC) was created. The BECC and its funding agency, the North American Development Bank (NADBank) are not formally part of NAFTA. They were created to promote and help finance infrastructure along the US border and were designed to convince sceptics to support the trade pact since the infrastructural improvements would mitigate any potential environmental degradation associated with NAFTA's promised economic development (Varady et al., 1996).

In this political climate, an important segment of the Mexican business community realized the importance of forging its own political capability in the area of the environment. In the various business chambers (manufacturing—CANACINTRA; commerce—CANACO), environmental commissions were created to counter social sector critiques and attempt to pre-empt initiatives by domestic and international environmental NGOs. By focusing on their own agendas, and participating collectively in public and legislative discussions of environmental initiatives, these commissions aim to provide a "greener" image of business and to forestall further public regulation of private sector activities. The government warmly received these moves, which came as it was attempting to reduce official intervention in the economy and promote the use of administrative and market mechanisms to induce the private sector to behave more responsibly in its use of resources. This paper analyses private sector programmes aimed at reducing the negative impacts of production on the environment. The following types of initiatives and impacts are considered: (i) institution building; (ii) private sector responses to environmental concerns; (iii) local programmes resulting from global policies by transnational corporations; and (iv) the environmental impact of economic change.[2]

INSTITUTION BUILDING: THE DEVELOPING RELATION BETWEEN THE PRIVATE AND PUBLIC SECTORS

The private sector developed a concerted programme of institution building to confront the challenges posed by demands for environmental responsibility. This activity was initially motivated by the concern of a small group within the Mexican business community to improve its environmental image. This coincided with Steven Schmidheiny's initiative to create the Business Council for Sustainable Development (BCSD) in the years leading up to the 1992 United Nations Conference on Environment and Development in Rio de Janeiro. His book, Changing Course: A Global Business Perspective on Business and the Environment (1992), was a clarion cry for the private sector; it also served as a

[2] These results are the product of my research into environmental efforts in the corporate sector (Barkin, 1997 and research in process) as well as that of others (such as Domínguez, 1996) participating in a program coordinated by Rhys Jenkins in the UK (1998).

warning that if there was not a better process of self-regulation and certification leading to a greater degree of environmental responsibility, general public dissatisfaction with deteriorating environmental conditions would lead to much stricter regulation. The book was translated almost immediately in Mexico and published by the government-owned publishing house, Fondo de Cultura Económica.

A Latin American chapter of the BCSD was founded in Mexico just after the Rio conference. In 1993, a unique bi-national chapter was also formed. Originally based in western Texas, for industries working exclusively in the border region around the Gulf of Mexico, this chapter has since expanded its area of influence to encompass the whole of the Gulf region, including forest products industries on the Yucatan peninsula. Shortly thereafter (in 1995), the BCSD was merged with the International Chamber of Commerce's environmental arm to form the World Business Council for Sustainable Development (WBCSD); as part of this process the two regional chapters became part of the BCSD-Latin America, which in turn became the Latin American chapter of the WBCSD in 1997. In 1995, both were located in Monterrey, Mexico, with close institutional ties to the Technological Institute of Monterrey (ITESM), a private university enjoying strong support from the business community in northern Mexico (WBCSD-LA Web page); the Mexico chapter is now located in Mexico City. With strong backing from US interests and the Mexican government, the BCSD-LA was active in the 1996 Summit of the Americas, where it counteracted Mexican grassroots participation.

The National Council of Ecological Industrialists (CONIECO) was created in 1992 as an organization of manufacturers and resellers of products that can help clean up environmental problems, reduce waste streams, or provide other environmental services. It describes itself as a grouping of "industrialists in a variety of areas . . . who have joined forces to face the challenge involved in the fight for ecological preservation" (Rozenberg, 1997). CONIECO's founder and director, Carlos Sandoval, maintains a high profile in the private sector, promoting his constituency's interests with trade fairs that offer the opportunity to inform potential clients of new technologies and equipment for controlling various sources of contamination and for remedial programmes. In 1997, its fifth annual congress emphasized responses to environmental audits, a mechanism used by governmental agencies to stimulate a process of self-regulation and compliance among industrialists. Such audits are of increasing importance for environmental certification and in order to participate in bidding for government contracts. As at most meetings of industrialists, this congress was also an important venue for the display and demonstration of recent advances in industrial equipment; and speakers included high-level Mexican officials describing their plans for co-operation with the private sector, officials from international organizations, and private sector experts offering suggestions for projects in environmental engineering and protection.

Another private sector organization, the Center for Private Sector Studies for Sustainable Development (CESPEDES), emerged in 1994. As part of the elite Business Coordinating Center (CCE), it is becoming a vehicle to promote private sector initiatives to protect and enhance the environment. Representing Mexico's most powerful financial and industrial groups, it was conceived as a mechanism to anticipate regulatory initiatives and perhaps even to become the implementing organization. Although it started with a decidedly academic focus, the appointment

of the former director of the INE, Gabriel Quadri de la Torre, as its Executive Director in late 1997 signalled the business community's readiness to take a more active role in promoting research and training at the enterprise level. During his first six months in office, Quadri became an outspoken critic, focusing on the absence of a clear government policy to confront the numerous existing environmental challenges and the lack of efficacy of the people charged with resolving these problems.

In another initiative, supported by the United Nations Industrial Development Organization (UNIDO) and based at the National Polytechnic Institute (IPN), international assistance is being channelled to create a new capacity for responsible environmental management of production processes. The Mexican Center for Clean Production forms part of a global network organized to promote industrial research and training. This Center, with assistance from the United Nations and the Center for Clean Production located at the University of Massachusetts, Lowell, promoted a first round of studies in the metal plating industry (galvanoplasty). This research demonstrated the cost effectiveness of minor but significant changes in process and technology that would promote a more benign effect of these industries on their local environment. A business seminar was held to give broad exposure to this work, but further lines of study have not yet been defined.

The CEC (based in Montreal) has also begun to play an important role in guiding private initiatives towards greater environment responsibility. One dramatic example is its response to a complaint arising from the massive killing of migratory ducks near a dam in central Mexico. A special investigative team examined work processes and made recommendations that pointed the way towards significant and cost-effective changes in the tanning activities associated with the shoe industry in Leon, Guanajuato. As a result of the CEC's findings and with its support, important changes were promptly introduced into production and effluent recovery processes of the larger enterprises. This case is important because it lent credibility to the CEC, an institution that raised serious suspicions within the business community from the time it was established. By going beyond the expected pattern of convening meetings with expert consultants, producer representatives, environmental NGOs, and bureaucracies in NAFTA member countries to work with both small and large industrial groups, the CEC effectively demonstrated its willingness to transform potential areas of conflict into avenues for constructive environmental improvements. Furthermore, as we shall see below, this applied research project pointed the way for similar initiatives in other segments of the corporate community.

