



**SUSTAINABLE DEVELOPMENT IN LATIN AMERICA AND THE
CARIBBEAN: TRENDS, PROGRESS, AND CHALLENGES IN
SUSTAINABLE CONSUMPTION AND PRODUCTION,
MINING, TRANSPORT, CHEMICALS AND
WASTE MANAGEMENT**

**Report to the eighteenth Session of the Commission on
Sustainable Development of the United Nations**



UNITED NATIONS

ECLAC

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I. INTRODUCTION

The first version of this report was prepared by the Division for Sustainable Development and Human Settlements of the Economic Commission for Latin America and the Caribbean (ECLAC) to guide discussion during the Regional Implementation Forum on Sustainable Development in Latin America and the Caribbean held on 26 and 27 November 2009 in La Antigua, Guatemala, in preparation for the eighteenth session of the United Nations Commission on Sustainable Development (CSD). The results of that forum, in addition to specific comments made on this document by member countries, have been included in this final version.

This report covers the main issues to be addressed during the session: sustainable consumption and production as a guiding paradigm for development; mining, as an activity of great importance to many of the region's economies, with heavy impact on environmental sustainability; transport, which is undergoing significant change that has contradictory effects on sustainability, primarily in urban areas; chemicals, which, owing to Latin America's large agriculture production, represent a diffuse, albeit serious, problem; and, lastly, solid waste, a topic around which many important activities are taking place in the region that need to be publicized and promoted, but which continue to generate persistent and multifaceted problems for social and environmental sustainability.

This report relies, among other sources, on information in national reports to the CSD. This information was incorporated into the report as documents were made available.

This document emphasizes progress made by the countries of the region, but it also points out persistent barriers that keep some of the most sustainable options for addressing the issues from being properly developed. There are many more challenges than achievements, but this report has sought to point out some of the best practices that countries have adopted and that might point to the way to successfully move towards sustainability.

During the Forum, participants stressed the cross-cutting nature of sustainable consumption and production, a broad area that has strong and obvious links with the other issues discussed. That is also the case of chemicals and waste management, both interrelated issues that affect the sustainability of mining and transport. Despite the diversity of thematic areas, the following common challenges (cross-cutting issues) were identified during the Forum:

- **Information, education and awareness.** Progress in any of the thematic areas requires efforts to produce relevant information and knowledge, making that information accessible and increasing public awareness and training. It is crucial to invest in quantification of the cost of environmental and social problems caused by certain activities, such as mining in certain areas, or by inaction—for example, exposure of persons to toxic chemicals—in order to ensure that those issues are adequately taken into account in public policy.

During the Forum, participants referred to the importance of making efforts towards sustainability, of recovering traditional values and knowledge and of critically evaluating foreign models so as to avoid copying those that are incompatible with the region's needs and resources.

- **Building State capacity.** In addition to recognizing the importance of multiple actors in dealing with each thematic area, participants stressed the need to reinforce the capacity of States to provide follow-up, monitor, manage and negotiate with other countries and companies. Many countries still suffer from the contraction and weakening of government structures that occurred in recent decades, the effects of which are felt at both the national level and the subnational and municipal levels.
- **The potential for public-private partnerships and the participation of multiple actors.** Public-private cooperation plays a key role in moving toward sustainable development. Partnerships are crucial to transforming policy goals and legal instruments into concrete action; to transferring technology; to developing productive links between extractive activities and local economies; and to ensuring financing for critical issues related to corporate activity, among others. Representatives of the countries and the major groups participating in the Forum emphasized the potential role of the major groups in supporting governments to progress towards sustainable development. In addition, participants pointed out that States play a unique role, which cannot be filled by other actors.
- **The potential for regional cooperation.** Countries can benefit from various forms of regional cooperation in their search for policy goals pertaining to the thematic areas of the eighteenth and nineteenth sessions of the CSD. These can include (and in several cases have already included) regional coordination in international negotiations and consolidation of common positions on issues of shared interest; an exchange of successful experiences for achieving similar policy goals; adoption of homogeneous standards in order to avoid distortionary effects of policy measures on investment and international trade; and common policies for integrating infrastructure under the concept of sustainability. Participants in the Forum stressed the growing importance of South-South cooperation.
- **The need for a subregional approach.** Participants in the Forum reiterated, as had been the case at previous forums, the importance of maintaining a subregional approach to issues, given the diversity of the Caribbean, South America and Central America and Mexico. Although the diversity within these groups is recognized, a subregional approach would help to explore issues of common interest for groups of countries, while taking into consideration the concerns and challenges of the smaller countries.

- **Cooperation, financing and technology transfer.** These are crucial issues for ensuring that the policy goals and international commitments result in effective action. The absence of adequate technology is frequently a significant factor that hinders the environmentally appropriate use of resources. Cooperation in this area is crucial because it allows taking into consideration the specific characteristics of local situations. As far as possible, there should be incentives for creating local technological capacities so that solutions satisfy local needs. Financing is a priority issue in moving towards sustainability in all the thematic areas covered by the eighteenth and nineteenth sessions of the CSD. In many cases, international agreement has been reached, and national policies have been established, but without adequate financing to ensure their implementation. Future international negotiation on new issues, such as the international agreement on mercury, or on issues that are already on the international agenda, such as climate change, should ensure that financial resources are sufficient to ensure that commitments are met, following the principle of common but differentiated responsibilities.

II. SUSTAINABLE CONSUMPTION AND PRODUCTION

Fundamental changes in the way societies produce and consume are indispensable for achieving global sustainable development. All countries should promote sustainable consumption and production patterns, with the developed countries taking the lead and with all countries benefiting from the process, taking into account the Rio principles, including, inter alia, the principle of common but differentiated responsibilities as set out in principle 7 of the Rio Declaration on Environment and Development. Governments, relevant international organizations, the private sector and all major groups should play an active role in changing unsustainable consumption and production patterns.

(Johannesburg Plan of Implementation, chapter III, paragraph 14, United Nations, 2002)

A. INTRODUCTION

Sustainable consumption and production is defined as “the use of goods and services that respond to basic needs and bring a better quality of life, while minimising the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardise the needs of future generations.”¹

During the United Nations Conference on Environment and Development (Rio de Janeiro, 1992), the issue of sustainable consumption and production took shape in Agenda 21. In chapter 4 of Agenda 21, it is stated that “the major cause of the continued deterioration of the global environment is the unsustainable pattern of consumption and production, particularly in industrialized countries, which is a matter of grave concern, aggravating poverty and imbalances.” Ten years later, at the World Summit on Sustainable Development (Johannesburg, 2002), governments agreed that poverty eradication, a change in unsustainable patterns of production and consumption and the protection and management of natural resources are the basic goals of sustainable development.

The Marrakesh Process began in 2003, with the purpose of implementing one of the actions agreed upon in the Johannesburg Plan of Implementation, namely the drafting of the Ten-Year Framework of Programmes (10YFP), which are to accelerate change towards sustainable patterns of consumption and production.² The Marrakesh Process has promoted and supported, among other activities, preparation of regional action plans in Africa and Latin America. The contributions of the Marrakesh Process are to be presented to the United Nations Commission on Sustainable Development (CSD), which will review the proposed set of programmes during 2010-2011. In May 2011 the member States will decide on the structure and content of the 10YFP. The Marrakesh Process proposal is expected to include (i) a declaration/decision on sustainable consumption and production and the elements of the 10YFP, and (ii) a series of specific programmes. As for the former, given the multidisciplinary nature of the concept of sustainable consumption and production and the 10YFP, these can

¹ The Oslo Symposium 1994, cited in UNEP (2009).

² The first international meeting to focus on development of the 10YFP was held in Marrakesh, Morocco, in June 2003.

support other goals of the United Nations, such as those of the United Nations Framework Convention on Climate Change (UNFCCC) and the Millennium Development Goals. Furthermore, the 10YFP can also be an important tool for implementing public policy, good practices in environmental management, investment and the use of technologies and for strengthening the capacities that are required for building a “green economy”.³ Unquestionably, a complete change towards a more sustainable economy will be impossible if we do not succeed in changing consumption and production patterns substantially. Regarding the specific programmes, the 10YFP will serve as a broad and flexible umbrella under which to include the specific activities of each region.

The purpose of this document is to provide an overview of sustainable consumption and production with a regional focus. Information provided in the national reports prepared for the Regional implementation Forum has been included, as have participants’ contributions and comments. The following section reviews progress achieved towards sustainable consumption and production in the region. Section C describes the main national and regional programmes on this issue. In the last section of this document, the main challenges and future options for promoting sustainable consumption and production are briefly presented.

B. THE PATH TOWARDS SUSTAINABLE CONSUMPTION AND PRODUCTION IN LATIN AMERICA AND THE CARIBBEAN

In response to the international commitment to sustainable consumption and production, Latin America and the Caribbean has taken a series of steps aimed at strengthening a regional strategy of sustainability based on a change in production and consumption patterns. The Council of Government Experts on Sustainable Consumption and Production was established in 2003 under the Forum of Ministers of Environment of Latin America and the Caribbean, in order to follow up on the issue in national environmental bodies, advise the Forum and expand participation to include the private sector, academia, NGOs and other civil society organizations.

Based on a series of recommendations made by the Council, the environment ministers decided in 2008 to include the issue of sustainable consumption and production as a priority of the Latin American and Caribbean Initiative for Sustainable Development (ILAC) and its Regional Action Plan.

As a result of several meetings held by the Council, and based on decisions of the Forum of Ministers of Environment, five priority programmes for sustainable consumption and production common to the countries of the region were defined. The programmes are described in table II.1.

³ United Nations Department of Economic and Social Affairs (UNDESA) and the United Nations Environment Programme (UNEP) September 2009. “Proposed Input to CSD 18 and 19 on a 10 Year Framework of Programmes on Sustainable Consumption and Production (10YFP on SCP) – Third Public Draft”.

Table II.1
**LATIN AMERICA AND THE CARIBBEAN: PRIORITY SUSTAINABLE CONSUMPTION
 AND PRODUCTION PROGRAMMES**

| Programme | Policies and measures |
|--|--|
| 1. Policies and national strategies for sustainable consumption and production | <ul style="list-style-type: none"> • Integration and coordination of the issue of sustainable consumption and production in policies, programmes and development strategies; • Strengthening the provision of information, education and training to the population in issues concerning sustainable consumption and production (review the language and means for transmitting concepts; expanding participation of other organizations and civil society actors; use of the Regional Information Network for sustainable consumption and production as an instrument for strengthening South-South cooperation); • Quantifying of the costs and benefits associated with implementation of sustainable consumption and production in national and subregional initiatives; • Promotion of corporate social responsibility and the incorporation of concepts of a producer's extended responsibility and analysis of the life cycle in businesses producing basic consumer goods, which create greater environmental and social impact. |
| 2. Improvement of the productive sector, small and medium-sized enterprises (SMEs) | <ul style="list-style-type: none"> • Prioritization of sectors at the subregional level linked to environmental or ecosystem services (each region will define priority sectors to be included in the 10YFP); • Creation or strengthening of mechanisms and economic tools that promote the sustainability of the productive sectors and improve their productivity and competitiveness; • Definition of specific indicators of sustainable consumption and production within the framework of the Latin American and Caribbean Initiative for Sustainable Development (ILAC). |
| 3. Sustainable public procurement (SPP) | <ul style="list-style-type: none"> • Establishment of high-level political leadership for the promotion of sustainable public procurement involving national public procurement agencies; • Adoption of a strategy for the gradual incorporation of environmental and social criteria into the procurement of priority goods and services; • Efforts to ensure the inclusion and sustainability of SMEs in sustainable public procurement programmes through the creation of policy measures and specific instruments; • Establishment of a multisectoral mechanism that promotes participation, evaluation and monitoring of sustainable public procurement (involving the ministries of economy and finance). |
| 4. Sustainable lifestyles | <ul style="list-style-type: none"> • Adaptation and application of policies that promote a sustainable supply of goods and services at prices accessible for all; • Active promotion of the inclusion of education about sustainable consumption into the education curricula; • Conducting of studies and use of systematic measuring mechanisms to identify and understand the motivations for consumption in the region. |
| 5. Information network on SCP | <ul style="list-style-type: none"> • Strengthening of the regional information network on sustainable consumption and production (REDPYCS) as a reference tool for measuring the quality and value of the information disseminated, for linking various actors, and for building the capacity needed to contribute to changes in consumption and production patterns for the achievement of sustainability. |

Source: Recommendation to the Forum of Ministers of Environment of Latin America and the Caribbean of the fifth meeting of Experts on Sustainable Consumption and Production, Colombia 2009. The complete version of the list of regional priorities, including the means for implementation, main parties concerned and successful measures, can be found in annex 1 of this document.

The subregional entities have also made progress. In 2007, the countries of MERCOSUR adopted a common policy for cooperation and promotion of sustainable consumption and production, and the Andean Community adopted this issue as a transversal axis of its Andean environmental agenda 2006-2010. The Central American Commission on Environment and Development (CCAD) adopted a decision calling for the drafting of a regional policy of sustainable public procurement.

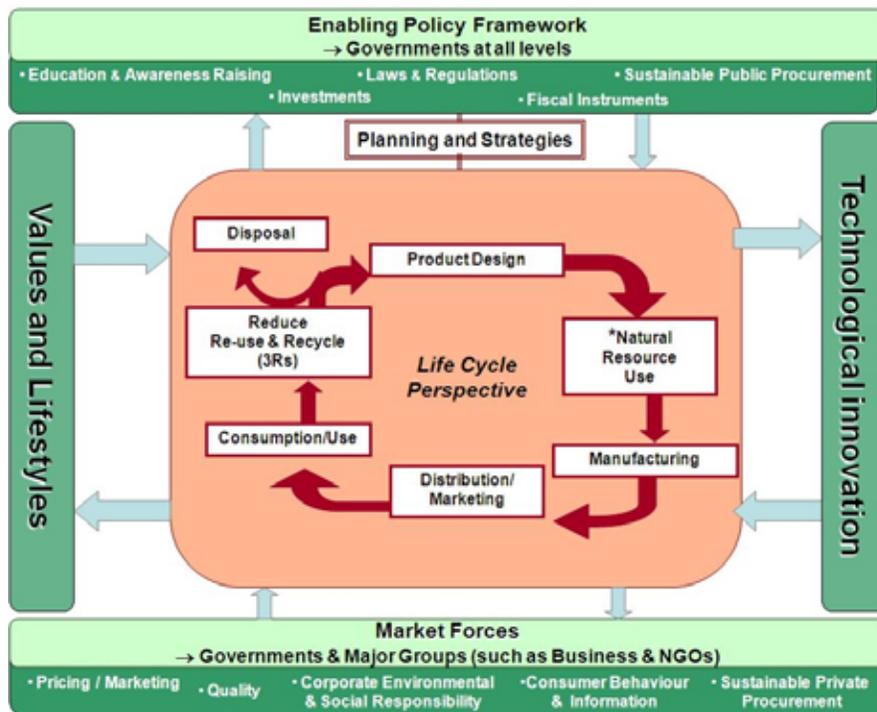
1. The life-cycle approach

A life-cycle approach to the economic system has been proposed as a tool for dealing with the broad concept of sustainable consumption and production in a structured and integral manner. That approach can provide a means for structuring the general approach of the 10YFP. It also allows using a separate approach to production vis-à-vis consumption, or an integrated approach to both, while taking into consideration the economic, social and environmental impact of goods and services throughout their entire life cycle.

The life-cycle approach is based on a consideration of the total resources used to produce a good or to provide a service, including emissions and any resulting waste.

Resource use and emissions at each stage of the entire cycle depend in large part on the general policy framework, which affects the entire system, and on specific regulations affecting each stage. Resource use and emissions also depend on values and social preferences, as well as on technological innovation, which, in turn, are influenced by the legislative and regulatory framework (see figure II.1).

Figure II.1
LIFE-CYCLE APPROACH TO SUSTAINABLE CONSUMPTION AND PRODUCTION



Source: “Green Economy and Sustainable Consumption and Production”, presentation by Arab Hoballah (UNEP) at the Third Regional Implementation Forum on Sustainable Development in Latin America and the Caribbean (La Antigua, Guatemala, 26-27 November 2009).

A study carried out by UNEP and the Society of Environmental Toxicology and Chemistry (SETAC) (Valdivia and Sonnemann, 2009) describes progress achieved in several countries of the region in applying the life-cycle approach to their economies. Progress as of October 2008 is summarized in table II.2.

Table II.2
LATIN AMERICA AND THE CARIBBEAN: PROGRESS IN IMPLEMENTING THE LIFE-CYCLE APPROACH

| Country | Regulations in place that use the life-cycle approach | Sectoral assessments in place on life cycles | Number of experts identified in each country |
|------------|---|---|--|
| Argentina | No | No | 12 |
| Brazil | Yes | Yes, there are assessments on eight refinery products | 42 (probably more) |
| Chile | No | No | 8 |
| Colombia | Yes | No | 12 |
| Costa Rica | In process | Yes, assessments on energy | 8 |
| Cuba | No | Yes, assessments on the sugar industry | 10 |
| Ecuador | No | No | 1 |
| Mexico | Yes | Yes, for fuels, chemicals, construction materials, electricity, waste treatment, paper and agribusiness | 20 |
| Peru | No | No | 8 |
| Uruguay | Yes ^a | No | 3 |

Source: Valdivia, S. and G. Sonnemann (2009), "Evolution of Life Cycle Thinking in Latin America—An analysis", conducted in October 2008 by the UNEP/SETAC Life Cycle Initiative.

^a Uruguay has regulations governing life cycle. Law 17.283, article 20, refers to the life cycle of chemicals, and there are other regulations that limit, restrict or prohibit use based on a life-cycle approach.

C. NATIONAL AND REGIONAL PROGRAMMES ON SUSTAINABLE CONSUMPTION AND PRODUCTION

1. National progress in sustainable consumption and production

A recent study on the status of progress in sustainable consumption and production in the region (UNEP/CEGESTI, 2009) provides interesting results of national policies and programmes for promoting the sustainability of consumption and production. Out of 20 countries, 14 reported that they had some sort of mechanism for accelerating change toward sustainable consumption and production in their country or had created mechanisms in the form of policies (35%), programmes (20%), projects (10%) or plans (5%). Approximately 50% of those mechanisms have been formalized, either by a law, decree or other means, including ministerial agreements, resolutions or other types of administrative approval.

Progress in terms of implementation of concrete activities with measurable results is less promising. More than 80% of the countries declared not having achieved significant progress, which can, in part, be attributed to the fact that these mechanisms were recently introduced.

(a) Argentina

The Direction for Clean Production and Sustainable Consumption (DPLyCS, the focal point for the Marrakesh Process) of the Secretariat for the Environment and Sustainable Development (SAyDS) is responsible for promoting and strengthening implementation of the national policy of clean production (adopted in 2003). It is also responsible for creating and adapting instruments for promoting and providing incentives for sustainable consumption and production through a programme of sustainable consumption begun in 2005. It is to carry out action plans for programmes of clean production and business competitiveness, for creating training materials and mechanisms on sustainable consumption and production and for developing strategic alliances with provincial governments, sectoral associations, non-governmental organizations and other parties from various public and private sectors.

In an effort to promote the consolidation and strengthening of public-private cooperation, the Advisory Council on Sustainable Consumption and Production meets quarterly. It was created by Resolution 1100/05 of the SAyDS as a means for encouraging dialogue and public-private cooperation between the government, the productive sectors, consumers, academia and civil society organizations, thus promoting the adoption of sustainable consumption and production.

(i) Policies, laws and ecological regulations on public procurement

The National Procurement Office, an agency of the Secretariat for Public Administration, is being created to prepare a national policy of sustainable public procurement. Through the National Institute of Public Administration (INAP) training courses are provided on the incorporation of criteria for sustainability in public procurement.

(ii) Instruments of sustainable consumption and production

The DPLyCS is implementing the National Clean Production and Sustainable Consumption Programme (PNPL), which is financed by the Inter-American Development Bank (IDB) through its Subprogramme I for Promotion of Clean Production (Programme of Environmental Management for Sustainable Production in the Productive Sector, IDB1865/OC-AR and UNDP/ARG/08/015). That subprogramme is divided into two components aimed at strengthening the technical and institutional capacity of the public sector at the national and provincial levels for implementing the national policy of clean production and sustainable consumption and for promoting clean production in SMEs.⁴

The DPLyCS has begun to consult and interact with representatives of the public and private sectors, academia, and scientific and civil society organizations on the creation of a draft national policy of sustainable consumption, which will be integrated into the national policy of clean production.

⁴ Component I, “Federalization of Clean Production”, seeks to strengthen the SAyDS. Component II, “Implantation of Clean Production Practices in SMEs, seeks to promote awareness about this issue at the provincial level through workshops and technical assistance to SMEs.