The BECC and NADBank have successfully initiated a dialogue about environmental problems along the border between the United States and Mexico among all stakeholders. Traditional mainstream actors have been forced to share their platforms with social groups, NGOs and local governments. This novelty is giving new visibility and attracting increasing attention to the serious environmental problems and concerns that were formerly denied or neglected. Although recognition and discussion are not tantamount to solution, new resources are available and greater authority is now lent to the opinions of environmental experts. While these institutions are only charged with evaluating proposals and financing public infrastructure for water and sewage, the consultative and evaluative mechanisms offer support to local and national authorities attempting to

ensure that the private sector plays its part in complying with the regulatory framework.[3]

PRIVATE SECTOR RESPONSES TO ENVIRONMENTAL CONCERNS

Mexican enterprises are guiding their efforts to improve environmental quality in a number of different directions. Perhaps the most important thrust of their collective action is a multifaceted attempt to gain credibility and build capacity for corporate self-regulation, both as an acceptable method for compliance with environmental norms and as an alternative to government regulation and bureaucratic enforcement of rules. They are carefully negotiating a new relationship between the private and public sectors with the aim of avoiding conflicts between the public sector mandate of establishing a normative framework for regulation and the private sector's objective of assuming responsibility for compliance.

The drive for capacity building is being orchestrated by the Mexican and Latin American chapters of the WBCSD. In Mexico, these developments have been strengthened by the direct participation of the ITESM. Through its Center of Political Economy for Sustainable Development (CEPDES), it created a Clearinghouse for Eco-efficiency for Business (CIEN Web site), an institution charged with collecting and disseminating information on environmentally friendly technologies and state of the art practices. Its research functions are designed to complement corporate initiatives, adapting eco-efficiency information to the conditions and environment of a developing country, and serving as an important bridge between the larger enterprises that are capable of confronting the challenges of responsible production on their own and the small and medium sized firms that require outside support (Farrera Athie, 1997). After the powerful CCE endowed CESPEDES with the capacity and resources to fund research, conduct training and serve as a liaison with national and international governmental and non-governmental organizations, the business community was in a position to take leadership in the field; with a new director, the CCE has strengthened its ability to directly influence governmental policy in the area of environmental regulation (Moncada, 1997; WBCSD-LA Web page).

This political strategy for creating an organizational capacity was particularly effective in that it defined a specific approach to environmental responsibility. A wide-ranging debate on the subject was pre-empted, with the analysis limited to a narrow definition of the production process itself, and its generation of waste streams within the work centre. This contrasted sharply with the attempts by grassroots community groups, labour unions and health sector workers to expand the analysis to include the impact of production processes on national and local resource use, environmental conditions, workplace health and safety, and community health in its broadest sense. Issues relating to the "viability" of prevailing wages or the adequacy of the existing regulatory framework were successfully shunted aside. The business community also attempted to shape fiscal

[3] For a critical evaluation of the BECC, see Sprouse and Mumme, 1997.

policy to shift as much of the cost as possible for adopting an environmentally responsible policy to the public sector.

An important step in the effort to legitimize self-regulation is the local implementation of international procedures for environmental certification. The largest corporations are focusing on achieving certification under the procedures of the International Organization for Standardization (ISO 14000), as part of a broader programme to include environmental factors in their overall drive to reduce costs. There is a great deal of scope for improvement, given a long history of inexpensive energy and unfettered access to resources that contributed to their squandering and the irresponsible handling of residual products and other waste matter. By the end of 1998, only a handful of corporations had successfully qualified: among Mexican owned firms, two had been certified: parts of the Altos Hornos de Mexico (steel making) division of the Grupo Acerero del Norte (GAN), and the Nhumo (black tar for the rubber industry) division of the Grupo Girsa-Desc. Other corporations are moving rapidly in this direction, and every environmental consulting firm in Mexico appears to be engaged in working with one or more clients to achieve certification.

Most investments in the industrial sector are directed towards reducing the regulated contaminants through "end of pipe" technology that reduces effluent streams and emissions—primarily in scrubbers in smoke stacks and vapour recuperation systems. Such technology is now mandatory in an ever-increasing number of industrial sectors. Investments are being encouraged and partially financed by tax incentives that allow for the expensing or accelerated depreciation of such equipment. The members of CONIECO report considerable increase in investment as a result of this effort. These stimuli account for the vast majority of investment, together with other measures to raise efficiency through a more careful use of inputs of raw materials and energy sources. Redesign of production processes themselves to improve efficiency and worker productivity as well as make the products themselves more environmentally benign (source reduction) has still not been considered in Mexico.

From the government's side, the Office of the Federal Attorney for Environmental Protection (PROFEPA) initiated an ambitious programme to encourage self-compliance. This programme enables qualifying companies to use the label "clean industry" in their consumer advertising and international marketing; it also certifies them as having complied with official standards for environmental protection in industrial categories. At the end of 1997, 86 companies (115 plants) were certified as being in compliance with a broad set of standards for eco-efficiency (see Appendix 1); another 26 plants (7 additional companies) had been certified by mid-1998. As might be expected, the companies most able to qualify are the larger corporations, especially subsidiaries of international firms, with easiest access to capital markets, technology and know-how, as well as the institutional capacity to undertake the training and investments required for incorporating these innovations in an increasingly competitive market; the concentration among the larger plants is clear from the data in Appendix 2 (Dasgupta et al., 1997; Tapia Naranjo and Pichs, 1997).[4] The programme,

[4] Scholars in Argentina, Brazil, Mexico and Malaysia, examining the question of corporate activities in the area of environmental performance have come to similar conclusions (Jenkins, 1998; Domínguez, 1996).

established in 1992, has assumed greater importance since 1996 when PROFEPA started encouraging firms to participate voluntarily as a way of avoiding the more cumbersome environmental audit process involved in programmed or surprise inspections by government officials. The list of participant firms is quite impressive, including a wide variety of national and transnational corporations. PROFEPA's certification of state petroleum, electricity and railroad enterprises, however, has led analysts to raise serious questions about the process, since there are continuing complaints from citizens and workers groups throughout the country of environmental abuses by all three companies (Procuraduría Federal del Medio Ambiente, 1998).

Two other significant initiatives being undertaken at the producer level, with co-ordination within the private sector, are: (i) energy savings through audits and changes in equipment; and (ii) technological evaluations and the implantation of a international certification for organic and/or sustainable production in agriculture and forestry. The energy savings programme is run by a government trust fund (FIDE) within the Federal Electricity Commission (CFE). It works with individual enterprises in both the public and private sectors to reduce total energy consumption, placing emphasis on the problems of peak versus non-peak usage, and the integration of more efficient motors and sources of lighting. It has access to some loan funds to finance technological and equipment changes; such loans are reimbursed through scheduled payments added to the electricity bill. The cost of the investment should be offset by energy savings. Long-term savings are often considerable. Although progress has been slow, this programme appears to be an effective, although modest way of implementing a meaningful plan for reducing energy consumption. The programme has been particularly effective among larger firms and public institutions.

International certification for the quality of primary production is gaining importance among certain groups of producers. This effort is directed primarily at coffee, fruits and vegetables, and forestry products. The struggle to develop local standards consistent with international criteria, and the development of credible local certifying mechanisms and institutions, have involved complex negotiations between local organizations and international certifying bodies. At present, there are at least 76 enterprises engaged in organic agriculture in many states (22 of 32) (Gómez Tovar, 1996). Almost half (35) export organically grown coffee, for which an important market has developed in Europe. Most of these producers coalitions of peasant communities that help finance production, maintain quality, and negotiate with buyers. Through the "good offices" of European organizations, this business now involves several hundred million dollars of exports and the partnership guarantees that some international credit is available directly to the producers. Most of the remaining producers of organically grown agricultural products are concentrated in spices, honey, fruit and vegetables Perhaps the most significant of these are the peasant producers of Baja California Sur, who are organized in a number of co-operatives. This is the result of an initiative by a group of entrepreneurs in the United States who saw an opportunity to supply their US market with fresh, organic spices. They took advantage of the excellent local conditions and an air transportation infrastructure to develop long-term marketing arrangements. Their first efforts involved contract farming, and since then the arrangement has evolved into a local partnership with foreign distributors.

An incipient initiative is that of the Mexican network of peasant forestry communities (Red Mocaf), which is developing an ambitious programme that will enable it to qualify for certification under the international standards for sustainability associated with the international Forest Stewardship Council and the Smart Wood Program. Like organic produce certification, this effort involves designing production processes that ensure the long-term viability of the forests from which timber resources are extracted; the criteria involve not simply quantitative aspects related to sustainable harvests, but also a broader vision of the viability of the participating communities that depend on the forests for their livelihoods (Madrid, 1998). While most of the communities in the programme are poor, the volume that they harvest and the potential for future growth are such that the Red Mocaf is expected to become a major exporter of wood products within the next five years, with turnover amounting to hundreds of millions of dollars annually. This is in sharp contrast to the official government forest development programme, which is based on subsidies for corporate management of plantation forms of single-species production on peasant lands; in addition to the serious environmental questions that the single-species strategy raises, the corporate approach is being questioned because it will not generate sufficient employment or income to permit the communities to survive in their traditional regions.

A search for individual enterprise actions with relation to the environment, however, reveals a significant number of conflicts and examples of "greenwashing" throughout Mexico. The number and variety of these cases were sufficiently striking as to warrant brief comment:

1. The problem of pesticide production and use is of great concern throughout the world. In Mexico, there used to be a large number of pesticides readily available that were not certified as safe by the phytosanitary authorities; in fact, several chemicals being produced or imported for agricultural use were explicitly banned by the authorities. In one particularly egregious case, Galecron, produced by Ciba-Geigy, was sold in large quantities in Mexico's northern states for use in cotton fields as well as to intermediaries who delivered it to US farmers, who could not legally purchase the chemical. Local investigative reporters and academic studies identified the problem after high rates of poisoning were observed in the region. Energetic protests in Mexico, supported by the Pesticide Action Network (PAN-USA), were successful in stopping this abusive practice. Today, its Mexican counterpart, the Red de Acción Sobre Plaguicidas y Alternativas en México (RAPAM), plays a growing, constructive role in documenting the present situation and organizing public campaigns to ensure a more responsible use of agrochemicals.

With privatization and economic integration, however, the problem with the use of agrochemicals has evolved. In 1992, a Mexican firm, Velsipol, purchased the government's fertilizer and pesticide company, Fertimex. In 1996, it was acquired by a German chemical company, Tekchem, and continues to produce DDT for the campaign against malaria, and to export it to other countries, although it will be slowly withdrawn from use during the next decade. The company also produces Parathion, which is still authorized for use in Mexico in spite of being widely prohibited in much of the world (Bejarano, 1997; La Jornada Ecológica, 1998b).

Today, the principal problem of pesticide abuse in Mexico and elsewhere has changed. Many chemical companies now boast that they are protecting the environment, and contributing to a sustainable form of agriculture, by selling products that are biodegradable. Genetically engineered seeds, designed to resist the toxic effects of chemicals intended to eliminate other growth, are the latest development. Such misrepresentation is very troubling, but serious problems and abuse from a previous era still persist: 32 pesticides, widely prohibited elsewhere because of their toxicity, are legally used in Mexico; only 10 have a restricted status. In 1990, the Pan American Health Organization estimated that there were 13,000 serious poisonings from agrochemicals in Mexico, leading to more than 700 deaths per year; the National Epidemiological System is still plagued by underreporting and misdiagnosis (Cedillo, 1996). A new Law of Phytosanitary Control, enacted in 1994, and a National Programme promulgated with the principal objective of promoting agro-exports and controlling "plagues of economic importance compound the problem". Together they eliminate the requirement to report poisonings to the agricultural authorities, transferring this function to the health system, which itself is overwhelmed with many other responsibilities. In contrast, the CEC is taking an active role in promoting "the good handling of chemical substances" by developing an action plan to reduce emissions and risks of toxic, persistent and biocumulative substances in all three countries. The working group is focusing on PCBs, DDT, chlordane and mercury, with the heaviest commitments being placed on Mexico.

2. University studies continue to report unacceptable levels of agrochemical and heavy metal residues in samples of milk collected from major brands (Prado et al., 1998). In spite of the prohibition on the use of organochlorates imposed more than a decade ago, unacceptable levels are still found in cow's milk and fatty tissue. When questioned about a February 1998 study, the bottling companies responded that they had no ability to control the practices of contract managers of the dairy herds or to deal with the above limit concentrations of these substances in the aquifers of major dairy producing regions, especially the former cotton producing area of La Laguna, the source of a substantial proportion of all milk delivered to Mexico City. The government has become intransigent on this issue, with officials responding unofficially that if they were to take action, the country would be without more than one-half of present milk supplies, further aggravating already serious supply problems.

3. When questioned about the quality of water discharges into an urban waterway in central Mexico from a major paper plant owned by the Kimberly Clark Paper Company (recently merged with Scott), managers responded that water quality was well within official norms and that the sulfurous odour that was being emitted was "quite normal" (interview with author, November 1997). They went on to add that the company was voluntarily undertaking sizeable additional investments to upgrade the plant, but that there were limits to what could be done, given the depressed international prices of paper products and the low productivity in the plant, a consequence of antiquated equipment that was brought in from plants in other countries.

4. In spite of regulations prohibiting the use of urban sewage for irrigation of fruit and vegetable production, neither the infrastructure nor the funds exist to

reverse this practice in many parts of the country. This is a particularly serious problem in those areas where the sewage system was deliberately designed to flow into areas specifically designed for such produce. In one highly publicized case, sewage water is channelled into an area where strawberries are cultivated for export. Field workers and their families have settled in a zone where the same waste matter has invaded the aquifer. They are acutely aware of this problem, but unfortunately even their efforts to reduce their exposure to contamination by trucking in drinking water are to no avail, because the nearby springs from which they buy these supplies are also similarly polluted (Lemus, 1995; Barkin and Lemus, 1997).