(iii) Sustainable consumption and production in national priority fields

In order to implement one of the goals of the national policy on clean production, namely the consolidation and strengthening of cooperation among public sector institutions for the integration and creation of joint policies, regular meetings are held with the following government institutions: the Ministry for Production (Secretariat for SMEs); the National Office for Regional, Sectoral and Foreign Trade Development and Institutions; the Subsecretariat for Industry (National Office for Industry); the Environmental Unit and INTI (the Environment and Valuable Wood Programme); the Secretariat for Energy (Coordination of Energy Efficiency); Education; Economy (Secretariat for Economic Policy and the El Norte Grande programme of competitiveness); the Subsecretariat for Consumer Rights (education on consumption) and the Secretariat for Public Administration (National Office of Procurement).

A draft resolution has been submitted for approval (as an instrument of the national policy for clean production) for establishing general guidelines and minimum contents governing cleaner production programmes promoted by the SAyDS. That resolution will define the intervention of that Secretariat along side other development promotion programmes, namely Law 26.360 on the promotion of investment in capital goods.

The National Clean Production Network has been created as a means for providing and exchanging information. Basic information requirements have been identified for the network, and a competition has been opened for designing a system of application that allows for the monitoring of the activities of the federal programme through management of environmental projects and requests for financing. In addition, the following products have been created: a customized methodological guide for drafting, presenting and monitoring environmental projects, with a nomenclature for selecting options; a database for presenting and monitoring environmental projects using the methodological guide; and an online course on clean production as support for the methodological guide. Coordination with the education sector has been carried out through meetings with representatives of various universities and institutes.

At the regional level, the Ad Hoc Group on Competitiveness and the Environment coordinates, exchanges information, prepares technical proposals and studies norms and other aspects that can contribute to the coordination of the national policy of sustainable consumption and production with the policy of promotion and cooperation in sustainable consumption and production in MERCOSUR. The programmes being carried out incorporate sustainable aspects into the criteria and principles contained in the regional policy.

(b) Barbados

An initiative backed by the Ministry of Finance was adopted in 2007 that seeks to promote a “green economy” in Barbados, based on the principles of equity and efficiency. There are three cross-cutting issues, namely the integrated management of water resources, solid waste and the coastal area. Specific short and medium-term programmes include the creation of a programme of green economy indicators, implementation of limitations on carrying capacity for planning purposes, adoption of green public procurement, promotion

of sustainable transport, promotion of green approaches in the construction industry and the creation of a certification programme for “green households”.

Support for this initiative was confirmed in 2008, with the addition of topics on the promotion of greater energy efficiency, incentives to facilitate the use of renewable energy and expanded promotion of greater corporate social responsibility.

The following barriers to effective implementation of practices of sustainable consumption and production were identified:

- The absence of an integrated multi-actor mechanism for managing the initiative;
- The need for a mechanism at the national level for monitoring and evaluating;
- The lack of a subregional institutional mechanism that supports implementation of the Caribbean Plan of Action on sustainable consumption and production;
- The lack of international technological and financial institutions that support implementation of sustainable consumption and production;
- The need for economic tools and other mechanisms (such as centres of clean production) that support sustainable consumption and production;
- The lack of education and research programmes on sustainable consumption and production.

(c) Brazil

The Ministry for the Environment established the Committee for Sustainable Consumption and Production (CGPCS) and gave it authority to draft the National Action Plan for Sustainable Consumption and Production. The Ministry is reviewing and updating that action plan, taking into account its relationship with the National Plan on Climate Change and intends to open that document for public review during the first quarter of 2010.

The following priorities were identified during review of the plan, which focuses on integrated sustainable consumption and production, with perspectives of significant impact within less than three years reduction of energy consumption, an increase in the generation of energy using renewable sources with low social and environmental impact; the use of identification for the sustainable expansion of the use of biofuels and the creation and expansion of markets for sustainable forest products (Ministry for the Environment, 2009).

(d) Colombia

The National Development Plan for 2006–2010 provides for the adoption of sustainable models of production and consumption, which has led to the creation in 2007 of several government institutions related to sustainability, such as the Environmental Programme for Businesses and Industries.

In the drafting of a national policy of sustainable consumption and production (with the support of UNEP), the issue of sustainable public procurement is a priority. Initial progress is being made with the signing of an agreement between the National Centre for Cleaner Production and Environmental Technologies of Colombia, the Ministry for the Environment, Housing and Territorial Development and six institutions in the Department of

Antioquia (the Medellin Metro, Empresas Públicas de Medellín, the Metropolitan Area of the Valle of Aburrá, the Autonomous Regional Corporation of Antioquia, the Medellin City Secretariat for the Environment and the Government of the Department of Antioquia). This convention seeks to strengthen SMEs through cleaner production.

Based on a life-cycle approach, programmes are being prepared to build on the inherent efficiency of production and the appeal of ecologically attractive characteristics as a means for adding value and differentiating products.

Colombia is working to strengthen inter-institutional technical environmental education committees, by including environmental education in formal and informal training, in the training of environmental educators, in the design, implementation, support and promotion of plans and activities of communication and dissemination, in the strengthening of environmental education in the National Environmental System, in the promotion of ethnic aspects in environmental education and in promoting environmental projects from the perspective of gender and civil participation. The Urban Environmental Management Policy of 2008 provides for education and participatory activities that promote awareness among the general public about their environmental rights and obligations, leading to sustainable use and consumption.

More than 25 cleaner production initiatives have been implemented since 2005 with an investment of close to US\$ 4.2 million.

The Ministry for the Environment is coordinating activities with the National Federation of Businessmen (FENALCO) to use an agreement for sectoral environmental management to facilitate the incorporation of criteria of environmental sustainability among its members (supermarket chains, shopping centres and small retail businesses). Among the more relevant aspects of this effort is the identification and development of activities of environmental management aimed at reducing the consumption of energy and water and decreasing the production of solid waste and waste water.

There are also plans for concrete activities for the development of post-consumption campaigns to reduce toxic waste, decrease the consumption of plastic bags and establish requirements for producers in the form of more than 10,000 domestic SMEs.

(e) Costa Rica

The National Development Plan for 2006-2010 includes aspects of sustainable consumption and production in the section concerning the environment, energy and telecommunications. More specifically, in chapter 4, paragraph 4.3, it calls for a dialogue to promote the initiative “towards sustainable consumption and production”.

As for SMEs, articles 24 and 27 of Law No. 8262 on the strengthening SMEs of 17 May 2002 provide for the use of cleaner production as a tool for promoting sustainable development in this sector of great importance for the Costa Rican economy.

Costa Rica has drafted a national policy of sustainable consumption and production, which was agreed upon by various levels of government, industry and civil society. There is a National Intersectoral Cleaner Production Committee, which is awaiting approval. Progress has been made in creating a system for measuring environmental performance and in the signing of voluntary cleaner production agreements with hog farms and slaughter houses. Finally, progress has been made in implementing a policy of sustainable public procurement and environmental management practices in the public sector. There is a manual on green procurement.

(f) El Salvador

El Salvador adopted a policy promoting cleaner production in 2004. The range of that policy was later expanded and new government priorities were added to include aspects of sustainable consumption. The National Intersectoral of Cleaner Production Committee has been formed to provide for inter-institutional and intersectoral coordination (public-private) for implementing strategies and activities related to national policy. Voluntary cleaner production agreements have been signed with the poultry, pork and dairy sectors. In 2009, the Ministry for the Environment and Natural Resources awarded the first national cleaner production prize, acknowledging small, medium and large businesses that excelled at reducing the environmental impact of their production.

(g) Jamaica

The National Strategy of Cleaner Production and Sustainable Consumption was adopted in 2004 by the government. Sustainable consumption and production policies have been incorporated into the Jamaican National Environmental Action Plan (JANEAP) for 2006–2009. The JANEAP presents a vision with clear and concrete goals, along with indicators for measuring progress.

The JANEAP focuses on the environment and covers 16 thematic areas, many of which are related to sustainable consumption and production, such as green consumption, management of demand and systems of environmental management, taking into account external effects, such as questions of bio-security and transboundary movement of toxic waste.

That plan provides a set of indicators that will be closely watched. Monitoring will be done within the national environmental plan with the support of a consultative committee. The quantitative indicators are mostly related to the Millennium Development Goals and are also linked to other regional and national information systems.

(h) Mexico

The issue of sustainable public procurement has been a priority in Mexico since 1999, and significant achievements have been made in legislation. The following progress has been made:

- A general law on ecological balance and environmental protection (LGEEPA–DOF 13 of June 2003), which obliges all departments and agencies of the three branches of government to prepare manuals on environmental management systems and implement a series of positive measures, not only concerning procurement.

- The law on the promotion of the competitiveness of micro, small and medium enterprises (DOF 30 of December 2002, as amended on 6 June 2006), promoting public sector planning for the procurement of goods, hiring of services and carrying out public works, gradually orienting that towards SMEs until reaching a minimum of 35%.
- A decree amending several provisions of the law on procurement concerning leasing and services in the public sector, the law on public works and related services, the federal law on administrative responsibilities of civil servants and the federal Criminal Code, while adding other articles (DOF 28 of May 2009). For the purchase of lumber, furniture and office supplies, it will be necessary to require certificates granted by third parties registered with SEMARNAT that guarantee the origin and sustainable management of the use of forests from which that lumber comes.

(i) Nicaragua

Nicaragua has a clean production policy adopted by presidential decree in 2006 and a National Intersectoral Committee for Cleaner Production responsible for providing follow-up. The national clean production prize has been awarded four times, and a voluntary agreement on clean production is currently being negotiated with the dairy industry.

(j) Panama

There has been a national policy of clean production, approved by executive decree, whose specific goals are the drafting of strategies of clean production, training and research, the creation of markets and management tools, the building of capacities for management and promotion of civil society participation in this area. Later, an action plan was drafted for implementation of that policy. Among the main progress reported are the holding of eight editions of the national prize for clean production, public recognition of businesses that have implemented systems of clean production and the preparation of environmental guides aimed at various productive sectors.

2. Subregional progress on sustainable consumption and production⁵

(a) The Caribbean subregion

At the subregional level, several conventions have been signed concerning sustainable consumption and production, among which should be mentioned chapter 14 of the Mauritius Strategy for the Further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States and the development strategy of the Revised Treaty of Chaguaramas, the basis for the Caribbean Community (CARICOM). This subregion faces the following main challenges: (i) establishing a definition of sustainable consumption and production; (ii) studying and carrying out policies related to that topic;

⁵ See the final report on the fifth Meeting of the Council of Government Experts on Sustainable Consumption and Production for Latin America and the Caribbean, 16-18 September 2009, Cartagena, Colombia.

(iii) coordinating and integrating the revised treaty, multilateral agreements on the environment, commercial agreements and national evaluations; (iv) solving the lack of a mechanism of governance, and (v) incorporating financial mechanisms.

Domestically, the countries face competing environmental issues that demand their attention, for example, between sustainable consumption and production and climate change. However, priorities among issues related to sustainable consumption and production have been identified. These are renewable energy, ecotourism, waste management, green procurement, environmental management systems and management of the supply and demand for energy. The subregion suffers from a lack of information about implementation of policies on sustainable consumption and production.

Initiatives on sustainable consumption and production at the subregional level have focused on the Assistance Service for the Caribbean, a programme on forms of sustainable living aimed at consumers.

(b) The Andean subregion

There is an Andean environmental agenda for 2006-2010. The three thematic axes of that agenda are biodiversity, climate change and water resources. Among the cross-cutting topics figure the following: building capacity for trade, the environment and sustainable development, environmental education and sustainable consumption and production.

The specific goals of sustainable consumption and production are: (i) the drafting, implementation and strengthening of national and regional policies on sustainable consumption and production; (ii) incorporation of concepts of clean production in the manufacturing sector and working to promote sustainable consumption, and (iii) supporting the Centre for Production and Consumption for the Andean region. There are four courses of action on that agenda:

- Preparation and implementation of policies of sustainable consumption and production on the basis of the experience of other countries and subregions;
- Drafting and carrying out a programme of cooperation focused on training, practice and technical assistance;
- Promotion of the creation of opportunities at the national level for consultation on the topic of sustainable consumption and production;
- Carrying out pilot projects for preparing and evaluating means of promoting sustainable consumption and production.

Under an agreement with UNEP, the subregion receives assistance for building capacity for policy implementation. In order to prepare a strategy of sustainable consumption and production for this group of countries, the Group of Andean Consumers was created in 2003, with the main goals of promoting responsible investment and building capacity. Its activities include establishing subregional technical standards for strengthening national standards for evaluating the life cycle of batteries and carrying out a campaign aimed at raising the awareness of consumers.

(c) The Central American subregion

This subregion has a regional clean production policy for 2005-2010. A Regional Technical Intersectoral Committee for Cleaner Production, made up of officials from the environmental agencies, ministries for the economy, centres of clean production and trade union and entrepreneurial movements, monitors regional policy. Four editions of the regional prize for production clean have been held with the participation of 185 businesses that presented 245 successful projects. A regional node of sustainable consumption and production has also been established.⁶ In addition, an Industrial Waste Exchange for Central America and the Caribbean (BORSICCA) is being established for exchanging waste, including paper, cardboard, glass, wood, plastic and ferrous and non-ferrous metals.⁷

In Costa Rica, El Salvador and Nicaragua, activities have been carried out to promote awareness and monitor compliance with the technical norms on energy efficiency among consumers. A regional guide on voluntary clean production agreements has been prepared, and training has been given in various practices related to sustainable consumption and production.

The Regional Agro-Environmental and Health Strategy (ERAS), adopted in 2008 by the Council of Ministers of Environment, Agriculture and Health of the subregion, contains provisions on sustainable consumption and production, for example, the strategic axis of agro-environmental businesses and healthy life styles. A regional policy of sustainable public procurement is also being prepared that will be endorsed by the presidents of the eight countries of the Central American subregion.

(d) Southern Cone

MERCOSUR has a policy on sustainable consumption and production that dates from 2007, in which a seven-part plan of action was carried out:

- Dialogue and cooperation;
- Production and consumption practices;
- Technological innovation;
- Inclusion of the issue of sustainable consumption and production in formal and informal education;
- Capacity-building and exchange of information;
- Functioning of SMEs;
- Sustainable procurement.

The European Union has provided assistance for carrying out a project on ecological standards and several others dealing with clean production in order to reduce desertification, provide eco-labelling and create a fund to promote better practices with a focus on poverty reduction.

⁶ See www.sinia.net.ni/regional.

⁷ See www.borsicca.com.

D. MAIN CHALLENGES AND POLICY OPTIONS FOR PROGRESS TOWARDS SUSTAINABLE CONSUMPTION AND PRODUCTION IN THE REGION

The two obvious and identifiable components of this goal are clean production and sustainable consumption. Significant progress has been made in the region concerning initiatives for clean production. The most concrete expression of sustainable consumption is activities concerning sustainable public procurement. This section describes the main challenges and policy options—especially those discussed during the Third Regional Implementation Forum on Sustainable Development in Latin America and the Caribbean (La Antigua, Guatemala, November 2009)—aimed at promoting both sustainable consumption and sustainable production in the region.

1. Challenges

- **A change in values that determine consumption patterns.** Among the characteristics of the current paradigm is consumption as a source of psychological satisfaction and social status. We still do not fully understand consumers' rationales and the factors that would make it possible to change their consumption patterns. Consumers inevitably respond very directly to prices. However, reality is more complex. Two goals have been suggested: recovery and restoration of traditional values and knowledge, and accepting that there are various public goods (such as air and water quality or the beauty of a landscape) that cannot be treated as private goods, as pointed out at the Forum. Furthermore, high levels of poverty in the region and the resulting unsatisfied basic needs add the provision of basic goods to the challenge of sustainability.
- **The contribution of the media and advertising to progress towards sustainable consumption and production.** This point is related to the preceding one, because in general communications and advertising do not favour the adoption of practices of sustainable consumption and production. Change may require regulation of the media and advertising. One example of this is the prohibition imposed in several European countries on the use of advertising during the broadcasting of children's programmes.
- **Climate change and its effects on consumption and production patterns.** Specifically, climate change is likely to modify the conditions of access of the poor to basic services (such as water) and food. These effects could be planned for, and measures taken that prevent and mitigate possible harm to persons and the environment.
- **Multistakeholder participation to facilitate progress towards sustainable consumption and production.** Forum participants viewed favourably and recommended disseminating the experience of creating advisory councils and other constructive opportunities for participation of various interest groups on

the issue of sustainable consumption and production. Those opportunities can include representatives of the government, the private sector, consumers, universities, NGOs and trade union movements, among others. If those opportunities are not created, there is a risk that the measures taken will be rejected and fail.

- **Support for SMEs in order to promote practices of sustainable consumption and production.** SMEs are very important in the region, especially in terms of job creation. Moreover, the conditions under which they operate —especially concerning budget and technological restrictions— bring out the need for mechanisms for government or trade union support, or both.
- **Education for sustainable consumption and production.** In several countries of the region this issue is being dealt with, although still incipiently.⁸

2. Policy options

The Council of Experts on Sustainable Consumption and Production of the region has proposed a set of priority areas and specific policy measures for action (see table II.1). In addition, the Regional Implementation Forum on Sustainable Development in Latin America and the Caribbean discussed the following issues.

- **Strengthening and incorporating new instruments and approaches compatible with the goal of sustainable consumption and production.** The large number of issues covered by sustainable consumption and production makes progress dependant on changes in the approaches, methodologies, instruments and other factors. Participants in the Forum stressed the importance of promoting innovation, life-cycle and supply-chain approaches and implementation of instruments such as land use (in urban and rural areas) and strategic environmental evaluation.
- **Permanent strengthening of initiatives and national networks of clean production.** The United Nations Industrial Development Organization (UNIDO), in cooperation with UNEP, has supported the establishment and operation of national centres of clean production in the region. There are currently 12 centres coordinated by a regional network for clean production, and an even greater number of institutions concerned with this issue that operate in the region with similar purposes. Those centres support businesses in implementing methods and practices of sustainable production, including the efficient use of resources, sustainable management of chemicals, waste management and environmental and corporate social responsibility. One of the main areas of activity of the centres of clean production is the provision of assistance to SMEs in the region. According to a study presented by UNIDO during the fifth meeting of the Council

⁸ Cuba has already made substantial progress concerning environmental education in general. Argentina and Brazil reported advances in education on sustainable consumption and production at the Forum on Regional Implementation of Sustainable Development Latin America and the Caribbean.

of Government Experts on Sustainable Consumption and Production (Colombia, September 2009), the effort of 19 national institutions that offer clean production services has reached nearly eight million SMEs in the region. The agro-industrial (food, beverages, coffee, dairy products), chemical (chemicals, plastic, paint) and metal-working sectors are those that have received the most assistance from the Centres. The benefits obtained thanks to implementation of the methodologies of clean production are quantifiable: a reduction in the consumption of water by 35%, energy consumption by 20%, waste created by 30% and carbon dioxide emissions by 25% (CEGESTI, 2009).

- **Strengthening initiatives for sustainable public procurement at all levels of the administration.** The benefits of implementation of sustainable public procurement programmes in the countries of the region are undeniable. In fact, in many cases steps are already being taken. The current challenge is to transfer that practice and those experiences to local governments and other subnational (or provincial) levels of public administration, that could implement systems of sustainable public procurement. Those initiatives must be coordinated with those of their own local suppliers, as far as necessary and possible, to provide them with support so that they actively participate under conditions determined by criteria of sustainability.
- **Continuation of the policy of voluntary sectoral agreements on clean production.** In many countries, those agreements have provided positive experiences that have resulted in progress and benefits. They deal with practices that must be encouraged and improved in light of ongoing monitoring.
- **Promotion of energy efficiency and development of renewable energies.** There is much room in the region for advancing towards those goals. Energy is vital for consumption and production, but initiatives on energy efficiency and promotion of renewable energies are only just beginning (in terms of their weight in overall energy consumption and production). There are interesting experiences in the region (for example, the promotion of renewable energies in Brazil and progress in energy efficiency in Chile and Mexico) that could be reproduced and serve as a basis for South-South cooperation.
- **Implementation of “green” practices in the construction sector.** This is a very significant issue within the UNEP initiative for a “green economy”. Governments can give clear and important signals—for example in relation to incentives—in a very dynamic sector of great importance for the economies. Mexico has recently oriented a considerable proportion of its fiscal stimulus packages to “green construction”.
- **Definition and harmonization of labelling and approaches to evaluation.** It is necessary that the promotion of the production and consumption of environmentally preferable goods and services be accompanied by transparent, efficient and tangible management of pertinent information. Specifically, development and consolidation of markets for sustainable goods and products should be supported with practices and regulations on labelling. Therefore, the countries of the region must actively, and in a coordinated manner, participate in

defining and implementing labelling systems and promote initiatives for their regional and international harmonization. In addition, sustainable consumption and production now require—and will continue to require—implementation of new methodologies for the assessment of aspects such as the carbon footprint, water footprint and the ecological footprint. Although the developed countries are the ones that have taken the lead in these practices, the countries in the region should participate dynamically in the definition of those instruments and methodologies.