5. The Mitsubishi Corporation, co-operator (with the Mexican government as majority owner) of a large solar evaporator for salt production on the Pacific Coast in Baja California, has proposed a three-fold expansion of this operation that would directly impact the biosphere reserve of El Vizcaíno. While international opposition has been strong, the joint venture has effectively purchased local support, generously contracting with the local university to produce the environmental impact assessment (in October 1997). Faculty members were told in no uncertain terms that any questioning of this very lucrative arrangement would not be tolerated, and those with doubts were excluded from the review process. The proposed facility not only threatens a calving area of the protected Gray Whale and the reserve, but, just as importantly, it also endangers the fishing communities in the area, by requiring the development of roads, industrial plants, service industries and housing for people who would be attracted to the region by the employment possibilities. It would also intensify conflicts over natural resources associated with land tenure, scarce water and the fishing areas themselves (Crawford, 1998).

This case is notable because Mitsubishi has taken a high-profile and seemingly responsible position on the issue. In 1995, it took out an advertisement in the New York Times, extolling the virtues of the project and promising to "proceed only if the project is environmentally sound and can be so sustained over the long term" (27 June 1995, p. A9). The company took the offensive once again in the autumn of 1997, with full page newspaper advertisements announcing the award of a contract to the state university in co-operation with the prestigious Scripps Institution of Oceanography to conduct a second environmental impact assessment (the first one was rejected by Mexican authorities). The proposed expansion is to provide the very highest quality inputs for industrial processes, especially chlorine plants. So troublesome are these corporate activities that numerous NGOs have specifically targeted the salt project for its environmental threats. In the spring of 1998, Corporate Watch awarded its quarterly "Greenwash Award" to Mitsubishi for the brazen way in which it obfuscates the complex issues involved in the management of such a facility (Karliner, 1997; see also the Corporate Watch Web site: http://www.igc.apc.org/trac/greenwash/ mitsubishi.html).[5]

[5] The literature about this matter is readily available on the Internet. Mitsubishi has created a Web site (http://www.bajasalt.com/) to air its position; the Executive Vice-President and general counsel for Mitsubishi International published an article in the San Diego Union-Tribune (Brumm, 1998) reiterating the official position. The Natural Resources Defense Council prepared a briefing book (http://www.nrdc.org/camp/ cagray.html) on the importance of the lagoon for protecting the whale. The Corporate Watch Web site has links to all parties to support its claims against the corporation

An alternative development proposal (being discussed at the Universidad Autónoma de Baja California Sur) for the region has not received a hearing by regional authorities. The programme focuses on improving the productivity of the existing solar-evaporators and of the local fisheries, along with building an ecotourist programme and efforts to strengthen the local community. This course of action would involve a different scale of development, which would favour a local resource management programme over an export-driven scheme in which the local residents and the region itself would be transformed and the communities threatened, as has occurred in many other locations in Mexico.

6. An "ecotourism" theme park, constructed on the southern coast of Quintana Roo, involved the dynamiting of natural wells (*cenotes*) of natural and religious value and in direct contravention of numerous local and national regulations. The theme park also contains numerous exhibits and facilities that violate local laws and international treaties with regard to the management of a natural environment and the care, capture, and maintenance of endangered species, such as giant marine turtles. Another tourist development programme in the region, carried out by the Spanish Melia consortium, threatens beaching areas for giant marine turtles. And a domestic developer (Hotel Cid) is seeking to build near the few remaining mangrove swamps on the Yucatan peninsula. A March 1998 decision to approve two large hotel developments on the "Mayan Riviera" confirms that the concerns of the local population, environmentalists and experts in local development are well founded: large-scale private developmental interests are prevailing over the more creative proposals offered by groups seeking balance between economics and the environment. The rhythm of development is intensifying, for the state's governor ends his term in office in 1999 and is attempting to leave his mark on the region (and a source of personal profit).[6] Perhaps even more serious, in the long run, is the direct threat that this development represents to the viability of the remaining Mayan communities whose very existence is threatened by the expansion of tourism. No effective effort is being made to involve these communities, as has been suggested by the numerous independent consultants who have evaluated the process. If current trends persist, these people will be forced to abandon their communities, and we will all lose the extraordinary fount of knowledge about the management of natural resource systems in the region, which has underpinned the survival of the indigenous communities.

On the Pacific Coast, the mega-resort of Huatulco is facing a crisis due to water shortage, but has the opportunity to resolve the problem creatively. The aquifer that was supposed to supply 24 luxury hotels has proved inadequate to the task, because of excessive withdrawals by the first few hotels that were completed. In this case a local environmental organization has proposed mobilizing the surrounding communities to collaborate in a large-scale and long-term project for resource management thereby increasing permanently available water supplies while dramatically improving conditions for the

(http://www.igc.apc.org/trac/greenwash/mitsubishi.html); their page includes an analysis of the corporate position by an environmental lawyer, Mark Spalding, of the Center for US-Mexican Studies at the University of California at San Diego (Spalding and Saldaña, 1998).

[6] At the end of his term, the governor was under indictment for drug-related crimes and money laundering through various properties along the Maya Riviera; he was also a fugitive.

10,000 people in the nearby communities. The foresight of a local entrepreneur, and the systematic efforts to build bridges of communication and mutual respect among stakeholders in the region are making this unusual effort possible (Barkin and Paillés, 1998).

7. One of the leading sponsors of the CESPEDES, the GAN, has taken decisive moves to sharpen its "green" image of corporate responsibility. GAN has been one of the first to qualify for ISO 14000 status in Mexico, and has taken a leadership role in transforming the CESPEDES into a more active participant in the private sector drive for participation in environmental oversight. It has assumed an even more high-profile position by sponsoring the cleaning of some of Mexico City's most important public monuments. But after presuming that GAN was committed to improving environmental conditions in its plants, and offering unrestricted access to a university group anxious to train professionals in worker health and safety under real-world conditions, the vice-president in charge of this area was apparently overruled at the highest levels, and all further communication was suspended. The academic analysts involved believe that this reluctance to permit scrutiny of claims of progress in environmental and worker health reflects the large gulf between standards of progress as determined by procedures established by the institutions of self-regulation, and objective progress as might be defined by internationally defined indicators of environmental impacts in the workplace and community (interview with author, December 1997).

8. As a result of the substantial climatic alterations induced by El Niño in 1998, Mexico suffered a large number of persistent fires throughout its territory. Fragile ecosystems were destroyed and massive quantities of smoke caused respiratory problems for millions. Environmental crisis also affected the southern part of the United States where, in several states, air quality emergencies were declared leading to serious impairment of activities and heavy economic losses. The United States sent several million dollars-worth of material and technical assistance to combat the conflagrations. The experience revealed once again that, discourse aside, environmental authorities are still not developing contingency plans for such disasters. And the private sector has chosen to remain on the sidelines, criticizing inadequate bureaucracies rather than facing up to the serious structural problems created by the cutbacks in government spending for rural development and environmental protection that has decimated the communities best equipped to deal with such problems, through regular programmes of informed soil and water management (La Jornada Ecológica, 1998a). Even more troubling, there is ample evidence to suggest that many of the fires were deliberately set as a result of local conflicts over land tenure or as part of an effort by powerful local interests to prepare the way for development projects opposed by local communities (Barkin and García, 1998).

THE LOCAL PROGRAMMES OF TRANSNATIONAL CORPORATIONS AND INTERNATIONAL AGENCIES

Growing demands for environmental responsibility have produced an outpouring of materials from the internationalized corporate sector to demonstrate its sincerity. One of the most striking examples of such efforts is the highly visible programme of the American Chamber of Commerce in Mexico to document the activities of its members. In spring 1997, it conducted a mail survey among its members, asking about the impact of NAFTA; three of the questions related to practices in the area of the environment and in health and safety matters. Of the 217 firms responding to the mail survey, 123 indicated having made investments (on average, of about US$ 200,000 per respondent) in new technologies for improving environmental practices. Almost two thirds (136) had implemented new health and safety measures since 1994, including changes in the work process, new guidelines for industrial safety, better techniques for handling wastes, on-the-job training, and the installation of new safety equipment. Finally, 84 firms indicated that they had implemented new labour practices, including the general upgrading of health and safety conditions, productivity bonuses and other incentives, new training programmes for personal development, sensitivity training, and renegotiating collective bargaining agreements (American Chamber of Commerce, 1997).

Corporate support for the efforts by UNIDO and the CEC to implement programmes for environmental remediation in certain industries has increased as studies demonstrated their value in reducing direct production costs and improving the quality of products. In fact, findings have been so convincing, that the demand has mushroomed for experts to apply the same methodology in specific settings. Not satisfied with restricting the recommendations to the firms covered by the international studies, the ITESM is promoting the broader application of the findings in other firms and industries. Private initiatives in this area are also being announced by local consulting firms as well as by private international organizations, both corporate and university based.

Perhaps the area of greatest international interest is in the industries that supply environmental equipment and provide environmental services. Many transnational firms are installing such equipment in their Mexican plants as part of a global programme to improve performance and reduce effluent streams. As a result of these programmes and other initiatives associated with self-regulation and the "clean industry" programme, most of Mexico's largest firms are vigorously pursuing strategies to install a wide variety of equipment to reduce their production of toxic wastes and recover effluents for reuse, sale or appropriate disposal.

The market for environmental services in Mexico is just beginning to develop. Subsidiaries of Waste Management Inc. and Browning-Ferris Industries (BFI) account for a significant share of this market, having successfully bid for numerous municipal waste disposal contracts and installed at least two important toxic waste collection and processing plants. Solid waste disposal is still an important field of contention in Mexico, because of a lack of consensus about the best way to organize the provision of such services, their ownership, and the

oversight procedures. As a result, much of the competition among international firms includes proposals for the design and organization of privatized services. Problems of implementation are compounded by the lack of expertise in local government, the very limited budgets for these services, and the lack of a tradition of charging fees for such services. In present practice, limited local budgets for garbage collection services are supplemented by "tips" paid to the collection teams and the income generated by separation and resale of recyclable materials. These "other" sources of income have proved so significant that the garbage workers' unions, the scavengers' associations, and the politicians associated with these groups have strongly opposed most campaigns by government for privatization.

The development and management of toxic waste processing facilities has been even more contentious, with groups organizing around typical NIMBY ("not in my back yard") interests at the local level. The federal government has offered no leadership in developing a national policy for handling toxic waste streams, including contagious hospital and biological products, which are still generally handled as just another category of solid waste. In a few notable cases, where public disclosure has created particularly embarrassing situations for government firms (PVCs in the case of electrical transformers, spent radioactive fuel near a nuclear power plant, or petroleum by-products) or private chemical companies, no adequate solution has emerged. One of the most serious of the unresolved waste issues, is that of the spent fuel rods used in the nuclear power plant at Laguna Verde, Veracruz. The power company (Federal Electricity Commission or CFE) remains intransigent, assuring that there are no health hazards involved with the plant or with the present storage procedures (in deep water holding tanks), in spite of numerous medical problems among the workers and studies of radioactivity at the site.

In the area of water management, including processing, distribution and disposal, a similar situation prevails. It is only with the installation of huge water treatment plants in the Mexico City metropolitan area, at a cost of more than US$ 1 billion, that people are beginning to realize the cost of this aspect of modern urban life. In some smaller metropolitan areas local conflicts have emerged over the management and design of water and sewage authorities, which are required to become self-financing. Until recently, there has been no outside investment or interest in this service, but with the institutional changes brought on by NAFTA, in particular the requirement of national treatment of investors from the other member states, there has been some greater discussion of these matters in industry circles. Most of this interest has been in the northern border regions, where some international financing is available from NADBank for installation and upgrading of infrastructure and for the reorganization of water authorities; international bidding for equipment and management has virtually excluded Mexican firms from the competition in these cases.

THE ENVIRONMENTAL IMPACT OF STRUCTURAL ADJUSTMENT AND INTERNATIONAL INTEGRATION

One of the greatest environmental challenges for policy makers in Mexico is the changing structure of production and the regional redeployment of activities and people. In the new economic model, emphasis is being placed on export

production. As part of this move away from stimulating production for the domestic market, politicians have placed their faith in the investment initiatives of international capital and the ready availability of inexpensive labour and natural resources, including energy. Mexican leaders consider these advantages crucial to the country's ability to attract new investment. They are hoping to transform the country into a productive platform for foreign firms seeking access to markets in the United States and Canada.

This change in emphasis was extraordinarily successful in stimulating the growth of *maquiladoras* (assembly plants for export production) in the northern border region, and more recently in other parts of the country. Over the past 15 years, employment has grown more than fourfold to about one million people, or about one quarter of the industrial labour force. Most assembly plants are distributed among some 18 border regions, with more than half of them concentrated in only four cities. In spite of this growth, however, the *maquiladoras* still only employ about 3 per cent of the Mexican working population of about 33 million, fewer than the number of young people entering the labour force each year.