- **Intervention of governments in making sustainable productive activities profitable.** In the quest for sustainable consumption and production, there is a clear need to make the exploitation and consumption of natural resources more sustainable. There are many alternatives for creating and expanding markets for sustainable products (for example for forest products). However, the viability of these alternatives—and the resulting elimination of unsustainable options of exploitation—depends on the signals (such as incentives and others) given by governments.
- **Extension of the benefits of the sustainable exploitation of resources to local communities.** A fundamental aspect of progress towards sustainable consumption and production is to ensure that the benefits of sustainable consumption and production benefit those who make the efforts to conserve or manage resources sustainably. There are indigenous communities in the region that historically depend on certain ecosystems. The sustainable exploitation of these ecosystems should contribute to the welfare of those communities.

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III. MINING

“Mining, minerals and metals are important to the economic and social development of many countries. Minerals are essential for modern living. Enhancing the contribution of mining, minerals and metals to sustainable development includes actions at all levels to:

- (a) Support efforts to address the environmental, economic, health and social impacts and benefits of mining, minerals and metals throughout their life cycle, including workers' health and safety, and use a range of partnerships, furthering existing activities at the national and international levels among interested Governments, intergovernmental organizations, mining companies and workers and other stakeholders to promote transparency and accountability for sustainable mining and minerals development;*
- (b) Enhance the participation of stakeholders, including local and indigenous communities and women, to play an active role in minerals, metals and mining development throughout the life cycles of mining operations, including after closure for rehabilitation purposes, in accordance with national regulations and taking into account significant transboundary impacts;*
- (c) Foster sustainable mining practices through the provision of financial, technical and capacity-building support to developing countries and countries with economies in transition for the mining and processing of minerals, including small-scale mining, and, where possible and appropriate, improve value-added processing, upgrade scientific and technological information and reclaim and rehabilitate degraded sites.”*
(Johannesburg Plan of Implementation, chapter IV, paragraph 46, United Nations, 2002)

A. INTRODUCTION

Paragraph 46 of the Johannesburg Plan of Implementation provides specific provisions related to activities in the mining sector. The concepts and words highlighted in the quote above identify topics that could shape an agenda for sustainable development in this sector. That paragraph is the basis for the work of the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IFMMMSD), which seeks to achieve concrete progress in implementing the mandate of the Johannesburg Summit. It should be mentioned that not all countries in the region in which mining is an important activity are members of that Forum.

This document provides an overview of the main issues related to mining and sustainable development in the region, focusing on the mining of metals, because of its economic, environmental and social importance in Latin America and the Caribbean, and touching on non-metals mining and hydrocarbons.⁹ Most of the information here is based on the experience of the countries in the region with the most extensive mining activity. Extensive use has been made of the South American version of the Mining, Minerals and Sustainable Development (MMDS) initiative, given its focus and the relatively up-to-date information that it contains. In addition, this document has incorporated information from the national reports submitted in preparation for the eighteenth session of the United

⁹ Energy and, therefore, the petroleum sector were also discussed at the 14th and 15th sessions of the United Nations Commission on Sustainable Development.

Nations Commission on Sustainable Development,¹⁰ the relevant initiatives of the United Nations entities working in the region, the discussions that took place during the Regional Implementation Forum and comments received thereafter.

B. THE IMPORTANCE OF MINING IN LATIN AMERICA AND THE CARIBBEAN

Countries as varied and diverse as Argentina, the Bolivarian Republic of Venezuela, Brazil, Chile, Colombia, Cuba, the Dominican Republic, Ecuador, Guatemala, Honduras, Jamaica, Mexico, Peru and the Plurinational State of Bolivia have strong historical ties to the mining industry. In those countries, mining represents an important engine of economic activity. The economic thrust that originates in the mining industry is of special importance in the daily life of the communities and regions in those countries in terms of contribution to GDP (see table III.1).¹¹ The products in which the region has the largest share of the world market are silver and copper, at approximately 50% (see table III.2).

In general, the information available on employment created by mining is limited to direct employment by the companies active in large-scale mining. Those figures record a maximum of around 1.5% of the labour force in countries where mining is the most important. However, total employment created by mining is far greater if the short-term and informal workers of small-scale mining are taken into account. Employment in the mining sector represents no more than 2% of total nationwide employment, with a trend of decreased direct employment in the mining sector and an increase in the intensity of the use of capital. In contrast, indirect employment has trended upward (COCHILCO 2008).

In 1990-2001, four out of the 10 countries with the most foreign investment in mining were in Latin America: Chile (first), Peru (sixth), Argentina (ninth) and Mexico (tenth). Since the mid 1990s, 25% of all investment in mining exploration carried out in the world has gone to Latin America (CIPMA/IIPM, 2002). In 2008, Brazil (eighth), Chile (seventh), Mexico (fourth) and Peru (fifth) were among the ten countries with the largest budgets for exploration (MEG/CESCO, 2009).

Finally, the international context—especially China's and India's growing demand for minerals and metals to feed their economic growth— suggests that this sector will keep growing at comparable or even higher rates.

¹⁰ At the time of this writing, reports had been received from Argentina, Barbados, Colombia, Costa Rica, Cuba, Ecuador, Mexico and Nicaragua.

¹¹ The environmental aspects that could be considered as externalities not included in estimates of contributions to GDP will be reviewed further along.

Table III.1
**SELECT COUNTRIES OF LATIN AMERICA AND THE CARIBBEAN:
 THE CONTRIBUTION OF MINING TO GDP, 2007**
(Millions of United States dollars and percentages)

| Countries | (A) National GDP | (B) GDP from mining and quarries | (C) B/A (percentages) |
|------------------------------------|---------------------|--|-----------------------------|
| Antigua and Barbuda | 1 155 | 23 | 2.0% |
| Argentina | 262 451 | 11 486 | 4.4% |
| Bahamas | 7 498 | 35 | 0.5% |
| Barbados | 3 433 | 23 | 0.7% |
| Belize | 1 277 | 6 | 0.5% |
| Bolivia (Plurinational State of) | 13 120 | 1 612 | 12.3% |
| Brazil | 1 300 312 | 24 297 | 1.9% |
| Chile | 163 879 | 37 200 | 22.7% |
| Colombia | 207 786 | 13 331 | 6.4% |
| Costa Rica | 26 267 | 61 | 0.2% |
| Cuba | 58 604 | 1 102 | 1.9% |
| Dominica | 341 | 3 | 0.9% |
| Dominican Republic | 41 013 | 279 | 0.7% |
| Ecuador | 45 789 | 10 671 | 23.3% |
| El Salvador | 20 373 | 123 | 0.6% |
| Granada | 608 | 3 | 0.5% |
| Guatemala | 34 031 | 537 | 1.6% |
| Guyana | 1 075 | 95 | 8.8% |
| Haiti | 6 225 | ... | ... |
| Honduras | 12 417 | 146 | 1.2% |
| Jamaica | 12 909 | 470 | 3.6% |
| Mexico | 1 018 221 | 79 124 | 7.8% |
| Nicaragua | 5 691 | 62 | 1.1% |
| Panama | 19 485 | ... | ... |
| Paraguay | 12 222 | 14 | 0.1% |
| Peru | 107 329 | 12 280 | 11.4% |
| Saint Kitts and Nevis | 512 | 1 | 0.2% |
| Saint Vincent and the Grenadines | 555 | 1 | 0.2% |
| Saint Lucia | 955 | 3 | 0.3% |
| Surinam | 1 867 | ... | ... |
| Trinidad and Tobago | 21 717 | 9 939 | 45.8% |
| Uruguay | 24 254 | ... | ... |
| Venezuela (Bolivarian Republic of) | 228 071 | ... | ... |

Source: Economic Commission for Latin America and the Caribbean (ECLAC).

Table III.2
**LATIN AMERICA AND THE CARIBBEAN: REGIONAL SHARE OF
 GLOBAL MINING PRODUCTION, 2008**

| Mineral | Share of Global Production (percentages) | Major producing countries |
|-------------------|---|---|
| Bauxite | 23.7 | Brazil, Jamaica, Venezuela (Bolivarian Republic of) |
| Copper | 46.4 | Chile, Peru, Mexico |
| Zinc | 22.2 | Peru, Mexico, Bolivia (Plurinational State of) |
| Molybdenum | 26.6 | Chile, Peru |
| Silver | 50.2 | Peru, Mexico, Chile, Bolivia (Plurinational State of) |
| Tin | 21.1 | Peru, Bolivia (Plurinational State of) |
| Gold | 21.4 | Peru, Mexico, Chile, Colombia, Argentina |
| Nickel | 22.0 ^a | Colombia, Cuba |
| Coal | 4th place | Colombia |
| Iron ^b | 2nd place | Brazil |

Source: Economic Commission for Latin America and the Caribbean (ECLAC) (personal communication, Eduardo Chaparro, 2009), adapted from Salas, A. Sociedad Nacional de Minería de Chile SONAMI, XXIII Convention Minera Mexicana, Veracruz, October 2009.

^a Estimate.

^b Iron: <http://www.unctad.org/infocomm/Iron/covmaro8.htm> (Consulted in December 2009).

C. MINING AND SUSTAINABLE DEVELOPMENT

Mining is a source of significant economic, productive and social dynamism in the region. In addition, mining is important for developing the infrastructure necessary for development. At the same time, mining has important undesirable effects on the environment and sustainable development. These effects and associated problems depend on many variables, including the legal and regulatory framework governing mining, the tax system and royalties and the capacity to add value to the primary product and to create productive clusters. This section identifies and briefly discusses some of the main issues surrounding mining and sustainable development in the region and draws a distinction between small-scale and large-scale mining. The current status along with current and future challenges are described for each type of mining, and several experiences of good practices are presented.

1. Small-scale mining

Small-scale mining¹² in the region is characterized by an intense use of labour, little use of technology, a major contribution to environmental degradation, precarious conditions of

¹² There are a number of ways to refer to small-scale mining. In the region, the terms “artisan mining” and “small-scale mining” are used. The distinguishing features of these two concepts are: (i) the nature of the workforce and equipment involved (artisan mining is based on digging with bare hands on a small scale, whereas small-scale mining may use machinery); and (ii) the nature of land rights of the miners (in small-scale mining the miners usually have land titles, which is not usually the case in artisan mining) (Valdivia, 2009). Reflecting the diversity of terms and classifications given to artisan and small-scale mining, ECLAC has coined the phrase “so-called small mining”.

security and hygiene, an important role as a source of employment for the poor, low production costs, its role in exploring the potential for larger projects, and the possibility of creating local production clusters. It is estimated that in the mid 1990s between 11 and 12.5 million persons were employed directly by or depended indirectly on small-scale mining in Latin America —primarily copper mining in Chile and gold mining in Brazil and Peru (Chaparro, 2000).¹³ Over the past two decades, this activity has experienced sustained growth rates globally. In 21 out of 35 developing countries in Africa, Asia and Latin America, mining has grown by between 10% and 20% annually (Hilson, 2002). A survey carried out by the World Bank on extractive industries led to the conclusion that the Bank should support small-scale mining in the areas of formalization, government administration, environmental and social improvements, and assessment and monitoring (EIR, 2002). Argentina, Brazil, Chile, Ecuador, Mexico, Peru, and the Plurinational State of Bolivia, among others, carried out programmes in the 1980s and 1990s supporting this industry. Many of those programmes have now disappeared, although there has been renewed interest recently. The Empresa Nacional de Minería (ENAMI) in Chile, the Fideicomiso de Fomento Minero (FIFOME) in Mexico and the government of Colombia are currently making important efforts to support small-scale mining.

(a) Safety, health and the environment

Small-scale mining in the region has traditionally been associated with precarious working, safety and health conditions;¹⁴ pollution from mercury used to process gold¹⁵ and with excessive land degradation owing to the migratory nature and abundance of small operations —*minifundios*— that are attracted to mineral deposits.¹⁶

The social and environmental effects are especially complex in cases in which child labour is used. That situation has been reported in Peru and the Plurinational State of Bolivia (CIPMA/IIPM, 2002 and ILO, 1999). In Peru, there are reports of inhuman working conditions that can require 30 days of work for the owner and two days of work for pay.¹⁷

Rudimentary technology is the aspect that most directly leads to environmental degradation and poor security. That situation is largely the result of a lack of appropriate and well-functioning financial mechanisms. Marketing is typically conducted through a large number of intermediaries, adding an element that hinders the use of technology needed for

¹³ A recent estimate by Valdivia (2009) suggests that around one million workers are directly involved in small-scale mining in the region.

¹⁴ When carried out under precarious conditions, mining can be a vector for transmission of diseases such as malaria, especially in Brazil (CIPMA/IIPM, 2002, and Hilson, 2002).

¹⁵ For example, nearly 300 tons of mercury are released into the environment in Brazil each year led to the accumulation in the Amazon River of between 1,000 and 2,000 tons of mercury (Hilson, 2002). A recent study requested by UNEP (Valdivia, 2009) addresses in detail the problem of mercury released from small-scale mining of gold in the region. In the Triángulo Minero of Nicaragua, it is estimated that 3-5 ounces of mercury are used for each ounce of gold produced. That amounts to a release of 450-750 kg of mercury into nature per year. That damage is not mitigated, and there are no regulations to prevent it (National Report of Nicaragua for the RIM 2009).

¹⁶ Several regions of Brazil and Colombia have been victims of heavy changes due to multiple excavations (Hilson, 2002).

¹⁷ Presentation by Ana María González del Valle, Vice-Minister for Environmental Management of Peru, RIM meeting. Guatemala, November 2009.

greater environmental protection. The most serious socio-environmental conflicts stem from air pollution caused by the burning of mercury, water polluted with cyanide (although less and less frequently), heavy metals and metalloids. The common practice of using mercury represents a danger for the environment and environmental health. Mercury is a highly toxic element commonly used to separate metals from a mineral because it is considered to be efficient, easy to use, abundant and inexpensive. However, the long-term consequences of its use are serious for the environment and for local inhabitants living near, downstream or downwind of deposits. The World Health Organization (WHO) has calculated that the rate of minor mental retardation reaches 17.4 per 1,000 children born in the population of subsistence fishermen living near gold mining activities in the Amazon (WHO, 2008). In one of the deposits that is part of the Global Mercury Project of the United Nations Industrial Development Organization (UNIDO)¹⁸, almost 50% of miners show signs of nervous disorders. Informal and small-scale extraction of gold contributes significantly to mercury pollution in the world.

At its 25th session held on 16-20 February 2009, the UNEP Governing Council adopted Decision 25/5 III concerning chemicals management, including mercury, stating that UNEP “Agrees to further international action consisting of the elaboration of a legally binding instrument on mercury, which could include both binding and voluntary approaches, together with interim activities, to reduce risks to human health and the environment.” Those negotiations will begin next year and are expected to be completed in 2013.

The challenges in overcoming the problems mentioned here are related, along with other factors, to the sector’s informal nature. As for environmental pollution from mercury, there are systems available to minimize emissions and discharges. The Plurinational State of Bolivia has made considerable progress in using the technology of capture by “recovery and gravity”, which has helped to reduce mercury emissions by 90%. One barrier to more progress in the use of that technology is the lack of permanent financial mechanisms and autonomous local authorities for purchasing gold. In the case of Mexico, the North American Agreement on Environmental Cooperation, an aspect of the North American Free Trade Agreement, has made it possible for the Mexican mining sector to provide information for inclusion in the “study of mercury in Mexico”.¹⁹

The specific situation surrounding the use of mercury is even more worrying if the current high price of gold is taken into account, which has motivated a “gold rush” that is especially manifest in Peru.

In more general terms, governments should develop specific regulations (laws, regulations, guidelines) for small-scale mining and, especially, move forward towards their effective implementation and oversight. It is important to keep in mind that sustainable support for small-scale mining should take a long-term view and the substance of this support should be to strengthen entrepreneurs according to civic values and capacities. In other words, support programmes for small-scale mining should not focus primarily on providing welfare assistance.

¹⁸ In the context of this project, UNEP has worked with Surinam on a project to build capacity for health surveys. Similar initiatives are beginning in Colombia, Ecuador, Peru and the Plurinational State of Bolivia, to prepare plans for improving the handling of mercury in small-scale mining.

¹⁹ According to Resolution 95-5 of the Working Group on Chemicals Management (information provided by Mexico’s national report for the RIM; Federal Government of Mexico, 2009).

(b) The informal nature of small-scale mining

The problems associated with small-scale mining stem from the sector's informality, illegality or both. Governments must address the sector with specific measures, recognizing the entrepreneurial nature (especially SMEs) of the activity. This recognition could begin with acknowledgement of the sector's socio-economic importance and the prospect of its probable future growth.²⁰ In the case of large-scale mining, there have been cases of public-private cooperation aimed at satisfying workers' needs and providing satisfactory living conditions. SMEs need the same types of programmes. Emphasis should be on providing basic services for workers and the communities that depend on the SMEs. For example, in the cases in which operations are distant from urban centres, it is necessary to establish health centres, housing solutions and transport services.

Efforts to overcome the informality of the sector should also include measures for educating and training miners, including improving their technical and business skills and helping them to establish cooperatives. Programmes should be sensitive to the social impacts associated with SMEs, especially in terms of gender issues and child labour (where relevant).

2. Large-scale mining

(a) Regulatory conditions

In the countries covered by the Mining, Metals and Sustainable Development (MMSD) initiative (Brazil, Chile, Ecuador, Peru and the Plurinational State of Bolivia), legislation provides that the State has absolute, inalienable and unchallengeable dominion over the soil, subsoil and mineral resources, and defines mining as an activity of public and social interest. None of those countries has legislation excluding the State from commercial exploitation of mineral resources. In most of those countries, there is no discrimination against private foreign investment in exploration or the exploitation of resources, ensuring equal or neutral treatment compared to that accorded to domestic capital. Nonetheless, each country has established a number of exceptions. For example, Colombia considers areas in which indigenous populations hold preferential rights to mining areas, while the Plurinational State of Bolivia and Uruguay prohibit foreign mining in border areas (CIPMA/IIPM, 2002).

Exploiting and exporting non-renewable resources with little (or no) value added through processing²¹ and making intensive use of energy and water resources with potentially significant environmental consequences, while there are limited mechanisms to ensure that the profits created remain in the producing regions, pose major challenges to sustainability. Thus, it is not surprising that some parties —especially in civil society— consider mining to be an unsustainable activity.²²

²⁰ This task has been made more complex by informality in the sector and deficiencies in public management (expressed, for example, in the lack of enforcement of tax and customs laws) that can distort the relevance of this sector.

²¹ This activity does generate “upstream” value added, i.e. in the productive chains that make mining possible.

²² Of note in this respect is the statement of the International Union for Conservation of Nature rejecting the idea of open-pit mining in Costa Rica (<http://www.informa-tico.com/index.php?scc=articulo&edicion=20091102&ref=02-11-090003>, consulted in November 2009).

A relevant question to ask is to what degree regulation (regarding ownership, taxation, access to and use of resources, oversight and monitoring, etc.) creates an environment that promotes sustainable mining development. More specifically, questions can be raised about how compatible mining is with protected areas and cities. There has been significant progress in this regard, but major challenges remain. As for progress, mining and environmental regulations have existed in most of the countries since the 1990s. As for the challenges, despite regulatory progress, many countries have made little progress in building coordinated policy frameworks to provide a basis for sustainable mining, i.e. national policy for sustainable mining that takes into account a country's major thematic priorities. Such a policy would send a clear message to investors and would also provide a frame of reference for plans, programmes and projects.²³ Notable in this regard is Cuba, whose Council of State recently (July 2008) approved a mining policy that establishes principles designed to promote sustainable development of mining in Cuba by creating quality control systems and environmental protection measures, regulating mine closures and determining the recovery of environmental liabilities, among others.

A related issue is that of coordinating various sectoral regulations for granting mining permits.

(b) The distribution of benefits and local development

Mining is an activity with a very well-defined cycle that includes lead-time, exploration, development, production and closure of mines. Closure is inevitable once the quantity and quality of the mineral has declined and exploitation becomes economically unfeasible. This cycle is based in part on the non-renewable nature of the resources involved. A priority for mining —especially from the perspective of government and communities— is to ensure the sustainability of the wealth generated during production or exploitation. Thus, the sustainability of any local development is measured by its impact after the mine and its installations have closed or are abandoned.

In legal terms, the distribution of mining profits depends on factors that (i) affect fixed costs (sales taxes, mining royalties and exploration and exploitation fees, etc.); (ii) affect operating costs (royalties, taxes on interest payments, etc.), and (iii) are based on the results of the annual bottom line (under a tax regime applicable to profits). However, the mere existence of such instruments by no means guarantees reasonable, effective, efficient and decentralized distribution of the resources generated. In fact, recent experience in a number of the region's countries shows that even where such instruments exist, constraints —such as weak public management at the local level— make it difficult to ensure that mining profits are invested effectively where that activity takes place.²⁴

²³ Discussions held in the Plurinational State of Bolivia in the context of the National Forum on Mining and Sustainable Development set priorities on issues such as support for mining cooperatives, an alliance of women and mining, protected areas and mining and on research, science and technology (www.globaldialogue.info, consulted in November 2009).