This dramatic increase in industrial assembly plants led to a number of problems in the border region, especially as concerns the environment. Although there is little hard data on contamination resulting from these industries, case studies suggest profound impacts in the whole region (Balcazar et al., 1995; Moure-Eraso et al., 1994, 1997). And environmental problems are intensifying, in part, because the fiscal regime in the region virtually exempts the plants from any local taxes that might be used to finance infrastructure for a rapidly growing population, to confront the severe water shortage in this arid area, or the lack of any publicly owned water treatment plants. Problems are further compounded by a widespread flouting of environmental laws and regulations by companies on both sides of the border: toxic wastes are regularly shipped into Mexico from the United States, in direct contravention of law, and effluents generated in Mexico from imported raw materials are not separated and re-exported to their country of origin, as stipulated in the La Paz Agreement of 1983.[7] But more importantly, in spite of improving governmental capacity to supervise implementation of the existing regulatory framework, industrial growth is simply outstripping the region's carrying capacity.

The emergence of the border region as a principal locus of production and as a trans-shipment point for the rapidly growing trade among the NAFTA countries has significantly increased the volume of vehicular traffic. To accommodate the growing demands, new border crossing points, along with the needed infrastructure (roads, bridges, administrative processing centres, etc.), are being built. The problem of increased traffic in urban areas is aggravated by the lack of housing for new workers, who are paid wages too low to be able to afford anything that might be supplied by the private sector. Self-built sheds and shanty towns are springing up without even minimal public services. Privately supplied collective transport services quickly respond to growing demand in every Mexican border town but are devoid of any official regulation, with disastrous impacts on the environment and tragic consequences when the inevitable accidents occur.

[7] Agreement Between the United States of America and the United Mexican States on Cooperation for the Protection and Improvement of the Environment in the Border Area (14 August 1983). The text of the agreement may be found in United States Department of State, **Treaties and Other International Acts Series**, Number 10827, US Government Printing Office, Washington, D.C.

Unfettered growth is raising levels of air pollution and noticeably reducing the quality of life in border communities (La Jornada Ecológica, 1998c). Other related problems include an unusually high incidence of birth defects, which often makes for spectacular headlines (as in the case of a rash of anencephalic births) and the growing problems of drug trafficking and consumption. Political violence and personal insecurity are also fixtures of everyday life, and kidnapping and assassination incidents are increasingly common. But even the horror and repulsion caused by the serial rape and murder of almost 200 young *maquiladora* workers over the past three years in Ciudad Juarez seems insufficient to arouse the local Chamber of Commerce or the authorities to take strong measures to control the situation.

A less apparent but potentially more serious problem in the long run, is the changing "pollution intensity" of the border export industries. Using international coefficients for 1987 to measure the contaminating effect of different industrial branches, we detected a tendency towards a slightly more contaminating productive structure.[8] Thus, contamination in the border region is intensifying not only because of the impact of economic growth, but also because some of the new plants generate more toxic waste than those that formerly settled in the region. Although the results are still preliminary, they show a clear tendency towards a greater concentration of growth in the *maquiladora* sector in industries with higher pollution intensities. On the basis of these results, and similar studies in other parts of the country (see Ten Kate, 1993), it seems that the particular pattern of growth in Mexico is leading to the expansion of industries which have more negative effects in terms of contamination than was the case in the past.

Analyses of the energy and water intensity of Mexican exports show similar results. It is striking that unlike most of Mexican industry, where the energy intensity of production has declined with productive modernization and technological innovation, the number of kilowatt hours per million dollars of exports has actually risen substantially over the past 10 years (Constantino, 1996). Similarly, examination of the changing structure of agricultural production toward exports demonstrates that the new higher-valued crops require more water. Present policies that grossly under-price water are causing scarcities of basic food grains in many parts of the country, while stimulating the planting of crops that use more water along with agrochemicals (Diaz Coutiño, 1999). In a related vein, a detailed analysis of the dramatic but short-lived increase in international maize prices in 1994 demonstrates how large-scale livestock interests in northern Mexico created an environmental problem for personal gain. As prices of calves fell because of the rise in feed costs, they halted the export of live calves that were fattened in feedlots in Texas and Oklahoma (a practice going back more than one hundred years) and put their animals out to pasture in Mexico. The increased demand for water by the 1.5 million animals that were not sold contributed to a severe water shortage in Mexico that was conveniently, but erroneously, attributed to a drought during the 1995-96 agricultural season. The ranchers were able to divert water from industrial and agricultural uses, thereby shifting heavy economic losses to other groups and reaping spectacular speculative gains, in spite of some cattle deaths during the seasonal dry spells (Barkin and Constantino, 1997).

[8] By isolating the impact of increasing contamination due to economic growth, we were able to identify the effect of changing industrial composition in generating various vectors of pollutants.

But "globalization" is not only causing problems for the northern border region. It is radically changing the regional distribution of activity in Mexico and, in the process, causing environmental damage in the new centres of productive growth.[9] In contrast to past eras, large manufacturing firms no longer choose to locate in the Mexico City metropolitan area or in the neighbouring cities of Toluca, Cuernavaca or Puebla. Instead, new industrial centres have been established in the northern cities of Aguascalientes (where Nissan moved operations from Cuernavaca), in Silao and Ramos Arizpe (where General Motors transferred production formerly in the capital), and in Hermosillo (where Ford built a brand new plant). Guadalajara fancies itself another Silicon Valley as well as a textile centre. Monterrey continues to grow as a result of the international alliances forged by the companies traditionally based there.

Problems on the border, like those mentioned above, are inducing many entrepreneurs to disperse their new assembly operations further south. Although still limited to a few dozen examples, small factories employing several hundred people can now be found in rural communities throughout central Mexico, as well as in intermediate cities. While this new pattern of productive expansion is celebrated by policy makers, a more careful examination of the process reveals that employment growth is limited and that the leading industries are actually causing a net drain on foreign exchange in spite of being heavy exporters. This results from the fact that a high proportion of their machinery and parts must be imported, as well as remittances for licenses, royalties and profits. Furthermore, in virtually every area where new industries are being installed, there are reports of conflicts over access to water and the siting of solid waste disposal and sewage systems, while traffic congestion and pollution become major sources of complaint. State and local governments do not have the resources to finance new infrastructure, nor do they possess the administrative and technical capabilities to meet these challenges. Central government authorities are not prepared to support them. There is no effective urban planning process, even as the influx of new workers and managers is unleashing speculative movements in land prices that are forcing many people into shanty towns and marginal housing as rents rise in their old neighbourhoods.

Although the new firms are undoubtedly using cleaner and more productive technologies than was characteristic of the old industrial plant, environmental pressures are increasing. The sheer increase in the volume of production, the requirements for transport of burgeoning volumes of imports for production and exports of finished goods, and the demands for water and energy are creating many environmental problems.[10] No satisfactory solution has been developed for solid waste collection and processing or disposal; sewage systems are virtually inexistent, and many of those that have been built use technologies that are too costly to operate. In the work places themselves, there is ample evidence of a increase in the intensity of work, with a consequent growth in occupational health problems. Many of these problems are not yet documented because data are highly unreliable. However, workers comment that they are being offered cash payments

[9] A more complete examination of some of the environmental consequences of structural adjustment and international integration can be found in a report prepared for the World Resources Institute (Barkin, 1997).

[10] The environmental, and worker health and safety impacts of rising production in existing industrial plants are explored in Lemus, 1999.

in lieu of reporting workplace accidents, since the workers' compensation system changed over to a risk-weighted premium system for employers' insurance payments (Lemus, 1999).

In the Mexico City area, environmental conditions continue to deteriorate in spite of the slower rate of industrial growth. During the past decade, the government moved many of the most contaminating industries from the valley and placed limits on private automobile use, but these steps have been insufficient to deal with air pollution; air quality rarely meets even the lax standards of the Mexican system. Supplying the demand for water requires going as far away as 500 kilometres to a river basin 1,000 meters below Mexico City that is beginning to provoke protests from the people in the sending regions whose communities and economies are threatened. With globalization, Mexico City is being transformed into a true global city (Sassen, 1995), as the stock exchange, banks, and international financial and real estate service firms replace factories in the urban centre. Modern shopping malls are being built to serve a small elite, the real beneficiaries of the new economic model, while Mexico City's working classes are left to fend themselves, with an inadequate transportation system and rising personal insecurity compounding the problems caused by a deteriorating environment.

The greatest environmental problem, however, is poverty itself. The new economic model is increasing social polarization, as formal employment in stable jobs declines and part time jobs, contract labour and other less secure forms of work proliferate. Self-employment, street vending, service work (including domestic work and those self-taught plumbers, painters, electricians who ply their trades on street corners) and other forms of "informal sector" activity are a last resort for those who cannot find adequate alternatives elsewhere. But with low incomes and several people in each family working, there is little time and no money to devote to the basic tasks of environmental management that were an essential part of community life in the past, such as maintaining water canals clear of debris, assuring the stability of small terraces, or planting trees. Although the public sector is generally expected to assume these responsibilities today, it is unable to do so because of dwindling revenues and pressures to support economic expansion. The collective labour practices common among rural communities in the past—building and maintaining community infrastructure such as roads, canals, schools and other public works—have been severely undermined by the desperate need to leave the community to earn basic (infra)subsistence wages.

With the privatization of many public firms and the transfer of public responsibilities to the corporate sector throughout the country, local governments and community organizations are just beginning to understand the problems of incorporating "externalities" into the negotiation process with individual enterprises. Among the issues that are still to be struggled over is the problem of defining how urban open spaces can be created, protected and maintained. The task of assigning responsibility for the clean-up of problems left from decades of mismanagement and lack of regulations seems virtually intractable. On top of all this, however, is the growing problem of an economic model that is unable to create sufficient quality jobs, while an ever increasing number of people are being prevented from strengthening their traditional forms of subsistence.

CONCLUSION

An analysis of the greening of business in Mexico necessarily produces a complex scenario of advances and retreats. As in the rest of the world, with greater information about the effects of industrial production, and increased concern for the quality of the environment, more public pressure is being placed on business for responsibility. In return, markets require greater consideration of these effects and reward some of the participants handsomely. On the other hand, the increased volume of production, the trend towards more production for international trade, and the changing composition of output all conspire to intensify pollution while shifting towards greater use of scare natural resources in countries like Mexico. Aggravating the problem is the accelerating tendency towards regional concentration with its associated ills of urbanization.

The heightened visibility of corporate campaigns to publicize their individual and collective efforts for environmental responsibility is a direct response to citizens' demands for greater regulation. In Mexico, the impressive process of private institutional development to forestall public sector action has been warmly welcomed by a government, committed to restraining its intervention in the economy. While there have been some notably successful new partnerships, and important advances in the dissemination and application of viable technological remedies for some particularly egregious examples of industrial contamination, the overall quality of the environment is deteriorating as a result of the present strategy of development with the ensuing pattern of social polarization.[11]

Corporate programmes for self-regulation have created the impression of important advances. The marketplace and consumer demands are playing an important role in creating opportunities for producers to behave responsibly while increasing their profitability. This is particularly true of products whose environmentally benign qualities can be readily identified and marketed, as is the case of organically grown produce and environmental services, like ecotourism. Inevitably, there is an element of confusion in the process of informing and educating the public, and in cultivating new demands, but some Mexican producers have clearly embarked upon ambitious programmes to take advantage of this trend. Given the present-day conditions of heightened international competition, however, it is likely that some players will choose the less costly route of "greenwashing" in place of genuine environmental responsibility. It is the difficult task of an informed environmental and consumer movement to insist that corporate efforts to promote environmental responsibility are more effective.

[11] For more on the relationship between the quality of the environment and social polarization, see Barkin, 1998.

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ANNEX 1

Office of the Federal Attorney for Environmental Protection:
Firms Certified Under the "Clean Industries" Programme (1997)