²⁴ There are numerous very promising public-private initiatives in the region that take account of existing realities and lessons learned recently. One interesting example is the work of the Association Los Andes de Cajamarca (ALAC) in Peru. ALAC is a corporate organization that came about as part of the Yanacocha social responsibility programme for the promotion of sustainable human development in the region. See also Del Corral (2003).

One remaining task is the promotion of local development with taxes on mining, managed by capable local entities. Creating local (subnational) development agencies could be one means of strengthening the institutional framework that handles the wealth generated by mining.²⁵ Those measures should de-bureaucratize and professionalize resource allocation use. In addition, the public sector can facilitate training for stable, professional working groups that serve as neutral venues for dialogue²⁶ when conflicts arise. Effective distribution of mining profits would benefit from trade union agreements on tax compliance, in an effort to prevent unfair competition. There is a vital need for the provision of timely information through investment bank projects, citizen participation and tax control bodies.

Another important related issue is that of transparency in handling information on payments generated by the mining industry. A new development in this area is the Extractive Industries Transparency Initiative. Most of the current members and candidate countries are in Africa and Asia. Despite recent official backing for the initiative on the part of the Inter-American Development Bank, Peru is the only country in the region that is currently a candidate.²⁷

With regard to voluntary action, various means exist for distributing benefits and promoting local development. Most are associated with companies' social responsibility policies and practices. A major underlying issue is how effectively companies contribute to coordination with other major parties (especially the public sector) in creating and strengthening the social and human capital of an area. Box III.1 describes a recent initiative of two mining companies in Peru that joined to provide a platform of commercial services for small businesses.

Box III.1

PERU: STIMULATING ECONOMIC GROWTH IN RURAL AREAS

Poverty in Peru is particularly acute in remote rural areas, where millions of persons struggle to survive by exploiting the scarce economic opportunities available to them. As a means of addressing this problem, the Clinton Giustra Sustainable Growth Initiative (CGSGI), serving as a catalyst, brought together two mining companies, Yanacocha and Gold Fields, in a unique partnership that is expanding possibilities for economic development through the opening of an economic services centre in the remote region of Cajamarca. Inaugurated in April 2009, the centre provides commercial services for small entrepreneurs and promotes the development of sustainable economic corridors by linking producers with markets for their products. As with two other economic services centres operating in Ancash supported by the CGSGI, the Cajamarca centre has a small staff to study, identify and manage opportunities for developing products that benefit small producers. CGSGI is also introducing new monitoring and evaluating criteria to ensure that the project achieves the goal of reducing poverty in Cajamarca.

Source: Clinton Foundation, www.clintonfoundation.org, consulted in November 2009.

²⁵ During the presidency of Michelle Bachelet, Chile created such agencies in 2006. In 2008, regional development agencies had a total budget of close to US\$ 10 million (www.ardp.cl, consulted in November 2009).

²⁶ Recent experience in Peru with the Mining and Sustainable Development Dialogue Group is a good example (<http://www.grupodialogo.org.pe>, consulted in November 2009).

²⁷ The Inter-American Development Bank (IDB) statement supporting the initiative can be found at www.iadb.org/nEWS/detail.cfm?language=SP&id=5544 (consulted in November 2009). The initiative has its Web site at www.eitransparency.org.

Foundations created by companies are another example of such action. These are generally legal entities (corporations, foundations, etc.) independent of the mining companies that establish them, and active board members usually include local parties from various sectors. They develop long-range programmes for working on issues that are important to local communities (for example, health, education and the environment). The endowments of these institutions can be expected to enable them to continue operating even after the closing of the mining operations that funded them.²⁸

Voluntary activities face various challenges. It is essential to differentiate clearly between purely philanthropic activities (which have no relationship with the sponsoring company's long-term production goals), compensation initiatives (which could be confused with covert attempts to coerce) and strategic social responsibility activities (which benefit the company and the community). The latter merits the greatest emphasis. Developing and adopting guidelines slated to enter into force in the near future in the form of ISO 26000 could help to systematize and increase the effectiveness of the efforts of social responsibility of companies.

(c) Environmentally sustainable mining

The environmental impact of mining in the countries of the region varies dramatically, as is evident from a brief comparison of the situations in five South American mining countries (CIPMA/IIPM, 2002). Brazil produces a greater diversity and much larger quantity of minerals than the other countries, and its mining operations are distributed in regions with climates ranging from tropical to arid, although it does not include any desert areas. Many of the country's mining operations are located near populated and agricultural areas or in biomes that are protected because of their unique characteristics. Thus, the types of environmental impacts generated include the entire gamut of known effects. While the task of prioritizing these is difficult, the closure of mines and the rehabilitation of land and water resources have been recognized as one of the main environmental issues associated with mining in Brazil. At the extreme opposite of that situation is Chile, where a large portion of large mines are located in deserts or semi-desert regions, with almost no rainfall and far from populated areas. Management of liquid and solid waste is simpler and less costly. One of the major concerns is to minimize water evaporation in order to reduce consumption. Because of that, a large number of mines in Chile do not have water at all, but rather recycle water that does not evaporate. Moreover, because of the low value of the land where most of the Chilean mines are located, the cost of rehabilitating and closing mines can be expected to be lower than that of mines located near populated or agricultural areas. In contrast, a large proportion of mines in Ecuador, Peru and the Plurinational State of Bolivia are in areas of high rainfall and populated areas. Thus, the most significant impact identified in those countries is related to the management of effluents, solid waste, land use and human health.

Mexico, whose situation is similar to that of Brazil, reports significant progress in promoting clean production in the mining sector. Approximately 80% of the mining companies affiliated with the Mexican Mining Chamber (Cámara Minera de Mexico, CAMIMEX) have already been given "clean industry" certification by the Federal

²⁸ There are many examples of foundations in the region whose work is appreciated by many parties, including the Fundación San Isidro in Colombia and the Fundación Minera Escondida in Chile.

Environmental Protection Agency (Procuraduría Federal de Protección al Ambiente, PROFEPA), as well as being certified under ISO 14001 on environmental performance. In addition, the government of Mexico, through the Secretariat for the Environment and Natural Resources (SEMARNAT), has created the National Programme for the Prevention and Integral Management of Waste 2008-2012, whose goal is to reduce waste generation in the mining industry.

Large-scale mining companies in the region are recognized for having pioneered the adoption of environmental practices in advance of national regulations. Mining development in the 1990s served as a catalyst for the development of national environmental regulations, especially in the area of environmental impact assessment systems (CIPMA/IIPM, 2002). Currently, the large mining companies publish regular reports on sustainability and social responsibility, generally in accordance with international guidelines set forth in the mining version of the Global Reporting Initiative (GRI). In addition, various national and international initiatives are working to create guidelines for sustainable, or green, mining.²⁹

An exhaustive review of the range of environmental issues associated with mining in the region lies well beyond the scope of this document. Below, however, is a brief description of the regional situation, and some experiences and recommendations with regard to two main sets of issues: access to and use and management of water resources; and the closure of mines and rehabilitation of environmental liabilities.

(i) *Water resources*

Mining is a water-intensive operation. It either takes place in areas where water is scarce and where competition for water is intense (in the form of agricultural or drinking-water needs), or it can affect other sectors or users through specific incidents of contamination. The situation tends to be more complex where mining activity occurs in or near ecologically or socially sensitive areas. The former are sometimes protected areas where an alteration of the hydrological cycle can have negative effects on the quality and quantity of goods and services provided by the ecosystem. The latter —socially sensitive areas— often involve indigenous communities. Although International Labour Organization (ILO) Convention No. 169 gives indigenous communities the right to participate in decisions on projects in their areas, the historical reality and asymmetrical position of these communities vis-à-vis large companies and constraints on complete implementation of the convention can lead to situations harmful to communities.

It is in companies' interest to use water efficiently, and there have been significant ongoing improvements in recent years in water use by mining operations.³⁰

²⁹ Canada is creating a “green mining” initiative, which will reduce the carbon footprint, provide innovation in waste management, manage risks to ecosystems and close open pit mines for rehabilitation. UNEP is considering preparing a global project on sustainable mining. (Presentations of Canada and UNEP at the RIM meeting in Guatemala, November 2009).

³⁰ A recent study in Chile reports reductions of more than 30% in concentration processes and reductions of more than 50% in hydrometallurgy between 2000 and 2006 (DGA and Proust Consultores, 2008). Chile's National Copper Company (CODELCO) recycles its water 11 times in its operations. In Mexico, Peñoles reports a major reduction in the use of freshwater since the late 1990s and a significant increase in the reuse of treated waste water (Chaparro, 2009).

With regard to waste water, companies must, of course, meet legal requirements set, for example, by standards and regulations on discharges. Authorities must implement laws and regulations, as well as monitor compliance. In addition, they face the challenge of overseeing the range of activities taking place in a particular geographical area, in order to ensure that cumulative impacts do not exceed the ecosystem's carrying capacity. Instruments that can be useful for this purpose include land use regulations and strategic environmental assessments.³¹

(ii) *The closing of mines and environmental liabilities*

As reflected in the work agenda of the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IFMMMSD), "Many stakeholders resist mineral investments based on a concern that they will be left with an environmental mess at the end of the operations. Local citizens are concerned that mining companies will simply walk away from the site once production stops or that insufficient financial resources will have been set aside to fully implement mine-site rehabilitation."

The MMSD initiative in South America indicated that Brazil, Chile, Ecuador, Peru and the Plurinational State of Bolivia have developed different regulatory structures governing the closing or abandonment of mines. In all of these, current regulations include references to mine closures as a stage of the mining process that is subject to environmental impact assessment, although, in many cases, related provisions have not been enforced. Bolivia has the most advanced system in terms of requiring planning. It specifies parameters for the objectives and content of plans, as well as stipulating time periods. However, it does not provide for financial performance guarantees, which are essential to ensure the effectiveness of such a system (CIPMA/IIPM, 2002). Under Mexico's current legal framework, the provisions on environmental impact do not explicitly require restoration of mines as a post-operational activity, and although this may normally be considered to fall within the scope of mitigation measures, it is ultimately left to the judgement of the entity carrying out the assessment.

Peru's recently published Law 28.090 contains regulations on mine closures, and Chile is in the final stages of developing such legislation. This is a relatively new legislative realm for the countries, as well as for industry practice, and is an area that is the object of considerable activity and innovation in the region.³²

Environmental liabilities pose a major challenge for the region's governments.³³ This issue relates to environmental problems created by old mining operations that were abandoned, where there are no identifiable parties to hold accountable³⁴. Environmental

³¹ Representatives of Guatemala and Mexico agreed on that need at the RIM meeting.

³² An interesting case, which has been publicized as a model for the industry, is the closing of El Indio mine in Chile. More information at <http://www.aminera.com/contenido-revista/cierre-de-el-indio-un-precedente-para-la-industria-minera.html> (Consulted in November 2009).

³³ A recent study by ECLAC deals with this issue, comparing the legal situations in Chile, Peru, the Plurinational State of Bolivia and the United States (Oblasser and Chaparro, 2008). ECLAC has also held three regional seminars on environmental liabilities and has advised Chile, Colombia and Ecuador on this issue.

³⁴ A situation has arisen in the Dominican Republic involving the company Barrick Gold, which is to start working an old mine with a large legacy of environmental liabilities. It is a complex problem to determine who should take responsibility for these liabilities (reported at the third Regional Implementation Forum on Sustainable Development).

liabilities in the region can have acute impact on ecosystems and human health.³⁵ The MMSD initiative suggests that, globally, the first priority should be for authorities to identify and inventory abandoned mining sites and assess the risks they pose to populations and ecosystems. Given budgetary limitations, priorities have to be set. Clearly, available resources should be used for the most dangerous situations, and for cases in which rehabilitation will provide the greatest benefits. The second priority is to develop new funding mechanisms that are sufficiently robust and sustainable to deal with the problems that future generations will face. As a general strategy, there should be emphasis on the fact that postponing solutions to the most urgent problems is likely to be extremely costly in the future.

Mexico's environmental authorities are addressing this issue by creating the National Programme for the Remediation of Contaminated Sites. The programme is now being designed, and will specifically address the situation of the country's environmental liabilities, including those associated with extractive activities such as mining and oil wells.³⁶ Colombia's Ministry of Environment, Housing and Territorial Development has worked on a general conceptual approach to environmental liabilities. As of 2009, the Ministry of Mining and Energy has been at the forefront of efforts to develop further and improve the conceptual approach to environmental liabilities resulting from mining, based on assessments in pilot areas where gold and coal extraction has occurred.

A related issue is that of safety, health and accidents. Mining companies today are recognized for their concern and action on these issues. Most of their internal management systems, which generally emanate from central headquarters, give these matters the same level of attention as environmental and community issues. A major concern on environmental liabilities relates to the possibility of accidents (e.g. possible failure of tailings dams). UNEP has a systematic Awareness and Preparedness for Emergencies at Local Level (APELL) programme, an important element of which is a focus on dialogue, information and training to bring together different interested parties (communities, businesses and governmental authorities). The programme has been active in Peru and will soon initiate projects in Argentina and Chile.³⁷

(d) Production clusters around mining

Clusters represent a concentration and coordination of productive resources and specialized businesses to satisfy special needs for goods and services that are essential for mining. Conceptually, there are two types of clusters: those involving forward linkages and those involving backward linkages. The former relate to the mining activity itself, providing related goods and services. The latter consist of clusters that use the minerals extracted to produce value-added goods and services. In Latin America and the Caribbean, the clusters that have been developed are largely of the backward type. There is a perceived need in the region to develop and enable backward linkages capable of adding value to minerals before they are exported.

³⁵ The case of La Oroya in Peru is an example of extreme lead pollution affecting local inhabitants (CIDSE, 2009).

³⁶ There are Mexican mining companies that have worked to restore sites where several of their mining operations were located, including Peñoles, Materias Primas, Luismin (today Goldcorp) and Minera Carbonífera Río Escondido (Federal government of Mexico, 2009).

³⁷ A document presenting the APELL initiative in the case of the mining sector can be found at http://commdev.org/files/722_file_UNEP_APELLMining.pdf (Consulted in November 2009).

To be effective, clusters must be supported by public and private institutions. Firms that form part of these clusters can achieve greater growth, reduce costs, be more profitable, acquire greater capacity to innovate and be less vulnerable to external factors. This is primarily due to the fact that they benefit from specialized resources, information, economies of scale, lower transaction costs and the dissemination of knowledge, and because they are in a position to learn through exchanges.

The reality in the region indicates that production clusters are far from being an established phenomenon. At the beginning of the decade in Peru, the following specific obstacles were evident: Providers could not meet the standards demanded by mining companies; the mining companies were not familiar with the technological capacities of the domestic providers; the small and medium-sized enterprises (SMEs) lacked marketing instruments and outlets; and mining services were generally outsourced abroad (Buitelaar, 2001). Efforts are now being made to overcome these barriers in the region. This is reflected in the fact that the majority of providers of goods and services at national mining trade shows today are domestic companies. In Chile, the country's clusters —e.g., in the Antofagasta region— are of the backward type, and principally involve medium and large suppliers, rather than SMEs that provide small-scale commercial services, such as restaurants, etc. (Culverwell, 2001).

Clusters are fundamental for sustainable development. They are an expression of local development, while, under certain conditions, they also can serve as vehicles for transmitting best practices from mining companies to SMEs. This can be facilitated by collaboration between businesses and the public sector to provide SMEs with opportunities for improvement. For example, there are interesting cases of mining companies that have supported SME providers in their efforts to obtain ISO 9000 and ISO 14001 certification.³⁸ The public sector has an important role in coordinating efforts of multiple agencies and providing conditions (capacities, infrastructure, goods and services, etc.) conducive to establishing clusters.

It should be remembered that production clusters —backward or forward— are essential for development when they produce knowledge and when that knowledge is an important factor determining their existence and permanence.

(e) Relations between companies and communities: preventing and managing conflict

Because of its social aspects (the isolation of miners, operations in indigenous areas, etc.), environmental issues (intensive demand for resources such as water and energy, and situations of environmental contamination) and economic issues (distribution of profits and benefits), mining activities generate acute conflicts with local, national and even international communities.³⁹ For the same reason, public and private enterprises must devote major efforts to building and maintaining fluid and constructive relations with related interest groups. As the proposed work programme of IFMMMSD recognizes, citizens want

³⁸ The Compañía Minera Escondida in Chile carried out a project with ISO 14001 certification of its suppliers (See Blanco, 2003).

³⁹ The Observatory of Mining Conflicts in Latin America maintains a complete record of the mining activities in the region associated with social and environmental conflicts (www.conflictosmineros.net, consulted in November 2009).

more open and transparent processes in decision-making capable of affecting their lives and families and the communities in which they live.

Some mining firms have even assumed that a constructive relationship with surrounding communities functions largely as a “social license” to operate. One of the seven principal areas for action specified in ISO social responsibility standard 26000—a non-certifiable guideline that is expected to be available in 2010—is that of community relations.

A major challenge facing mining companies is the need to make advance efforts to understand and familiarize themselves with the social and human realities of the areas in which they operate. Even when their operations are located in unpopulated areas, the potential environmental, social and economic consequences of their activity mean that they must not neglect social factors and relationships. Just as a company invests time and resources in exploring an area’s soil, it should devote time and professional resources to exploring its social realities. Such efforts make it possible to plan properly for later activities, building relationships based on trust and mutual benefit.⁴⁰ At a minimum, this helps the different stakeholders in preparing to face possible conflicts that may arise. Mineral exploration makes these challenges greater for this sector than for other sectors. Prospecting activity can generate disproportionate expectations (both positive and negative) in communities, partly because of the relatively low probability that a prospecting site will develop into an actual mining operation.⁴¹ This reality is even more relevant in a scenario of rising prices (the current case of gold), leading to the opening of new areas of exploration and exploitation, which in turn can engender conflicts for environmental and social reasons.

The public sector plays a decisive role in facilitating relations between companies and communities. Although regulations and standards provide important consultation mechanisms (e.g., in the context of environmental impact assessment), experience shows that formal venues for participation and conflict management are inadequate, often even exacerbating conflicts rather than preventing them or managing them appropriately. Authorities, along with companies and communities, should seek alternative ad hoc approaches that provide for early, informed, organized dialogue. Creating guidelines for best practices, or adapting those developed by international institutions, can be a useful addition. One promising practice is community validation or monitoring of a mining operation’s environmental effects (box III.2).

⁴⁰ The International Council on Mining and Metals (ICMM) recently published a guide to facilitate relations between companies and communities with an emphasis on local development and mutual benefits. That could be useful for businesses, government agencies, regulators and the general community.

⁴¹ An interesting environmentally and socially responsible experiment of work in the exploration stage is that of Consolidada of Hualgayoc S.A., a joint venture between a South African firm and another Peruvian firm carrying out exclusively mining exploration.

COMMUNITY ENVIRONMENTAL MONITORING IN GUATEMALA

The silver mining project of Montana Exploradora, S.A., near the Mexican border, which began in 2006, is the largest in Guatemala. In submitting to an environmental impact study, the company was required to create a community monitoring group. The group began by discussing terms of reference for its functioning. The task consisted of the parallel monitoring of samplings from two laboratories. The result of the community process was a climate of understanding and acceptance on the part of the community that had been involved in the project and activities —something relatively new in Guatemala.

Source: Revista Area Minera, available at <http://www.aminera.com/contenido/mineria-y-communities-en-olami.html>. (Consulted in November 2009).

(f) Climate change

Mining is a highly energy-intensive sector. The relation between mining and energy consumption is a function of the fact that: (i) mining operations move and process large volumes of material; (ii) products that depend on their output (i.e., on minerals), such as electrical goods and motors, use considerable quantities of energy; (iii) because of its requirements, mining can influence decisions on investment in energy sources; and (iv) various minerals, particularly coal, are used directly as fuels.⁴² Globally, mining is estimated to account for between approximately 4% and 7% of all energy consumed (IIED/WBCSD, 2002).⁴³

Energy is a significant cost of mining activity. Fully one quarter of the total cost of processes that involve flotation is estimated to be energy costs. In recent decades, the sector has made significant progress in energy efficiency. It is estimated, for example, that at the global level, over the last 50 years, the amount of energy needed to produce a ton of aluminium has fallen 40% (IIED/WBCSD, 2002). Given the magnitude and seriousness of climate change today, energy costs will probably continue rising —the result either of using alternative low-carbon sources or of the cost of paying carbon taxes or buying emission permits.

Central to this overall issue is the reduction of direct and indirect emissions of greenhouse gases (GHGs). Mitigation options vary from sector to sector within the industry, and technology will certainly continue to play a central role. In Mexico, one of the most recent changes in the Mining Act (2006) was to permit degasification of coal mines to make use of an energy resource that is currently wasted, while reducing the environmental impact of the atmospheric release of grisú gas, which contains large quantities of methane.

It is essential that the region implement public-private partnerships to: (i) address the lack of relevant, consistent and regular data on the mining sector's energy consumption (taking account of the role of recycling); and (ii) study the implications of climate change

⁴² Coal generates 25% of the GHGs produced by fossil fuels and others sources. Emissions of methane produced by all activities related to coal mining (extraction, transport and storage) reached 7.4% of all anthropogenic emissions of that gas (<http://www.worldcoal.org/coal-the-environment/climate-change/>, consulted in November 2009).