1 3M México, S.A. (P.D. F.)	41 Dupont México, S.A. (P.Lerma)
2 Adydsa del Sureste, S.A.	42 Federal Mogul, S.A.
3 Aga Gas, S.A. (P.Guadalajara)	43 Fenoquimia, S.A. (P.Cosoleacaque)
4 Agronitrogenados, S.A.	44 Fertilizantes Guadalajara, S.A.
5 Alambrados y Circuitos Eléctricos, S.A. (P.V)	45 Gates Rubber de México, S.A. (P.Toluca)
6 Alambrados y Circuitos Eléctricos, S.A. (P.VII)	46 Glicoles Mexicanos, S.A.
7 Albright and Wilson Troy de México, S.A. (Complejo Industrial Pajaritos)	47 Grasas Vegetales, S.A.
8 Alcoholes Desnaturalizados y Diluentes, S.A. (P.Tlalnepantla)	48 Grupo Industrial N.K.S., S.A.
9 Bayer de México, S.A. (P.Ecatepec)	49 Industria Química del Istmo, S.A. (Complejo Industrial Pajaritos)
10 Carplastic, S.A. (P.Hermosillo)	50 Industrias Cydsa Bayer, S.A. (Complejo Industrial Pajaritos)
11 Celanese Mexicana, S.A. (Complejo Cangrejera)	51 Industrias Resistol, S.A. (P.Coatzacoalcos)
12 Celanese Mexicana, S.A. (Complejo Cosoleacaque)	52 Industrias Texel, S.A.
13 Celanese Mexicana, S.A. (P.Celaya)	53 Insecticidas de Occidente, S.A.
14 Celanese Mexicana, S.A. (Terminal Maritíma Coatzacoalcos)	54 Insecticidas Nacionales Corey, S.A.
15 Cementos Anáhuac, S.A. (P.Barrientos)	55 Kimex, S.A.
16 Cementos Guadalajara, S.A. (P.Guadalajara)	56 Koblenz Eléctrica, S.A.
17 Cementos Mexicanos, S.A. (P.Torreon)	57 Kodak de México, S.A. (P.Guadalajara)
18 Cerillos y Fósforos La Imperial, S.A.	58 Masterpak, S.A. (P.Celorey)
19 Cervecería Cuauhtémoc-Moctezuma, S.A. (P.Monterrey)	59 Masterpak, S.A. (P.Propirey)
20 Cervecería Cuauhtémoc-Moctezuma, S.A. (P.Orizaba)	60 Masterpak, S.A. (P.Reyprint)
21 Cervecería Cuauhtémoc-Moctezuma, S.A. (P.Tecate)	61 Nueva Fábrica Nacional de Vidrio, S.A.
22 Cervecería Cuauhtémoc-Moctezuma, S.A. (P.Toluca)	62 Nylon de México, S.A.
23 Cervecería del Pacífico, S.A.	63 Operadora Metamex, S.A.
24 Cía. Cerillera La Central, S.A.	64 Orozco Polaris, S.A. (Marina Aqua Ray)
25 Cía. Mexicana de Terminales, S.A.	65 Papelera del Nevado, S.A.
26 Ciba Especialidades Químicas México, S.A. (P.Atotonilquillo)	66 Pavillion, S.A.
27 Ciba Especialidades Químicas México, S.A. (P.Puebla)	67 Pemex Petroquímica Centro Embarcador Pajaritos
28 Ciba Farmacéutica, S.A. (P.Tlalpan Norte)	68 Pemex Refinación Centro de Transportación Terrestre de Cadereyta
29 Cloro de Tehuantepec, S.A.	69 Pemex Refinación Centro de Transportación Terrestre de Cd. Madero
30 Colgate Palmolive, S.A. (P.D.F.)	70 Pemex Refinación Ductos Norte Cd. Madero
31 Compañía Nestle, S.A. (P.Xalapa)	71 Pemex Refinación Refinería Ing. Antonio Dovali Jaime, Salina Cruz, Oax.
32 Crisoba Industrial, S.A. (P.Morelia)	72 Pemex Refinación Terminal de Almacenamiento y Distribución, Cd. Madero
33 Curtidos Toluca, S.A.	73 Pemex Refinación Terminal de Almacenamiento y Distribución, Nuevo Laredo
34 Cyanamid de México, S.A. (P.Tlalpan)	74 Pemex Refinación Terminal Marítima de Cd. Madero
35 DELPHI Ensamble de Cubiertas Automotrices, S.A. (P.Parral)	75 Pennwalt, S.A. (P.Santa Clara)
36 DELPHI Vestiduras Fronterizas, S.A. (P.Juárez)	76 Petroquímica Cosoleacaque, S.A.
37 DELPHI Vestiduras Fronterizas, S.A. (P.Río Bravo)	77 Petroquímica La Cangrejera, S.A.
38 Detonadores Estrella, S.A.	78 Petroquímica Morelos, S.A.
39 Dow Química Mexicana, S.A. (P.Tlalnepantla)	79 Petroquímica Pennwalt, S.A. (P.Coatzacoalcos)
40 Dow Química Mexicana, S.A. (P.Tlaxcala)	80 Pinturas y Barnices Calette, S.A.

81 Polaquimia, S.A.
82 Polimeros de México, S.A. (P.Tlaxcala)
83 Procter & Gamble de México, S.A. (P.Talismán)
84 Procter & Gamble de México, S.A. (P.Vallejo)
85 Productos de Consumo Resistol, S.A. (P.Vallejo)
86 Productos Pelikan, S.A.
87 Productos Químicos Coin, S.A.
88 Productos Químicos Naturales, S.A.
89 Pyosa, S.A. (P.1 y 2)
90 Química Hoechst de México, S.A. (P.Santa Clara)
91 Química Lucava, S.A.
92 Quimobasicos, S.A.
93 Reichhold Química de México, S.A.
94 Reind Química, S.A.
95 Residuos Industriales Multiquim, S.A.
96 Resirene, S.A.
97 Rexcel, S.A. (P.Química Lerma)
98 Río Bravo Eléctricos, S.A. (P.I)
99 Río Bravo Eléctricos, S.A. (P.IV)
100 Río Bravo Eléctricos, S.A. (P.V)
101 Río Bravo Eléctricos, S.A. (P.VII)
102 Río Bravo Eléctricos, S.A. (P.IX)
103 Río Bravo Eléctricos, S.A. (P.X)
104 Río Bravo Eléctricos, S.A. (P.X-A)
105 Sales del Istmo, S.A.
106 Schneider Eléctric México, S.A. (P.D. F.)
107 Servicios Minerometalúrgicos de Occidente, S.A.
108 Síntesis Orgánicas, S.A. (P.Puebla)
109 Sistemas Eléctricos y Conmutadores, S.A.
110 Stepan de México, S.A.
111 Tecniquimia Mexicana, S.A.
112 Tetraetilo de México, S.A. (Complejo Industrial Pajaritos)
113 Univex, S.A. (P.Salamanca)
114 Vidriera Toluca, S.A.
115 Viniles de Acuna, S.A.

ANNEX 2

Office of the Federal Attorney for Environmental Protection: Environmental Audits (1992–2/1998)

Firm	In Process	Completed	Total
1 Grupo Cementos Mexicanos	0	19	19
2 Ferrocarriles Nacionales de México	0	54	54
3 Grupo Peñoles	0	14	14
4 General Motors	0	50	50
5 Pemex	23	133	156
6 Comisión Federal de Electricidad	0	30	30
7 Ford Motors	0	12	12
8 Asa	5	24	29
* 9 Others	28	197	225
*10 Procuraduría Federal de Protección al Ambiente	0	315	315
TOTALS	56	848	904

* Letters of Commitment; in other cases, formal agreements

Of the 848 environmental audits completed, 864 action plans have been drawn up:

Negotiated	349
In process	338
Fulfilled	177
TOTAL	864

Source: PROFEPA, Undersecretariat of Environmental Audits

Summary of Environmental Audits by States (1992–2/1998)

State	In process	Completed	Total
Aguascalientes	0	14	14
Baja California	1	37	38
Baja California Sur	1	7	8
Campeche	0	5	5
Chiapas	0	11	11
Chihuahua	2	66	68
Coahuila	3	58	61
Colima	0	9	9
Distrito Federal	1	32	33
Durango	7	15	22
Guanajuato	0	25	25
Guerrero	0	6	6
Hidalgo	0	22	22
Jalisco	1	34	35
México	1	95	96
Michoacán	1	22	23
Morelos	1	18	19
Nayarit	0	1	1
Nuevo León	2	43	45
Oaxaca	0	18	18
Puebla	4	33	37
Querétaro	4	15	19
Quintana Roo	1	4	5
San Luis Potosí	1	21	22
Sinaloa	0	22	22
Sonora	2	15	17
Tabasco	9	42	51
Tamaulipas	3	37	40
Tlaxcala	1	29	30
Veracruz	7	71	78
Yucatán	1	8	9
Zacatecas	2	7	9
Various States*	0	6	6
TOTALS	56	848	904

Source: PROFEPA, Undersecretariat of Environmental Audits
* Environmental Audits to the right of way of PEMEX