⁴³ In Chile, however, the National Energy Commission estimates that mining represents 13% of the national consumption of energy (mining of copper represents 32% of national consumption of electricity). Electricity is the most important source for this sector (50% of the total). Use of petroleum products corresponds to 46% of consumption. The Mesa Minera de Eficiencia Energética exists, with the goal of identifying elements, projects and more efficient and environmentally friendly processes (www.cne.cl, Consulted in November 2009).

(e.g., for the hydrological cycle and for underground water reserves and mining), in order to identify the best ways of adapting to the current realities and providing for mitigation measures. Box III.3 describes recent initiatives in Chile to measure GHGs.

Box III.3
GREENHOUSE GASES IN THE CHILEAN MINING SECTOR

The Chilean Copper Commission (Comisión Chilena del Cobre, COCHILCO) provides a comprehensive estimate of the greenhouse gases emitted by copper mining operations in the country. The data it uses on energy consumption cover approximately 99% of Chile's copper production. The calculation takes account of: (i) the methodology proposed by the Intergovernmental Panel on Climate Change (IPCC); (ii) standardized conversion factors according to the different types of fuel consumed by electrical generation and distribution systems; and (iii) the energy consumption of individual mines.

By way of conclusion, COCHILCO states: "Considering that copper mining is a fundamental element in Chile's economy, and that the country is a world leader in this area, it is of the greatest importance to have full information on this sector's energy consumption and GHG emissions.

- There is increasing impact from emissions patterns by generation systems, in terms of the emissions from various stages of the process, as well as from commercial production processes.
- Global warming and issues related to GHG emissions are a direct challenge for the mining sector, particularly considering the sector's portfolio of investment projects and the positive outlook for growth in production.
- The mining sector, which has been proactive, and has at times been a pioneer, in the area of environmental management in Chile, faces the possibility of making step-wise advances and contributing positively in this area."

The institution is now working on projections for future emissions.

Source: Zúñiga, 2009.

One interesting case, in terms of mining and climate change —though it involves hydrocarbons— is that of Yasuni, in Ecuador. The Ecuadorian government has offered to refrain from exploiting these crude oil reserves, which total nearly one billion barrels, or 20% of the country's reserves, and which would emit 410 million tons of CO₂, in exchange for international economic compensation on the order of US\$ 7 billion (with a trust fund to be endowed over 10 years). The offer has met with positive response from several European governments and is expected to be finalized in the near future.

(g) Local and national research and development

Each of the issues addressed in this document merits significant research and development in the region's mining countries. In reality, however, budgets and research and development capacities at the local level, at least in the public sector, are extremely limited. Governments should seek opportunities to collaborate and cooperate with the private sector. The primary justification for joint initiatives is the simple fact that sustainable development is in the interest of all stakeholders, especially those whose development relies on mining. Through a process of research and participation, the MMSD initiative has defined a complete agenda for research and training in the region. It includes concrete proposals for the public sector, the business sector and civil society, as well as specific themes for small-

scale mining (see CIPMA/IIPM, 2002). The greatest challenge is to ensure that there are appropriate long-term funding mechanisms for research and development initiatives.

(h) Voluntary initiatives

As a result of the many challenges that the mining industry faces, especially in developing countries, a series of voluntary programmes have been organized related to corporate governance. Table III.3 presents the main programmes.

Table III.3
THE MAIN VOLUNTARY INITIATIVES RELEVANT TO THE MINING SECTOR

| Initiative | Leadership |
|--|---|
| Guidelines for Multinational Companies (OECD) | Governments |
| Extractive Industries Transparency Initiative (EITI) | Multiactor (government, industry, civil society) |
| Voluntary principles on safety and human rights | Multiactor |
| Standards of corporate governance practices for social and environmental sustainability (the Ecuador Principles) | Industry, World Bank, financial institutions |
| Global Reporting Initiative | Industry |
| ISO 26000 | Multiactor, in development by ISO |
| Kimberley Process | Multiactor |
| International Cyanide Management Code | Industry |
| “Towards sustainable mining” Mining Association of Canada | Industry |
| E3+ Prospectors and Developers Association of Canada | Industry |
| Communities and small-scale mining | Civil society, commercial organizations, small-scale mining |
| Alliance for responsible mining | Civil society, commercial organizations, small-scale mining |

Source: Communication of the representative of Canada to the third Regional Implementation Forum on Sustainable Development (Antigua, Guatemala, November 2009).

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IV. TRANSPORT

“Promote an integrated approach to policy-making at the national, regional and local levels for transport services and systems to promote sustainable development, including policies and planning for land use, infrastructure, public transport systems and goods delivery networks, with a view to providing safe, affordable and efficient transportation, increasing energy efficiency, reducing pollution, congestion, and adverse health effects and limiting urban sprawl, taking into account national priorities and circumstances. This would include actions at all levels to:

- (a) Implement transport strategies for sustainable development, reflecting specific regional, national and local conditions, to improve the affordability, efficiency and convenience of transportation as well as urban air quality and health and reduce greenhouse gas emissions, including through the development of better vehicle technologies that are more environmentally sound, affordable and socially acceptable;*
- (b) Promote investment and partnerships for the development of sustainable, energy efficient multi-modal transportation systems, including public mass transportation systems and better transportation systems in rural areas, with technical and financial assistance for developing countries and countries with economies in transition.”*

(Johannesburg Plan of Implementation, chapter III, paragraph 21, United Nations, 2002)

“Reduce respiratory diseases and other health impacts resulting from air pollution, with particular attention to women and children, by:

- (a) Strengthening regional and national programmes, including through public-private partnerships, with technical and financial assistance to developing countries;*
- (b) Supporting the phasing out of lead in gasoline;*
- (c) Strengthening and supporting efforts for the reduction of emissions through the use of cleaner fuels and modern pollution control techniques;*
- (d) Assisting developing countries in providing affordable energy to rural communities, particularly to reduce dependence on traditional fuel sources for cooking and heating, which affect the health of women and children.”*

(Johannesburg Plan of Implementation, chapter V, paragraph 56, United Nations, 2002)

A. INTRODUCTION

Both Agenda 21 and the Johannesburg Plan of Implementation highlight the fact that transport plays a key role in the economic and social development of countries.⁴⁴

The transport sector is a complex one. It includes passenger and freight transportation by water, air and land (roads, railways)—and combinations of these modes—at the international, regional, national (inter-city and rural-urban) and local levels.

Although there has traditionally been a tendency to approach transportation based on individual modes of transport, the concept of “mobility” has recently gained currency as a means of emphasizing the issue of moving people and goods in a sustainable fashion. This shift is an attempt to focus on the many different facets of the subject, including but not limited to: modal options, transportation infrastructure, and integrating transportation policy with policies in other areas (urban development, environment, energy efficiency, poverty reduction, etc.).

⁴⁴ Agenda 21, Paragraph 9.13 (Basis for Action), section 2, Transportation, chapter 9: Protection of the Atmosphere. Agenda 21, Rio de Janeiro, 1992.

In a global context of climate crisis and volatile fuel prices, the current challenge facing the countries of Latin America and the Caribbean is to develop efficient and less polluting transportation systems for both passenger and freight transport.

This chapter seeks to stress the importance of transport for the region's sustainable development and describes progress in Latin America and the Caribbean in fulfilling the obligations assumed by countries at the World Summit on Sustainable Development, held at Johannesburg in 2002. In addition, the existing main challenges, lessons learned and obstacles that must be overcome in order to promote implementation of policies of sustainable mobility are identified.

B. DESCRIPTION OF THE SECTOR

Transportation is one of the largest sectors in the global economy, both financially and in terms of jobs and resource consumption. As table IV.1 shows, it is directly responsible for 5% to 9% of the region's urban jobs.

Table IV.1
**SELECTED COUNTRIES OF LATIN AMERICA AND THE CARIBBEAN: TRANSPORTATION SECTOR
 EMPLOYMENT AS A SHARE OF TOTAL URBAN EMPLOYMENT**
(Percentages)

| Country | 1990 | 2000 | 2002 | 2004 | 2006 | 2007 |
|------------------------------------|------|------|------|------|------|------|
| Argentina | 6.8 | 8.1 | 7.2 | 7.8 | 7.7 | ... |
| Bolivia (Plurinational State of) | 7.5 | 7.0 | 7.7 | 7.7 | ... | 9.1 |
| Brazil | 4.9 | ... | 5.5 | 5.5 | 5.3 | 5.6 |
| Chile | 7.5 | 8.1 | ... | ... | 8.2 | ... |
| Colombia | 6.6 | 6.9 | 7.7 | 8.2 | ... | 9.6 |
| Costa Rica | 5.4 | 7.4 | 6.7 | 6.5 | 7.6 | 7.4 |
| Dominican Republic | ... | 6.7 | 7.8 | 8.2 | 7.5 | 7.7 |
| Ecuador | 5.8 | 5.0 | 6.5 | 7.7 | 7.3 | 7.6 |
| El Salvador | 5.5 | 5.8 | 5.3 | 6.3 | 5.5 | ... |
| Guatemala | 5.3 | 3.2 | 2.8 | 4.3 | 4.1 | ... |
| Honduras | 4.5 | ... | 5.4 | 5.5 | 5.2 | 6.0 |
| Mexico | ... | 4.9 | 5.4 | 4.9 | 5.3 | ... |
| Panama | ... | 9.1 | 9.7 | 9.7 | 9.1 | 8.7 |
| Paraguay | 5.9 | 5.3 | 5.2 | 5.6 | ... | 5.3 |
| Peru | ... | 8.5 | 8.0 | ... | ... | ... |
| Uruguay | 5.8 | 6.0 | 6.0 | 5.8 | ... | 6.0 |
| Venezuela (Bolivarian Republic of) | 6.6 | 6.8 | 7.3 | 8.2 | 8.2 | 8.7 |

Source: ECLAC/CEPALSTAT databases. Based on official information.

There is a positive relationship between economic growth and high-quality transportation infrastructure. Efficient and effective transportation infrastructure and services play a central role in a region's productivity and competitiveness and are, therefore, key factors in its economic growth (Sánchez and Wilsmeier, 2005).

Although the Millennium Development Goals do not refer explicitly to transportation services, this sector plays a crucial role in advancing towards these goals and also, therefore, in overcoming poverty in the region. For example, improvement in the design, regulation and operation of transportation systems facilitates access to centres of production at lower economic and social costs (see Millennium Development Goal 1) and provides or improves connectivity and mobility, which are essential for access to basic education and health care services for the entire population, especially among the poorest segments and in rural areas (Millennium Development Goals 2-6). Redesigning the policies that govern the provision and operation of transportation systems can lead to low-carbon infrastructures and sustainable transportation, thus improving the chance of meeting Millennium Development Goal 7. Effective analysis of the problems involved in streamlining transportation and improving its competitiveness directly benefit small island nations and countries without sea coasts, relating directly to Millennium Development Goal 8 (Pérez, Cipoletta and Sánchez, 2009).

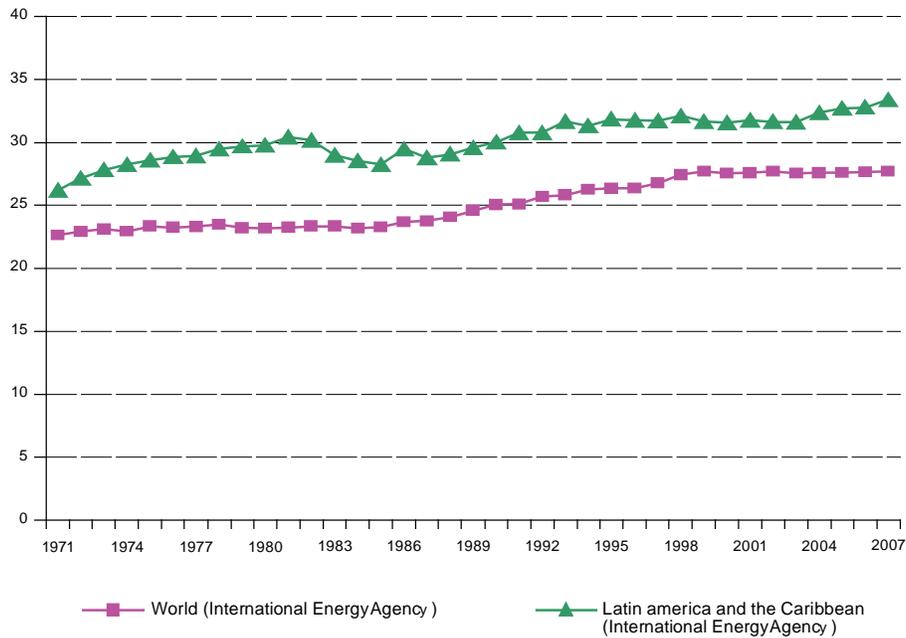
As in other regions of the world, passenger and freight transport in Latin America and the Caribbean has increased steadily in the past few decades, and trends point to continued growth. This is due largely to increasing population, globalization and a rising standard of living, which, among other things, have increased the frequency of personal travel and the volume of goods transported.

The increased demand for transportation services creates a variety of serious environmental problems, principally due to the fact that it generates a need for more physical infrastructure and requires greater consumption of energy. Notably, the transportation sector is the principal source of growing energy demand, and this upward curve is expected to continue (see figure IV.1).

According to the International Energy Agency (IEA), oil is the basis for the fuel used for nearly 95% of the world's transportation needs. Latin America fits this pattern, with oil representing 95.5% of the sector's energy consumption in 2006 (OLADE, 2006).

The transportation sector is also responsible for atmospheric emissions that impact the environment at the global, regional and local levels. Among the substances involved are greenhouse gases —carbon dioxide (CO₂), in particular— which have global environmental repercussions. The transportation sector is also responsible for particulate material, such as lead, nitrogen oxides (NO_x), sulphur oxides (SO_x) and volatile organic compounds (VOCs), which create environmental and health problems at the local and often regional levels.

Figure IV.1
**TRANSPORTATION SECTOR ENERGY CONSUMPTION AS A PROPORTION OF
 ALL ENERGY CONSUMPTION**
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), with data from the International Energy Agency (IEA).

According to emissions estimates, mobile sources account for most of the air pollution in the region’s urban areas. In addition to generating particulates, automobiles are a major source of nitrogen oxides, sulphur oxides and carbon monoxide, which have serious consequences for the local inhabitants’ health (see box IV.1).

The economic consequences of atmospheric pollution have been studied in Central America. In Costa Rica, for example, a study on the health costs of air pollution was made in 2005 (with data from 2001). In order to estimate the effects on public health the following variables were taken into account: general mortality (adults ≥ 30 years); hospital visits for respiratory complaints (all ages); hospital visits for cardiovascular problems (all ages); chronic bronchitis (adults ≥ 25 years); acute bronchitis (minors ≥ 15 years); days of forced rest owing to respiratory illnesses (adults ≥ 20 years); asthma attacks (minors < 15 years, adults ≥ 15 years). It was determined that the annual health cost attributable to air pollution was 2% of public expenditure. The initial estimate of direct and indirect costs, with several extrapolations, was US\$ 27,558,259 annually.

Box IV.1

PRINCIPAL POLLUTANTS ATTRIBUTABLE TO MOTOR VEHICLES AND RELATED HEALTH IMPACTS

| Pollutant | Health impacts | Additional problems |
|------------------------------------|--|---|
| Particulate matter (PM) | <ul style="list-style-type: none"> – Aggravation of asthma – Reduced pulmonary function – Heart attack – Premature death – Diesel PM is most likely a human carcinogen | <p>Fine particulates (PM_{2.5}) produced directly by combustion sources are the by-product of precursor gases such as sulphur dioxides, nitrogen oxides and organic compounds. PM_{2.5} are a serious concern, given that they are capable of penetrating deep within the lungs. These particles can remain in the atmosphere for days or weeks and can travel hundreds or thousands of miles.</p> |
| Hydrocarbons (HC) | <ul style="list-style-type: none"> – Many toxic components of hydrocarbons cause cancer and have other detrimental health effects. | <p>Hydrocarbons can also react with nitrogen oxides in the presence of sunlight to produce ozone. In urban areas, mobile sources are typically responsible for a significant portion of the pollution.</p> |
| Nitrogen oxides (NO _x) | <ul style="list-style-type: none"> – React with hydrocarbons to form ozone, which can create serious respiratory problems – React to form nitrate particles and acid aerosols such as NO₂, causing respiratory problems | <p>This category includes various components and derivatives of nitrogen oxides, including nitrogen dioxide, nitric acid, nitrous oxide, nitrates and nitric oxide. The latter is one of the principal ingredients in the formation of ozone at ground level. It reacts in the atmosphere to form nitrate particles and acid aerosols. The nitrogen oxides and pollutants that it forms are capable of travelling long distances.</p> |
| Sulphur oxides (SO _x) | <ul style="list-style-type: none"> – Factors in respiratory illness, particularly in children and the elderly – Aggravating factors in cardiac and pulmonary diseases | <p>These compounds contribute to the formation of atmospheric particles that reduce visibility. They can travel long distances and be deposited far from their point of origin.</p> |
| Ozone (O ₃) | <ul style="list-style-type: none"> – Creates serious health problems, even at very low concentrations. Prolonged exposure can cause permanent lung damage and premature death | <p>Ozone at ground level is not emitted directly by vehicles, but, rather, is a product of reactions involving hydrocarbons and nitrogen oxides in the presence of sunlight.</p> |
| Carbon monoxide (CO) | <ul style="list-style-type: none"> – Toxic at high atmospheric concentrations, even for individuals in good health. At low levels, CO can affect people with heart disease. It can also affect the central nervous system, cause premature death and reduce the weight of newborns. | <p>Motor vehicles are the major source of CO levels in cities.</p> |

Source: "Opening the Door to Cleaner Vehicles in Developing and Transition Countries: The Role of Lower Sulphur Fuels." Report of the Working Group on Sulphur of the Partnership for Clean Fuels and Vehicles (PCFV), UNEP, 2007.

In El Salvador, it was estimated in 2006 that the health cost attributable to air pollution—in 2003—in the four main cities, using the same methodology used in Costa Rica. Based on those results, the cost of respiratory illnesses caused by atmospheric pollution reached US\$ 54.8 million year in the San Salvador metropolitan area.

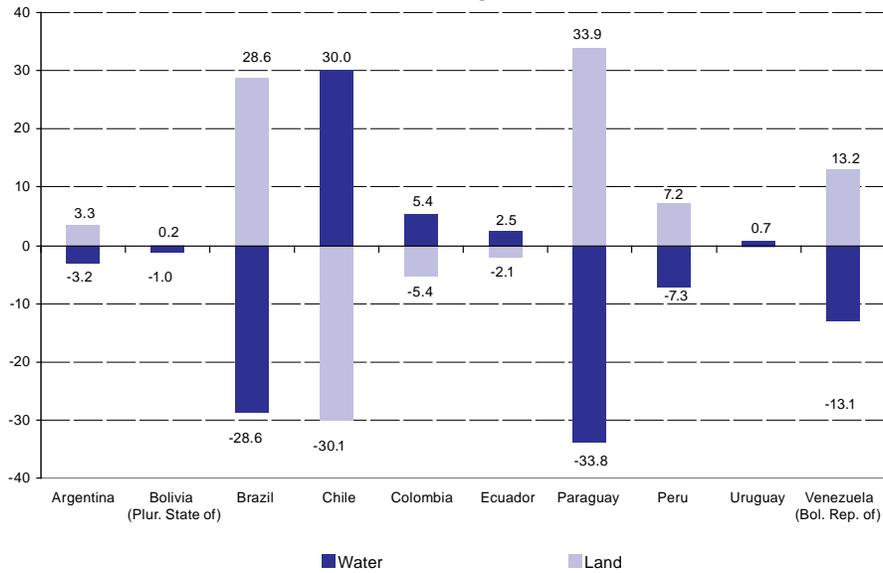
Despite significant impact on local, regional and global environments, as well as on health, transportation policy in the region has generally failed to take the environmental variable into account when planning investments in freight and passenger transportation. Although steps have been taken (pollution monitoring, requirements concerning greater use of biofuels) and there are several successful experiences, there is still a way to go to encourage inclusion of the environmental variable in transport policies.

For example, the increased volume of freight transported within the region between 2000 and 2007, particularly in South America, was biased towards land transport, as opposed to the less polluting water-borne modes of transport (maritime, river, lake) (see figure IV.2). The current modal mix reflects the structure of logistical chains and political and legal obstacles to transporting merchandise by water. This inefficiency in the transportation and logistics system has economic consequences (higher transportation costs, leading to higher end prices), as well as environmental consequences (associated with higher emissions levels). Redesigning transportation infrastructure, and systems to create low-carbon infrastructure and less-polluting and more energy-efficient means of transportation would reduce the sector's environmental impact and improve economic competitiveness and productivity, provided that the redesign includes a strategy to integrate transportation policy with economic and social development policy, replacing the traditional disjointed, modal approach.

With regard to passenger mobility, despite extensive literature supporting the importance of emphasizing public over private transportation, mass urban transport continues to be largely inefficient in many cities, while the region's private automotive fleet is on the increase, with the number of automobiles per capita having risen from 0.08% in 1990 to 0.17% in 2007 (see figure IV.3). The growing use of automobiles in the region's cities has had major effects on pollution, as well as creating increasingly severe traffic congestion, which affects travel time and quality of life in large cities. There has also been an increase in safety problems on the roads. Indeed, the region's rates of injury and death from automobile accidents are among the highest in the world (see box IV.2).

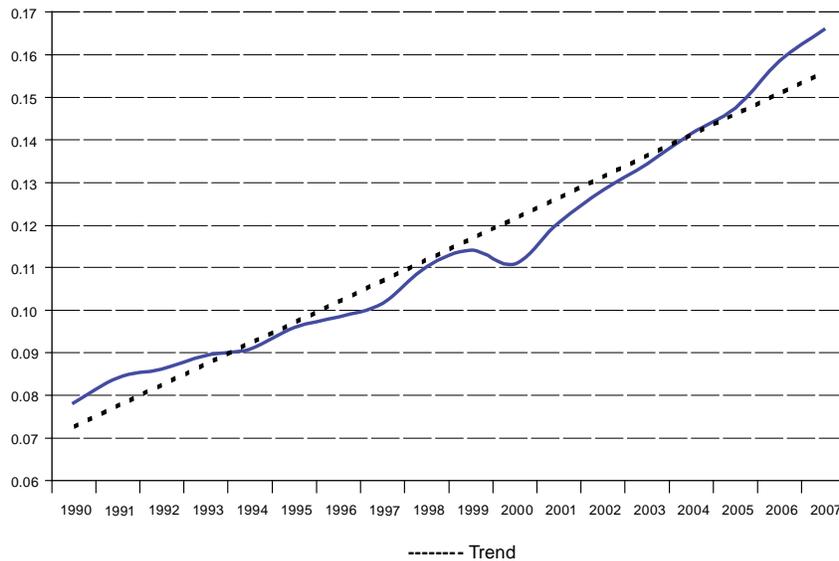
Most of the region's cities have seen a dramatic rise in motorcycle use. This has not only aggravated congestion, given the lack of infrastructure and education needed to ensure that these vehicles are properly operated but has also increased the accident rate. In fact, among different forms of transportation in Latin America and the Caribbean, motorcycles constitute the segment with the highest death rate (United Nations, 2010).

Figure IV.2
**DIFFERENCES IN THE MODAL COMPOSITION OF TRANSPORTATION FOR IMPORTS
 WITHIN SOUTH AMERICA, 2000-2007**
(Percentages)



Source: International Transport Database (BTI), Economic Commission for Latin America and the Caribbean (ECLAC), 2009.

Figure IV.3
**LATIN AMERICA AND THE CARIBBEAN (SELECTED COUNTRIES)^a: CHANGES
 IN SIZE OF AUTOMOTIVE FLEET, 1990-2007^b**
(Number of automobiles per person)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), with automotive fleet statistics from the Statistical Database of Social, Economic and Environmental Indicators for Latin America and the Caribbean (CEPALSTAT). Online, as of October 2009, at <http://websie.eclac.cl/sisgen/ConsultaIntegrada.asp>.

^a Includes statistics for Argentina, Belize, the Bolivarian Republic of Venezuela, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Panama, Paraguay, Peru and the Plurinational State of Bolivia.

^b Annual rate of change, 1990-2007: 6.59%.

CHALLENGES FOR THE REGION'S ROAD SECURITY

Traffic accidents constitute a serious public health problem and a major cause of death, injury and disability worldwide. Each year, over 1.2 million people die as a result of vehicle accidents, and nearly 50 million people are injured. Over 90% of these deaths occur in low and medium-income countries, and the Latin America and the Caribbean Region has the highest death rate from automobile accidents (26.1 deaths per 100,000 inhabitants). Predictions suggest that unless urgent measures are taken, this figure will increase to 31 deaths per 100,000 by 2020.

Historically, measures to reduce injury and mortality from traffic accidents have focused on protecting the occupants of vehicles. However, nearly half of those who die in accidents each year around the world are pedestrians, motorcyclists, bicyclists and persons using public transportation. This figure is even higher in the world's poorest countries and communities. The United Nations system—including WHO and the Regional Economic Commissions—has underscored the importance of addressing the needs of all road users when establishing road safety, land use and urban traffic policies. Those belonging to the most vulnerable groups must not be neglected. There is an awareness that prevention is by far the best approach. In addition to strengthening interventions that have proven effective around the world, such as the use of seatbelts and child restraint systems, greater attention must be given to the needs of specific groups of road users when planning transportation policy. This is particularly true in Latin America and the Caribbean, where more than 70% of such deaths occur among members of vulnerable groups using roads (e.g., in Colombia, Guatemala and Peru). WHO has suggested strengthening initiatives such as reducing vehicle speeds in urban areas and controlling alcohol consumption among drivers, since both affect not only vehicle occupants but also vulnerable road users. Prioritizing the needs of vulnerable road users also involves recognizing the importance of the environment when designing policy and making planning decisions. In this respect, it is clear that infrastructure has a major effect on safety. As a specific example of how land use and transportation infrastructure planning that takes account of the needs of vulnerable road users can help prevent traffic accidents, there is the case of the Colombian capital of Bogotá. Between 1995 and 2001, the city implemented a number of land use and transportation infrastructure measures to address the needs of vulnerable road users. These measures included creating dedicated routes for cyclists and pedestrians, including automobile-free paths, and excluding automobiles from the city centre during morning and evening rush hours. These measures helped reduce the number of deaths from traffic accidents from 1,387 in 1995 to 697 in 2002. In Costa Rica, thanks to the National Road Safety Plan, traffic accident mortality rates fell between 2000 and 2005. The objective of the 2007-2011 plan is to coordinate actions of the public sector, the private sector and civil society to reinforce safety and protection for users of the national transit system, with a target of reducing the number of traffic-related deaths by 19%. For many of the region's people—particularly the most deprived—non-motorized means of transport (such as walking and bicycling) and public transportation are the only viable option for getting from one place to another. However, despite the obvious environmental benefits of improving infrastructure for non-motorized transportation, there continues to be a deficit in this area, with non-motorized transportation becoming increasingly unsafe. ECLAC has emphasized the importance of considering measures to ameliorate this situation and protect the most vulnerable road users, such as pedestrians and motorcyclists, by including pedestrian overpasses and underpasses, signage and proper partitions when designing infrastructure. In addition, however, such measures should be supplemented and strengthened by coordinated and integrated action in other areas, such as education, legislation and health, within a multidisciplinary framework. Of particular interest in this context is the initiative “Share the Road: Minimum 10% Finance for Safety, Sustainability and Accessibility”, led by the United Nations Environment Programme (UNEP), the FIA Foundation for the Automobile and Society and other associated organizations, in an effort to promote safe, sustainable transportation by encouraging the funding and design of roads to accommodate all users.

Source: Global status report on road safety: time for action, WHO, 2009; Share the Road: Minimum 10% Finance for Safety, Sustainability and Accessibility, UNEP-FIA Foundation; Global Status Report on Road Safety, WHO, 2008.

C. TRANSPORTATION AND SUSTAINABLE DEVELOPMENT

The following is a brief introduction to the principal issues surrounding the subject of transportation and sustainable development in the region. For each of the issues, a description of the current situation is given, along with an indication of present and future challenges. Wherever possible, examples of best practices are provided.

1. Integrated policy on infrastructure, transportation and logistics

Traditionally, infrastructure and transportation in Latin America and the Caribbean have been two rather separate policy areas. This poses problems in attempts to provide both common and scarce public goods efficiently. Transportation and transportation policy in the region are often analysed and acted upon in terms of a single mode of transportation, and logistical considerations are often neglected entirely in planning transportation and infrastructure.

The focus of transportation policy needs to move from a unimodal orientation towards an integrated approach. Planning must integrate infrastructure development, transportation services, logistical considerations and the need to facilitate trade and transportation within a context of sustainable development.

Where freight transportation is concerned, for example, policy planning and execution must focus on the competitiveness and productivity of the goods and services that the country exports or imports, rather than on its modes of transport. Thus, rather than debating the need for national maritime or rail policy, attention should centre on creating a national transportation policy designed to promote the productivity and competitiveness of the national economy (Pérez, G., 2008).

In summary, some of the major obstacles frequently encountered in implementing policies of this type in Latin America and the Caribbean include lack of knowledge of the subject and excessively simplified long-range approaches and planning. Thus, the challenge is to provide for effective training of human resources, adopt a comprehensive perspective in designing plans and establish a legal frame of reference capable of supporting a long-term sustainable model (Cipoletta, 2009).

Regional experiences are of particular interest in this respect. The Colombian case is perhaps the best example, to date, of national logistical policy in Latin America. As part of a set of initiatives undertaken in the framework of the National Competitiveness System (Sistema Nacional de Competitividad, or SNC), which was established in 2006, Colombia established a national logistics policy in 2008. This effort had several objectives, including: consolidating a national logistical system to optimize the cost structure of the physical distribution of goods; integrate supply chains through efficient use of high-quality transportation infrastructure designed to encourage intermodality; and supporting information and communications technologies (ICT) to promote trade and ongoing adoption of improved business, logistics and transportation practices (Cipoletta, 2009).

Although it is still too early to evaluate implementation of this policy, the attempt to coordinate efforts and improve the efficiency of the country's logistical and transportation system is noteworthy. The policy does have certain shortcomings, such as a failure to incorporate

efficient training of human resources, a low level of support for ongoing public-private collaboration, and the fact that there is not, as yet, any single legal entity to oversee the entire policy. Moreover, there is uncertainty as to how environmental issues will be incorporated. Nevertheless, the effort is an interesting attempt at establishing an integrated transportation policy that takes account of social and environmental, as well as strictly economic, factors.

Other Latin American countries have begun to devote attention to these issues, although no comprehensive national policies have yet emerged.

Peru has adopted various measures to improve its logistical, infrastructure and transportation system, but these measures have not yet been unified under a single policy.

Ecuador is beginning to take actions to address the issue through its National Council for the Revitalization of Production and Competitiveness, but private-sector involvement remains to be incorporated, and there needs to be better organization of working groups on logistics and facilitation.

Paraguay and Chile are currently studying this issue, and preliminary discussions are in progress. Brazil has created a logistics and transportation plan, but the plan has been focused more on infrastructure than on developing a logistics policy.

At the third Regional Implementation Forum on Sustainable Development in Latin America and the Caribbean (Guatemala, November 2009), in preparation for the 18th session of the United Nations Commission on Sustainable Development, the representative of Argentina reported that Argentina is adopting policies aimed at creating a system of sustainable transport at the regional and global levels through transnational networks in order to organize the MERCOSUR region and promote South American integration. That involves establishing an intermodal and interoperable network interlinking various transport modes in support of the logistic chains in each country. The main projects concern the Andean passes and cross-border connections, creation of hubs with transfer terminals and areas of logistic activity, the strengthening of uncongested road and railway access, port interfaces and river and sea transport.

2. Urban transportation

Approximately 75% of the population of Latin American and the Caribbean live in cities, and the figure projected for 2020 is 80.4% (United Nations, 2010). Against this backdrop, developing sustainable urban transportation systems remains a priority for the region.

Both large and medium-sized cities in the region currently face heightened automobile traffic and private automobile use. The resulting increase in air pollution (with significant health effects for the population), high noise levels, heavy traffic congestion, damage to architectural patrimony and degradation of green areas, as well as higher accident rates, create a range of dilemmas for governments as they attempt to prioritize infrastructure investments in urban mobility.

Faced with those circumstances, urban transportation policy in most of the region's large cities has attempted to simultaneously achieve two objectives: (i) increase capacity for private automobiles by building urban motorways and widening streets to handle more cars; and (ii) extend, enlarge and improve mass transportation systems such as subways and bus

systems, including the creation of integrated mass transport systems, such as the “TransMilenio” in Bogotá, Colombia (Lupano and Sánchez, 2009) (see box IV.3).

Box 4.3

INITIATIVES TO IMPROVE PUBLIC TRANSPORTATION IN THE REGION

In order to improve air quality and reduce traffic congestion, reforms of urban public transportation systems have been undertaken in a number of the region’s cities during the past several decades, with differing results. The following are some examples of such efforts.

Curitiba: The Curitiba rapid transit bus (RTB) system was initially implemented in 1972 as part of a more general urban planning policy. The system includes 64.6 kilometres of trunk roads and accommodates 560,000 trips per day. The system employs dedicated lanes, a payment system at stations, and high-capacity vehicles.

Quito: Based on the experiment in Curitiba, Quito developed a similar system, but on a smaller scale. Since 1995, a network of trunk roads has been under construction for the city’s RTB systems, with three currently in operation. The overall system has 37 kilometres of trunk roads, and moves 400,000 passengers per day. Two operators—one private-sector and one public—are involved. One of the system’s shortcomings is its lack of integration, both physically and in terms of how payment is handled in the three subsystems.

Bogotá: Bogotá’s RTB system, TransMilenio, which was launched in 2000, has 84 kilometres currently in operation and transports some 1.4 million passengers per day. Its planning incorporates major innovations, which have made it the strongest RTB system in the world. Among its distinctive features are express service (buses that do not stop at all stations). It has reduced travel times and increased per-hour capacity in each direction. Another feature of the system is its recent integration with non-motorized transportation (bicycle parking at points of entry to the system). This has increased the system’s passenger numbers considerably, and has reduced the burden on feeder lines. It is estimated that TransMilenio has reduced greenhouse gas emissions (GHGs) in the city by approximately 134,000 tons per year (UNEP, 2010). The success of Bogotá’s TransMilenio has led to implementation of a plan to create RTB systems in seven Colombian cities.

Mexico City: Mexico’s capital city has also created a system, the “Metrobus”, which was built to complement the city’s extensive subway system. Trunk roads totalling 20 kilometres have been built, and the system supports 260,000 trips per day. Although the project was not explicitly aimed at reducing CO₂ emissions, it has reduced emissions associated with vehicle traffic on the order of 10%, or 50,000 tons per year. This represents roughly 0.25% of all emissions from transportation in the city, a significant achievement for a small project (Shipper, L. and others, 2009).

Santiago, Chile: The “Transantiago” system was developed by the Chilean government in order to improve the coverage of public transportation in Santiago and reduce the number of transfers from one line to another; improve waiting times and increase the routes available; and redesign the system to integrate—physically and in terms of the payment system—the city’s bus and metro services. Despite the problems attending its launch in 2007, major improvements have been achieved in the system’s functioning, principally through increasing the fleet and creating a greater number of dedicated lanes, bus stops and infrastructure for modal (metro/bicycle) integration. This, along with redesigning the route network to better serve the population’s needs, has significantly reduced wait and travel times. The system’s primary impact on the population has been to increase safety and reduce noise levels. Remaining challenges include continuing to reduce particulate emissions and improving the system’s energy efficiency, along with finding a form of financing that will make it sustainable and attractive for the city’s population.

Guatemala City: The trans-urban system, which is intended to improve efficiency and lower the pollution levels of the city’s transport sector, began to operate in December 2009.

Source: Pardo, Felipe (2009). Los cambios en los sistemas integrados de transporte masivo en las principales ciudades de América Latina. ECLAC: Infrastructure Services Unit; UNEP (2010), GEOALC, 2009; Schipper, L. and others, (2009), Considering climate change in Latin American and Caribbean urban transportation: Concepts, applications, and cases. Final report. 5 June 2009. Centre for Global Metropolitan Studies, University of California, at Berkeley. Personal communication of delegates to the Regional Implementation Forum on Sustainable Development in Latin America and the Caribbean, in preparation for the 18th session of the United Nations Commission on Sustainable Development, held in Guatemala in November 2009.

These priorities are evident in most of the region's capital cities, such as Buenos Aires and Santiago (Chile). The phenomenon reflects not only a lack of uniformity in urban mobility policy but also the contradictory pressures affecting authorities faced with making decisions. On the one hand, mass transportation is a priority, while, on the other, efforts are being made to reduce congestion by creating greater capacity for individual modes of transportation. As has been described extensively in the literature, expanding the capacity of streets and motorways, although it helps alleviate the problem of traffic congestion in the short term, creates greater incentives for automobile use, which in the medium term generates greater congestion (Lupano and Sánchez, 2009).

Thus, although there is an awareness of the benefits of public transportation over private automobiles and a record of interesting experiments in the region (see box IV.3), there continue to be contradictions at the policy level. In order to advance in this area, two specific obstacles need to be overcome.

First, a lack of integration of policies regarding sustainable mobility, land use and urban growth. At the third Regional Implementation Forum on Sustainable Development, delegates expressed concern that because the region might adopt United States and Canadian models of urban development and land use in metropolitan areas, there was a need to integrate transport policies with those of land use. The relationship between density and mobility has been described extensively in the literature, and it is argued that while the forms of dispersed and low-density North American cities (and also many Latin American, recently) promote an increase in mobility and dependence on the automobile owing to a lengthening of distances, in European, Japanese and Chinese metropolitan areas, the more dense forms promote shorter journeys, resulting in between 30% and 60% of journeys by local residents are made on foot or bicycle (Rodrigue, 2006, cited in García Palomares, 2008).

The challenge in this context is to limit urban expansion and promote the creation and consolidation of neighbourhoods and diversified urban centres by use and business activity, with relative independence from the traditional centre and dimensions that allow walking or bicycling, when possible, in addition to having attractive, efficient and sustainable public transport.

International experience has shown that the availability of efficient public transportation is not, in itself, sufficient to discourage automobile use. As in most of the world's countries, automobiles in Latin America and the Caribbean are not only a means of transportation but also a status symbol. Thus, as incomes increase, interest in owning a vehicle intensifies. Given this dynamic, policies to discourage automobile use must take account of three complementary elements: (i) high-quality public transportation whose attraction will not be limited to the lower-income population; (ii) economic instruments designed to discourage the use of private vehicles (road use fees, tolls to enter city centres, etc.); and (iii) educational initiatives and campaigns to increase awareness of the impact of transportation on air pollution and climate change and enhance people's appreciation of the benefits associated with specific modes of transport (e.g., the health benefits of walking or bicycling).

Safety is a very relevant issue in the region, as was stressed at the Regional Implementation Forum. In many Latin American and Caribbean cities the difficulties of offering safe, reliable and clean public transport turn people away from choosing this type of transport.

At the Forum, the need to promote non-motorized transport in the region and promote co-modality was also raised, which implies improving a combination of transport modes. Although there are worthy programmes in that direction (for example the cycle paths in Bogotá), it is necessary to invest in basic infrastructure so that that alternative can become viable and safe.

In that context, mention should be made of the project named “Share the roads: a minimum of 10% of financing for safety, environment and accessibility”, led by UNEP and the FIA Foundation for the Automobile and Society, whose goal is the promotion of urban development that favours peaceful coexistence of multiple modes of transport (walking, riding a bicycle, using public and private transport). Under that programme, an appeal is made to investors to allocate at least 10% of the budget for roads to safety and infrastructure for non-motorized transport.

The thinking behind that initiative is that it will be impossible to have safe streets or low carbon-producing transport unless investment is made in non-motorized transport infrastructure, which, in addition, can contribute significantly to the decongestion of cities.

3. Existing transportation infrastructure

(a) Freight transportation infrastructure

The region today has limited freight transportation infrastructure. Unless this is addressed, it could affect growth and poverty reduction policies (see box IV.4). Exports have become the engine of the region’s development. However, the growth in export volumes, particularly with the explosion of demand in the Asian economies (especially China), has not been matched by expansion and improvement in the region’s transportation infrastructure, resulting in bottlenecks. The divergence between the dynamics of the growth in transportation infrastructure supply and increased demand calls for prompt action and policy decisions at the national and regional levels, in order to ensure that development is not held back by insufficient transportation infrastructure and services.

Box IV.4

LATIN AMERICA AND THE CARIBBEAN: LACK OF CAPACITY AND THE STATE OF TRANSPORTATION INFRASTRUCTURE

The Americas, as a region, have an extensive transportation infrastructure network stretching from the United States-Mexico border to the southern tip of Panama, with another from Venezuela through Colombia and west of the Andes, and a third linking central Chile with Argentina and southern Brazil. Other parts of the region have smaller networks or series of links, but consisting mostly of unpaved roads that are difficult to traverse, not what could be considered actual networks. The region’s highways, overall, are old, except for those built by concessionaires during the last decade, which represent no more than 3% of the total in the region. Most of the transportation network consists of roads, since railways function primarily as links between mining or agricultural areas and ports on the sea coast (or, in some cases, on rivers). General railway freight transportation is limited principally to central and northern Mexico, central and northern South America (iron and coal) and certain parts of the Southern Common Market (MERCOSUR) area. The integrity of the rail network is compromised by differences in rail gauges from one country to another. Moreover, there is markedly less road infrastructure in Latin America and the Caribbean than in other regions of the world. The region’s paved roads account for only 15.4% of its total road infrastructure, compared with figures of between 54% and 59% for the United States and Central European countries, and over 95% in Western Europe.

Box IV.4 (concluded)

The Western European countries have over 1,000 metres of highway for each square kilometre of territory, while the United States has 658. The average for Latin America is 147 metres. The amount of rail per unit of area is also considerably lower in Latin America than in the United States, Europe or Asia. On average, Latin America and the Caribbean have eight times less road per square kilometre of territory than do the European countries.

The potential of water transport is of great interest, since the region has a vast amount of navigable waterways. Although the average length of river waterways per square kilometre of territory is greater than in the United States (6.06 versus 4.26), the United States moved more than 14% of total volume on waterways in 2000, while the Latin American figure is under 3%, suggesting that there is major untapped potential in this area.

Source: Sanchez, R. and G. Wilmsmeier (2005), Provision of Transport Infrastructure in Latin America: recent experience and problems observed. Series 94, Economic Commission for Latin America and the Caribbean (ECLAC) Division of Natural Resources and Infrastructure.

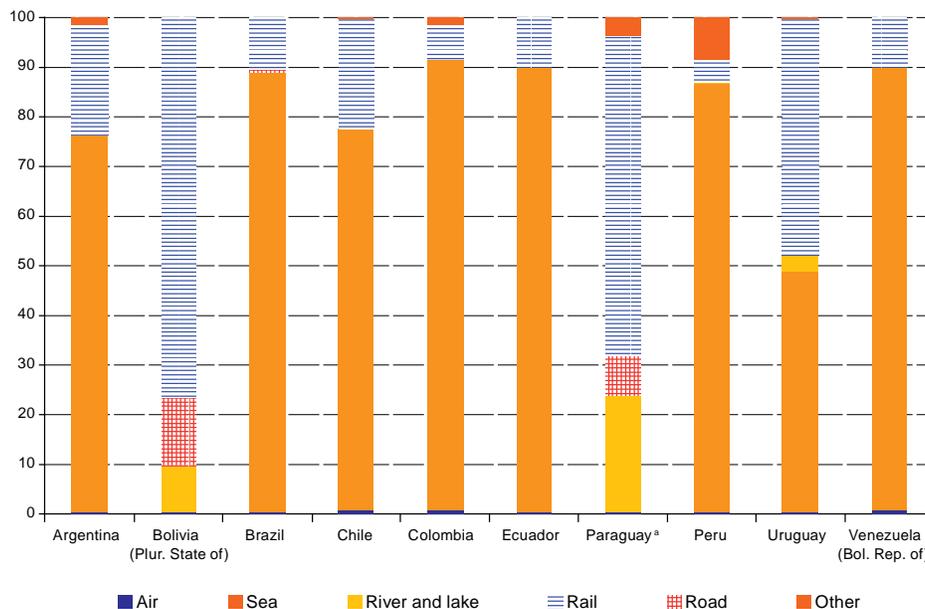
Given these realities, the challenge is to develop integrated infrastructure, transportation and logistics policy based on a new economic and social development model—a model designed with a view to economic productivity and competitiveness at the national level, while also taking account of social well-being and respect for the environment. Considering all of these factors, governments should emphasize low-carbon infrastructure, favouring those transportation modes or combinations of modes that provide greater competitiveness for export products without endangering the population's economic, social or environmental welfare.

As shown in figure IV.4, the modal distribution of the South American countries' transportation systems favours maritime transport, except in the countries that have no coastline (Bolivia and Paraguay). Given the impossibility of directly accessing international maritime transport, landlocked countries have emphasized highways, often at increased cost, and with the consequent negative externalities entailed by this type of transportation (including a need for more infrastructure, maintenance of existing infrastructure, congestion, pollution, traffic accidents, deforestation and relocation of populations necessitated by creating new infrastructure) (Pérez, Cipoletta and Sánchez, 2009).

Among the different forms of freight transport, rail transport in South America continues to be the least important at the national and subregional levels. However, the export boom, and a renewal of interest in developing infrastructure, are favouring the emergence of new approaches that are not only unimodal, but multimodal and intermodal. In this connection, ECLAC has emphasized the potential of rail transport for connecting isolated regions with rivers, providing better access to seaports downstream, with less environmental impact (Wilmsmeier, 2007). Participants at the Regional Implementation Forum emphasized the importance of promoting local sea transport in the region.

At the Forum, the delegate from Argentina reported that Argentina is adopting very relevant measures to promote river and lake transport and reconstruction of passenger and freight rail systems.

Figure IV.4
SOUTH AMERICAN COUNTRIES: TOTAL TONS IMPORTED, BY MODE OF TRANSPORT, 2007
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), International Transport Database (Base de Datos de Transporte Internacional, or BTI) 2009.

^a Information on Paraguay is for 2006.

In short, multimodal transportation (not limited to rail and river) should be a key component in a sustainable regional transportation policy. Advancing such policy, however, requires coordination among the region’s governments, in order to organize resources and actions with reference to multimodal options that offer the greatest economic, environmental and social benefits for the region as a whole.

Given the circumstances, it is important to support and strengthen initiatives designed to improve transportation infrastructure in the regional context. Of note in this connection are the South American Regional Infrastructure Integration Initiative (IIRSA) and the Mesoamerica Project (formerly the Puebla-Panama Plan). Although the environmental issues have been given only marginal consideration in their original designs, these projects represent an opportunity to address the challenges of developing sustainable transportation systems in a coordinated fashion (see box IV.5).

In this context, delegates at the Forum pointed out the need to create opportunities in the region for studying the epidemiological implications of greater integration of transport infrastructure. It was also argued that the free movement of goods and persons requires harmonization and homologation of norms aimed at preventing the spread of diseases such as hoof and mouth disease and Venezuelan equine encephalitis.

Box IV.5
REGIONAL COOPERATION INITIATIVES

The South American Regional Infrastructure Integration Initiative (IIRSA) is a forum for dialogue among the agencies responsible for transportation, energy and communications infrastructure in the 12 South American countries. It seeks to promote the development of infrastructure in the subregion, improving interconnection between countries. Although the initiative has been criticized for being conceived without due regard for environmental and social impact, especially in highly sensitive regions such as the Amazon, its institutions have gradually been incorporating mechanisms and instruments related to environmental sustainability, such as the so-called Strategic Environmental and Social Assessment mechanisms. The Mesoamerica Project (formerly the Puebla-Panama Plan) has made evident progress. It established a Mesoamerican Environmental Sustainability Strategy that provides for regional action in areas strategic for biodiversity and forests. Addressing climate change, it is designed to promote sustainable competitiveness (cleaner-production interventions, strategic assessment of environmental impact for projects in infrastructure, mining and other economic areas). Although the effects of these measures are not yet apparent, the two initiatives represent concrete efforts to address multimodal transportation options that promote sustainable freight and passenger mobility in the region.

Source: United Nations (2009, forthcoming), Millennium Development Goal 7 in Latin America and the Caribbean: Environmental Sustainability of Development. ECLAC, Santiago.

(b) Transportation infrastructure in rural and isolated areas

The limited availability of transportation infrastructure has serious consequences for the population in rural and isolated areas, given the particular territorial distribution of the region's population. The amount of area in Latin America—particularly in South America—is vast, with low population densities and large distances between population centres and principal centres of production, due to the nature of the productive activities (mining, agriculture and forestry, among others) that characterize the region. The region has some of the highest urban-population concentrations in the world, with cities such as Mexico City, São Paulo, Buenos Aires and Rio de Janeiro—all of which are among the most overpopulated cities in the world, each with over 12 million inhabitants—while the enormous interior areas of the countries generally are sparsely populated.⁴⁵

Because of the low population density in remote rural areas, infrastructure investment in such regions continues to be a challenge for the region's governments. However, such investment is indispensable in order to ensure that rural, isolated populations have access to education, health care and basic services.

Mexico is advancing in this area, developing methods of assessment to measure how the construction of rural roads affects the population's welfare (tracking parameters such as marginalization, access to health services, education and jobs, income and spending). As a result of this initiative, and with increasing awareness of the importance of rural mobility in low-income areas, the government has invested in rural roads (Federal Government of Mexico, 2009).

⁴⁵ For example, one of the largest and most populous countries is Brazil, over 90% of whose population is located in the Atlantic states, while 55% of Argentina's population lives within a radius of 450 kilometres from Buenos Aires—within which nearly 70% of the country's economic activity takes place. (Sánchez, R. and G. Wilsmeier, 2005).

At the same time, Barbados is studying the possibility of promoting the use of taxis between main roads and a number of small villages, in order to supplement the services provided by its main transportation system. Among the challenges that the country must face is the difficulty of providing bus service in certain areas of the country, given the poor conditions of the roads there and the fact that some residential areas have been developed with streets too narrow for standard-size buses (Environment Division, Barbados Ministry of the Environment, Water Resources and Drainage, 2009).

4. Transportation and climate change

Although the region's carbon dioxide (CO₂) emissions represent only a small fraction of total emissions released into the atmosphere by developed countries, the region's level of emissions resulting from land transport is high in relation to its income levels. This is due largely to the relatively high number of vehicles per person. Cars and light trucks are responsible for nearly two thirds of CO₂ emissions in the region's metropolitan areas, despite the fact that these modes of transportation account for only a small proportion of total urban trips (Schipper, L. and others, 2009).

If current trends continue, emissions from highway transportation in Latin America and the Caribbean are expected to increase markedly in the coming decades. Considering projections for both freight and passenger transportation, it is estimated that growing automobile use will cause a tripling of the region's total CO₂ emissions by 2030, even with improvements in fuel efficiency (Schipper, L. and others, 2009).

However, the increase in the automobile fleet is not the only factor influencing vehicle emissions in LAC. Other significant factors are the age of the fleet, inadequate maintenance, lack of emissions control technology and problems of fuel quality. In some countries, the practice of importing inefficient used vehicles also affects the age of the fleet. A study in Lima in 2003, for example, found that the average age of the city's automobiles was 11 years, as compared with 6.4 years in Santiago (2002) and 7.4 years in São Paulo (2004) for the same types of vehicles. Buses and trucks were found to represent only 10% of the fleet in San Salvador, but to be responsible for 75% of the PM₁₀ emissions from transportation (UNEP, 2009).

In order to deal with this situation, a number of interesting initiatives have been implemented by several countries in the region. Peru, for example, has instituted a Transitory Automobile Fleet Renewal Regime, which includes a so-called "scrap bond" to remove the oldest vehicles from circulation and to promote the purchase of new natural-gas-powered automobiles to be used as taxis.

Notable at the international level is the Global Fuel Economy Initiative (GFEI) headed by the United Nations Environment Programme (UNEP), the International Energy Agency, the International Transportation Forum and the FIA Foundation for the Automobile and Society. In March 2009, as part of this initiative, the "50 by 50" campaign was launched. This effort seeks to reduce global fuel consumption by 50%. Pilot projects were also initiated in Chile and Costa Rica to support the formulation of national fuel policies.⁴⁶

⁴⁶ More information can be found at: www.50by50campaign.org.

Also of note is the Central American Sustainable Energy Strategy 2020, which was approved in 2007 at the Third Meeting of Ministers of Energy of the countries in the Central American Integration System (CAIS). This establishes goals for five major components, one of which involves using biofuels for improvements in the areas of transportation and climate change (Ministry of Environment, Energy and Telecommunications of Costa Rica, 2009).

In summary, with regard to transportation and climate change, the region must move forward simultaneously on a number of fronts: (i) establishing policies that contribute to reducing the demand for transportation (for example, by creating diversified urban centres and encouraging telework); (ii) encouraging the least polluting and most energy-efficient forms of transportation (see box IV.3); (iii) adopting measures such as reducing the environmental impact of transportation by applying new technologies, using low-carbon and renewable fuels (biofuels) and adopting intelligent transportation systems to optimize routes; and (iv) reviewing and eliminating subsidies for the most polluting forms of transportation, and sending the economy correct signals to create incentives for efficiency and for adopting sustainable systems of transportation (internalizing the costs and social and environmental benefits of decisions).

At the Regional Implementation Forum, it was also proposed that the issue of importing used automobiles should be addressed at the regional level, in order to discourage both the import and export of these vehicles. This, it was suggested, would have a positive impact not only on air pollution, but also on highway safety, especially where imported vehicles are used for transporting heavy freight. In this connection, there was mention of the possible utility of instituting regional obsolescence guidelines for vehicles.

There are also extensive opportunities for improvement in the region through the implementation of simple operational changes that seek, for example, to encourage driving habits that lead to more efficient fuel use. These changes could produce swift reductions in the costs of transportation and could have an immediate impact on safety. However, they require investment in creating capacities and in training.

Studies of road transportation firms in Mexico have shown, for example, that driving behaviour influences vehicles' fuel consumption. The most successful measure in this regard has been training drivers in what is known as technical driving. This teaches them about the vehicle's performance in relation to the components of the drive train, and leads to greater energy efficiency, lower fuel consumption and thus less pollution (Mexican Government, 2009).

Participants at the Regional Implementation Forum also noted the need for a regional debate on the effects that the transportation sector will have on climate change, and how this will affect the region's trade. This issue, it was agreed, should be addressed in the relevant forums, in particular through the World Trade Organization (WTO). It was also emphasized that the impact of climate change on the region's maritime shipping must be analysed, since arctic warming will open up a northern shipping route for an expanding time period each year.

5. Technological innovation and more efficient fuels

The region has made major advances in technological innovation. The most important step in the follow-up to the Johannesburg agreements is the total elimination of leaded gasoline in all of the region's countries. In addition, most of the countries —Brazil, Colombia, Cuba, Chile and Mexico, for example— have adopted vehicle emissions standards, though these continue to vary from country to country. There was consensus, in the Forum, on the need to move towards setting common regional standards.

One challenge still to be addressed in the region is that of reducing sulphur levels in fuels. This would translate into immediate reductions of emissions from existing vehicles, and would represent a necessary step in facilitating the use of improved catalytic converters, filters and other technologies to eliminate most of the pollution caused by existing gasoline and diesel vehicles (UNEP, 2007). The sulphur content of fuels in LAC varies from country to country.⁴⁷

Of note in this connection is the decision, adopted at the Fourteenth Meeting of the Forum of Ministers of the Environment of Latin America and the Caribbean, to work with regional organizations and other collaborators on reducing the sulphur content of fuels, with a view to reaching a goal of 50 parts per million. This initiative is targeted to countries with air quality problems in their metropolitan areas.⁴⁸

To achieve this objective, Peru is taking a progressive approach: an initial stage involved implementing restrictions that were limited to large cities, but the goal is to extend them to all of the country's cities.

The region has benefited significantly from the exchange of information and experience in the framework of global initiatives such as the Partnership for Clean Fuels and Vehicles, which was established at the 2002 World Summit on Sustainable Development.⁴⁹ Its aim was to help developing countries reduce transportation-related air pollution by encouraging the use of clean fuels and vehicles, promoting best practices and facilitating knowledge and technology transfer. Regional initiatives such as this should be encouraged in Latin America and the Caribbean.

The region has also been a leader in using alternative fuels to replace oil. The most notable country in this respect is Brazil (see box IV.6). A number of countries (Barbados and Colombia, for example) are also exploring the use of electric vehicles, hybrid vehicles and vehicles running on natural gas or liquefied petroleum gas.

⁴⁷ The Partnership for Clean Fuels and Vehicles website (www.unep.org/pcf) provides information on the specific situation of each country.

⁴⁸ Online at: <http://www.unep.org/pcf/PDF/FinalXVIReuniondelForo08feb2008.pdf>.

⁴⁹ More information available online at: <http://www.unep.org/pcf>.

Box IV.6

BRAZIL AND THE USE OF BIOFUELS

During the first global oil crisis, in 1975, Brazil undertook a national biofuels programme in which it produced ethanol on a large scale, drawing on the nation's supply of sugar cane. Today, over 90% of the automobiles manufactured and sold in Brazil are flex-fuel vehicles, i.e., they can function on bioethanol, gasoline or a mixture of the two. It is calculated that, as a result of using ethanol instead of gasoline, CO₂ emissions since 1975 are 600 million tons lower than would have been the case had the change not been instituted. More recently and on a smaller scale, Brazil established a program that included efforts to produce biodiesel, along with a requirement that approximately 5% of fuel oil be biodiesel.

Brazil's success with biofuels efforts is due largely to the high levels of sugar cane production and its suitability as a raw material that can be efficiently converted into ethanol. Each year, approximately 190,000 hectares of sugar cane are planted in Brazil, mostly in the southern part of the country and in degraded areas.

Development of the ethanol industry has also produced social, economic and energy-security benefits. Brazil, which has recently launched a global campaign to promote this viable alternative to fossil fuels for transportation needs, is expected to remain the world's largest biofuels exporter.

Source: Forests and Energy-Key Issues. Study by the Food and Agriculture Organization of the United Nations (FAO): MONTES 154. FAO. Rome, 2008; information provided by the Government of Brazil.

The Third Regional Forum on sustainable development in the region identified other challenges related to technological innovation and more efficient fuels. These include:

- Promoting a broad regional debate on the benefits and limitations of biofuels. This issue, on which different views have been expressed, has not been resolved in the region. Brazil has extensive experience with biofuels and is encouraging regional cooperation in this area.
- Improving oversight of the technical inspection of vehicles, and strengthening air quality monitoring programmes and emissions inventories. It was emphasized that regional cooperation and sharing of experiences on these matters is needed in order to encourage the adoption of uniform systems.
- Working with large and medium-sized automobile manufacturing firms to promote the production of cleaner and more efficient vehicles. Further issues cited included dealing with manufacturers' long-term responsibility, facilitating the recycling of vehicle components at the end of their useful life, and defining criteria on the useful lifetime of fleets. It was suggested that a regional initiative in this regard could serve as an example to other parts of the world.

In short, although the region's countries have progressed in introducing technological solutions to reduce pollution from cars, buses, trucks, trains, ships and airplanes, these measures are not sufficient: they must be complemented by a restructuring of current transportation patterns. In this context, although it is important to encourage various initiatives, the primary focus should be on developing an integral approach to moving people and goods in an appropriate, efficient and sustainable fashion, rather than on particular modes of transport. There is potential for the countries of the region to cooperate on this issue and to create greater integration, common standards, joint monitoring and a sharing of experiences.

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V. CHEMICALS

In the Johannesburg Plan of Implementation, chapter III, paragraph 23, the United Nations member countries: "Renew the commitment, as advanced in Agenda 21, to sound management of chemicals throughout their life cycle and of hazardous wastes for sustainable development as well as for the protection of human health and the environment, inter alia, aiming to achieve, by 2020, that chemicals are used and produced in ways that lead to the minimization of significant adverse effects on human health and the environment, using transparent science-based risk assessment procedures and science-based risk management procedures, taking into account the precautionary approach, as set out in principle 15 of the Rio Declaration on Environment and Development, and support developing countries in strengthening their capacity for the sound management of chemicals and hazardous wastes by providing technical and financial assistance."

The countries are also committed to continue supporting application of the Montreal Protocol on Substances that Deplete the Ozone Layer, in the framework of the Vienna Convention for the Protection of the Ozone Layer (chapter IV, paragraph 39).

A. INTRODUCTION

The production and use of chemicals have considerable economic and social benefits. Particularly relevant in Latin America and the Caribbean is the use of chemicals to control insect- and pest-borne diseases in crops, and as fertilizers in farming. They are also a key element in producing drugs, foods and cleaning and personal hygiene products, as well as in water treatment, construction and many industrial processes. In some countries, the chemical industry plays a significant role in the economy.

Without adequate management and monitoring, however, the pollution of water, soils and air by toxic chemicals brings high risks and social and economic costs. Exposure to pollutants particularly affects the poorest populations. Progress has been made in recent years in Latin America and the Caribbean, but the situation varies greatly from country to country, and serious problems are still present.⁵⁰

- Until 2002, toxic pesticides such as DDT, lindane, endosulfan, aldrin and dieldrin were still being used. There have been considerable efforts in the region to prohibit or restrict the use of chemicals such as DDT, aldrin, dieldrin, lindane, paraquat and metamidofos. Use of aldrin and dieldrin are now prohibited. Nearly all of the countries have prohibited the agricultural use of lindane, although some countries still allow its use as a drug. Though there is insufficient information on DDT use, it is clear that limited use still occurs in some countries as a component of public health measures to control vector-borne diseases, under the guidelines of the World Health Organization (WHO) and the Conference of the Parties to the Stockholm Convention (UNEP/Conference of the Parties to the Stockholm Convention, 2009). The disposal

⁵⁰ See a review of the situation as of 2002 in UNEP (2002), <http://www.chem.unep.ch/pts/regreports/Translated%20reports/Eastern%20and%20Western%20South%20America%20sp.pdf>; "Evaluación regional sobre sustancias tóxicas persistentes - Informe regional de América Central y el Caribe", <http://www.chem.unep.ch/pts/regreports/Translated%20reports/Central%20America%20&%20Caribbean%20sp.pdf>; and IOMC/UNEP (2002), "Global Mercury Assessment Report."

of obsolete pesticides and other hazardous substances remains a challenge, since there is insufficient capacity to dispose of them in environmentally appropriate ways.

- Major progress has been made in eliminating toxic substances from industrial production, but a number of significant problems remain.
 - PCBs or dielectric oils (used in transformers and condensers) are no longer being produced, and many of the region's countries have made preliminary inventories of these products. However, much equipment containing PCBs is still being used.⁵¹
 - In some parts of the region where persistent toxic substances were produced in the past, there are high levels of contamination. The effects of this on nearby populations are not yet clear.
 - Certain toxic industrial by-products (dioxins and furanes) are still being produced. Uncontrolled burning of residues is one of the principal sources of emissions of these pollutants.
- In many cases, workers in sensitive agricultural and industrial sectors are not adequately protected, and exposure to pollutants jeopardizes their health.
- The use of mercury to extract gold has generated high concentrations of the substance, particularly in the Amazon basin, impacting human health through mercury ingested in fish. This is also addressed in Chapter 3.
- Leaded gasoline has been eliminated, but there are other sources of this metal that still have not been adequately controlled, such as paints and batteries. Exposure to lead is associated with (among other conditions) nervous system and cerebrovascular disease, learning problems among children and behavioural disorders.
- Inadequate or inappropriate management of hazardous wastes leads to contamination of soil, water and air by pesticides, metals and other pollutants. Improper incineration of household, industrial and agricultural wastes and the practice of burning to clear land are potential sources of dioxins, furanes, hexachlorocyclohexane (HCH) and polycyclic aromatic hydrocarbons (PAH). Oils from waste matter add to PAH pollution. Hospitals, which commonly incinerate waste, represent an additional contributing factor.
- Preventive measures and levels of preparedness for accidents among workers handling hazardous chemicals are inadequate. There are also deficiencies in regulation and institutional capacity in public sectors (local and national), as well as in the private sector, to reduce the risk of industrial accidents and ensure that adequate preparations have been made to manage them when they occur. This situation involves unacceptable risks for workers and for communities near industrial areas, particularly in countries where the chemical industry has grown substantially.

⁵¹ Under the Stockholm Convention, the deadline for eliminating these is 2025.

- Illicit trade in hazardous wastes is still a reality, despite progress in countries' capacity to prevent it.

Sound management of chemical products is an important cross-cutting issue in addressing the other thematic areas in the cycle of implementing the agenda of the United Nations Commission on Sustainable Development for 2010/2011. The signatories to the Johannesburg Plan of Implementation agreed on the following principal areas of action related to the management of chemicals:

- To develop a Strategic Approach to International Chemicals Management.
- To ratify and enforce international instruments on chemicals, hazardous waste, and the illicit traffic in these (Basel, Rotterdam and Stockholm Conventions).
- To develop consistent, comprehensive data on chemicals, for example by means of national pollutant release and transfer registers (PRTR).
- To implement the new Globally Harmonized System (GHS) of Classification and Labelling of Chemicals.
- To foster collaborative partnerships to promote activities designed to improve the ecologically rational management of chemicals and hazardous wastes.
- To reduce the risks associated with heavy metals.

In the Johannesburg Plan of Implementation, the countries also committed to working to reduce ozone-depleting substances (ODS), pursuant to the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on ODS, under the principle of shared but differentiated responsibilities.

Following is a description of the situation in Latin America and the Caribbean with regard to each of these issues.

B. THE STRATEGIC APPROACH TO INTERNATIONAL CHEMICALS MANAGEMENT

In order to meet the goal adopted in the Johannesburg Plan of Implementation, the first session of the International Conference on Chemicals Management (ICCM) in Dubai, in February 2006, approved the Strategic Approach to International Chemicals Management (SAICM). Three basic texts define this approach: the Dubai Declaration on International Chemicals Management, the Overarching Policy Strategy and the SAICM Global Plan of Action. A Quick Start Programme was established as an implementation mechanism (SAICM, 2009a).⁵²

⁵² The information Note prepared by the SAICM Secretariat for the Third Forum on the Regional Application of Sustainable Development in Latin America and the Caribbean, in preparation for the Eighteenth Session of the

To date, 28 of the 33 Latin American and Caribbean countries have participated in sessions of the International Conference on Chemicals Management (ICCM). Before the Strategic Approach was adopted on 17 June 2005, through the Declaration of Mar del Plata, which resulted from the Meeting of Ministers of Health and Environment of the Americas (HEMA), a cooperation agenda for the region had been developed. It identified the sound management of chemical products as a priority issue that was fully consistent with the objectives of the Strategic Approach. The importance of a cooperation agenda to prevent and reduce the impact of chemical products that are obsolete and potentially harmful to health was underlined at the Summits of the Americas, held in Quebec City (Canada) in 2001 and in Monterrey (Mexico) in 2004. The region's commitment to effective application of SAICM was reiterated by the Heads of State in the Declaration of Lima, which was approved at the Fifth Summit of Heads of State and Government of Latin America and the Caribbean and the European Union, held in Lima on 16 May 2008.

ICCM has emphasized the importance of regional forums for the application of SAICM, given their value as a mechanism for sharing information and experiences between countries, and their importance as a catalyst for national and regional measures (SAICM, 2009a). To date:

- The first regional meeting on SAICM was held in Panama City in February 2008, at which time the Regional Coordinating Committee was created.⁵³ The Committee met for the first time in Port of Spain in June 2008.
- A regional consultative meeting was held in Viña del Mar, Chile, in December 2008. Here, issues relevant to the second session of ICCM (ICCM₂) were debated.
- A workshop for the Caribbean subregion, covering SAICM and associated instruments regarding potentially hazardous chemical wastes, was held in Bridgetown (Barbados) in March 2009.⁵⁴

United Nations Commission on Sustainable Development, published 14 October 2009, is available at <http://www.eclac.org/dmaah>.

⁵³ The membership of the Regional Coordination Committee is as follows: regional focal point (Chair); regional representatives on the Executive Board of the Quick Start Programme (Barbados); national focal points for the Strategic Approach in each of the Latin American and Caribbean subregions (Guyana for the English-speaking Caribbean, Ecuador for South America; Cuba for Central America, the Spanish-speaking Caribbean and Haiti); one representative of a non-governmental organization in each of the following sectors: industry (International Council of Chemical Industry Associations, or ICCA); unions (Chemical Workers Union in Brazil's ABC region / Central Única de Trabajadores de Brasil); public interest (Centre for Analysis and Action on Toxic Substances and Alternatives); and science (International Society of Doctors for Environment, ISDE); a rotating representative of a key regional organisation (Organization of American States, or OAS); a representative of a member organization of the Inter-Organization Programme for the Sound Management of Chemicals (IOMC), which has a significant chemical safety programme at the regional level (UNITAR); and the immediate predecessor of the current SAICM regional focal point (Argentina). The current SAICM focal point is Gillian Guthrie (Jamaica). The region is represented on the Executive Board of the Quick Start Programme by the Government of Barbados and the Government of the Bolivarian Republic of Venezuela. Carlos Portales, of Chile, is the current Latin American and Caribbean region representative to the Board of the International Conference on Chemicals Management.

⁵⁴ The Information Note prepared by the SAICM Secretariat summarizes the content of the debates and assistance needs in the Caribbean with regard to these issues. It also indicates that financial considerations for the application of the Strategic Approach are recurrent in nature. The Note is available on the website of the

- San Salvador (El Salvador) was the site of a meeting in November 2009 for consultations on the Implementation Plan for SAICM in the subregion.
- The second meeting of the Regional Coordinating Committee was held in Santiago (Chile) in November 2009, in order to review the results of ICCM2, adopt measures needed to maintain the continuity of the process, and prepare for the second regional meeting on SAICM. It was recommended at the Committee's second meeting that a regional implementation plan for SAICM be developed, and various recommendations on regional priorities were reviewed. These will be considered at the Kingston meeting.⁵⁵
- The second regional meeting on SAICM was held in Kingston, Jamaica, in March 2010.

National focal points have been designated in most of the region's countries to implement SAICM. These are generally professionals working in areas of environment, health and sustainable development within governmental agencies that deal with these issues and with foreign relations. Mechanisms have also been created for inter-institutional coordination between different areas within the participating Governments. Meetings have been held for direct stakeholders in each country, and collaborative mechanisms have been created. Non-governmental organizations that are located or are active in the region have also been designated as focal points for implementation of SAICM. Some regional organizations, such as the Organization of American States (OAS) and the Central American Commission on the Environment and Development (CCAD), have been designated as inter-governmental focal points.

A number of countries have begun creating national implementation plans. In Chile, the National Chemical Security Policy (PNSQ), which was approved in 2008, includes measures to implement the Strategic Approach. Costa Rica has created a short- and medium-term National Action Plan that includes measures in priority thematic areas of the Strategic Approach (Minaet, 2009).⁵⁶ In Colombia, with the support of funds from the Quick Start Programme (which is part of SAICM), a project to strengthen national governance for implementing SAICM in Colombia was approved. Panama has designed an integrated national programme for the rational management of chemical products, and for implementation of SAICM. Funding has been provided through the Quick Start Programme for projects to support activities and capacity-building to improve the management and handling of chemical products. Similar efforts were undertaken in Colombia, as mentioned above, as well as in Honduras, Guyana, Nicaragua and Paraguay, which are developing their individual implementation plans. In other countries, such as

SAICM Secretariat (www.saicm.org) and on the website of the Third Forum on Sustainable Development in Latin America and the Caribbean (www.cepal.org/ddsah).

⁵⁵ See "Information paper for the third Regional Implementation Forum on Sustainable Development in Latin America and the Caribbean preparatory to the Eighteenth Session of the Commission on Sustainable Development (CSD-18): SAICM Implementation and priorities in the Latin America and the Caribbean Region", presented by the regional focal point of the strategic approach, as representative of the Regional Coordinating Committee, available at www.cepal.org/ddsah.

⁵⁶ According to questionnaires completed by the Governments on the application of the strategic approach/SAICM for the information of ICCM2, available at: <http://www.saicm.org/index.php?menuid=9&pageid=327&submenuheader=>.

Argentina, Costa Rica, the Plurinational State of Bolivia, Guatemala, Nicaragua and Paraguay, the priorities set forth in SAICM are being incorporated in national policy, while national profiles are being updated and capacity-building programmes are being conducted. Many of these activities have been carried out with the collaboration of participating organizations, such as UNITAR in the case of the countries cited above. The Quick Start Programme will make it possible to initiate regional programmes on issues of common interest to the countries of the region.

At the subregional level, the MERCOSUR Action Plan on Chemical Substances and Products was approved in 2006 and revised in 2008. The Plan places priority on pesticides, mercury, management of contaminated sites and implementation of the Globally Harmonized System (GHS) of Classification and Labelling of Chemicals. In MERCOSUR, a variety of initiatives are being undertaken to establish a Mercury and Pesticide Monitoring and Management System, with support from the Pan American Health Organization (PAHO) (Government of the Republic of Argentina, 2009).

The member countries of the Central American Integration System, through the Central American Commission on the Environment and Development (CCAD), with support from the United States Environmental Protection Agency and UNITAR, are analyzing their capacities and existing initiatives with a view to implementing the Strategic Approach. Based on the analysis, they will develop an implementation plan. In addition, they will formulate a regional chemical safety policy and establish the Central American Region Environmental Plan 2010-2014.

A recent OAS document identifies areas in which intraregional cooperation, based on a regional action plan, could benefit the countries of Latin America and the Caribbean (OAS, 2009). The region's countries will also need to consider emerging themes within the context of SAICM defined at the Second International Conference on Chemicals Management (ICCM2). These include nanotechnology and nano-materials, chemicals contained in products, electronic waste and lead in paint.

C. RATIFICATION AND IMPLEMENTATION OF INTERNATIONAL CONVENTIONS: BASEL, ROTTERDAM AND STOCKHOLM

Most of the Latin American and Caribbean countries have ratified the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, as well as (primarily since 2002) the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, as well as the Stockholm Convention on Persistent Organic Pollutants (see table V.1). The Basel Convention entered into force in 1992, the other two conventions in 2004.

Table V.1
**LATIN AMERICA AND THE CARIBBEAN: PARTICIPATION OF THE COUNTRIES IN THE
 BASEL, ROTTERDAM AND STOCKHOLM CONVENTIONS (YEAR OF RATIFICATION,
 ACCEPTANCE, APPROVAL OR SIGNING)**

| Country | Basel Convention 1989 | Rotterdam Convention 1998 | Stockholm Convention 2001 |
|------------------------------------|--------------------------|---------------------------------|---------------------------------|
| Antigua and Barbuda | 1993 | ... | 2003 |
| Argentina | 1991 | 2004 | 2005 |
| Bahamas | 1992 | ... | 2005 |
| Barbados | 1995 | ... | 2004 |
| Belize | 1997 | 2005 | ... |
| Bolivia (Plurinational State of) | 1996 | 2003 | 2003 |
| Brazil | 1992 | 2004 | 2004 |
| Chile | 1992 | 2005 | 2005 |
| Colombia | 1996 | 2008 | 2008 |
| Costa Rica | 1995 | 2009 | 2007 |
| Cuba | 1994 | 2008 | 2007 |
| Dominica | 1998 | 2005 | 2003 |
| Ecuador | 1993 | 2004 | 2004 |
| El Salvador | 1991 | 1999 | 2008 |
| Granada | ... | ... | ... |
| Guatemala | 1995 | ... | 2008 |
| Guyana | 2001 | 2007 | 2007 |
| Haiti | ... | ... | ... |
| Honduras | 1995 | ... | 2005 |
| Jamaica | 2003 | 2002 | 2007 |
| Mexico | 1991 | 2005 | 2003 |
| Nicaragua | 1997 | 2008 | 2005 |
| Panama | 1991 | 2000 | 2003 |
| Paraguay | 1995 | 2003 | 2004 |
| Peru | 1993 | 2005 | 2005 |
| Dominican Republic | 2000 | 2006 | 2007 |
| Saint Kitts and Nevis | 1994 | ... | 2004 |
| San Vicente and the Grenadines | 1996 | ... | 2005 |
| Saint Lucia | 1993 | ... | 2002 |
| Suriname | ... | 2000 | ... |
| Trinidad and Tobago | 1994 | ... | 2002 |
| Uruguay | 1991 | 2003 | 2004 |
| Venezuela (Bolivarian Republic of) | 1998 | 2005 | 2005 |

Source: United Nations Treaty Collection, <http://treaties.un.org>.

The three conventions, examined individually below, have all been ratified by a relatively large number of countries in Latin America and the Caribbean, but there have been notable problems with implementation, due to the countries' insufficient budgetary, institutional and technical capacities, and the precarious state of financial resources provided by the international community.

Today, a global effort is underway to take advantage of the synergies available from implementing the three conventions, as expressed in a resolution of the Conference of Parties to the Conventions in 2009. A joint meeting is due to address this issue in 2010.⁵⁷ Such an initiative could benefit the region by helping to coordinate national implementation measures and make them more efficient. The technical assistance programmes associated with the three conventions are designed to make use of these potential synergies. A thorough analysis of the related dynamics, examined from the perspective of each country, as well as of the overall region, remains to be conducted. At the next joint meeting, it is essential that the countries be represented by delegates who are thoroughly familiar with all three conventions. Another critical issue in this process is that of the financial resources needed to carry out the conventions' implementation plans.

1. Implementation of the Basel Convention

The objective of the Basel Convention is to protect the environment and human health from adverse effects due to the generation, manipulation, cross-border transportation and disposal of hazardous and other wastes. The measures needed to fulfil the commitments of the Basel Convention include national definitions of hazardous wastes, restrictions on the exportation, importation and transport of hazardous wastes, measures to reduce or eliminate hazardous wastes and cross-border movements of these substances, and actions to develop facilities for training and for the recovery and final disposal of such wastes.

These measures have been implemented, to varying degrees, by the region's countries, according to their individual capacities, characteristics and needs. Seventeen of the 30 countries in the region that ratified the Convention have implemented import and/or export restrictions for hazardous wastes.⁵⁸ There are variations in the extent to which the region's countries have fulfilled the obligation to present periodic national reports on compliance with the Convention. By the end of 2009, only 14 had filed reports for 2007.

Lack of information is a significant obstacle to the implementation of the Convention. In 2005, 19 of the region's countries submitted reports to the Convention, but only Brazil indicated the volume of domestic hazardous wastes generated, based on an inventory taken in 12 of its 26 states. Seven countries are conducting inventories, but these initiatives need to be accelerated. An additional 11 countries have indicated that they have no systematic information or reporting systems (OAS, 2009).

⁵⁷ See information at <http://www.basel.int/meetings/bureau/bureau%201%20cop%209/docs/02e.doc>.

⁵⁸ See national reports available at the website of the Convention Secretariat (Country Fact Sheets), available at: <http://www.basel.int/natreporting/cfs.html>.

Although it has not yet entered into effect, an amendment to the Convention was approved in 1995 to prohibit exportation of hazardous wastes from developed countries to developing countries for final disposal, recovery or recycling. In Latin America and the Caribbean, only Chile, Ecuador, Panama, Paraguay, the Plurinational State of Bolivia, Saint Lucia, Trinidad and Tobago and Uruguay had ratified the Amendment (out of 68 countries worldwide). Of the countries in the region, only Chile, Colombia and Costa Rica (among 13 countries throughout the world) have signed the Basel Protocol on Liability and Compensation for Damage resulting from Transboundary Movements of Hazardous Wastes and their Disposal, and only Colombia (one of only 9 countries worldwide) has ratified it.

According to the Convention Secretariat, effective national implementation would require a range of actions: monitoring hazardous waste shipments; technical visits to firms and other relevant sites; transport oversight and inspection; the taking and examination of samples; and sharing of information. This cannot occur without other conditions: adequate regulation and enforcement capacity; sites with sufficient technological and financial resources to deal adequately with wastes; monitoring systems for these sites, and monitoring of the effects of the transfer and disposal of wastes; and the presence of personnel trained to react to accidental spills or irregular emissions and capable of managing waste and providing oversight on its handling. By these criteria, progress has been made in Latin America and the Caribbean with regard to regulations, specifically, prohibitions on the importation of hazardous wastes and implementation of prior notification procedures for transboundary movements.

It is a recognized fact that hazardous wastes are being moved from developed countries to Latin America and the Caribbean in violation of the Basel Convention. Recent operations to detect and stop these flows—for example, illegal shipments of hazardous waste from the United Kingdom to Brazil falsely declared to be polymers for recycling—make it clear that this problem has not been eliminated. However, the legal and institutional support provided by the Basel Convention is essential to eliminating such practices. The success of the above-mentioned operation was the result of intense inter-governmental coordination, as well as coordination between Government, civil society institutions and the communications media. Also figuring in this equation has been cooperation, within the Convention framework, between the Governments of sending and receiving countries.

With regard to the safe recovery and recycling of hazardous wastes, reports from the region's countries to the Basel Convention in 2005 showed that 10 of the countries had policies in effect, 7 were formulating such policies, and 4 still lacked any such policy. Only one country reported that it had adequate facilities to treat waste oil. The vast majority of countries in the region lack facilities to treat, dispose of or recycle these substances (OAS, 2009).

For the purposes of providing technical assistance, promoting technology transfer and fostering capacity building, the Basel Convention has regional centres in Argentina (for South America), El Salvador (for Central America and Mexico), Trinidad and Tobago (for the Caribbean) and Uruguay (the regional coordinating centre). The funding for these centres needs to be strengthened.

The initiative on the Mobile Phone Partnership Initiative (MPPI) is being put in practice in the framework of the Basel Convention Partnership Programme. Its purpose is to foster sound management of used mobile telephones and those that have reached the end of their useful life. For computer equipment, the Partnership for Action on Computing Equipment (PACE) is now in operation, with the participation of Argentina, Brazil, Chile and Mexico. This initiative functions as a forum for Governments, industry, non-governmental organizations and universities to address the environmentally sound management —reconditioning, recycling and disposal— of computer equipment at the end of its useful lifetime.

In 1992, six of the Central American countries signed and ratified a Regional Agreement on Transboundary Movement of Hazardous Wastes, under which the countries commit to adopt appropriate legal, administrative and other measures within their jurisdictions, in order to prohibit importation and transit of hazardous wastes to Central America from countries participating in the agreement. This regional initiative is based on the Basel Convention.

Some of the most important issues facing the region include: stopping illicit traffic of hazardous waste; training customs officials and enforcement personnel; fostering awareness among judges responsible for punishing violations of this type; improving legislative and regulatory frameworks; providing infrastructure for the handling of waste (including establishing facilities for monitoring and analysis); obtaining funding; and educating and enhancing awareness in the public and private sectors.

2. Implementation of the Rotterdam Convention

The Rotterdam Convention, which has been in force since 2004, establishes a procedure for prior informed consent (PIC) for the importation of hazardous chemicals. The 40 products on the list include 25 pesticides, 4 extremely hazardous pesticides and 11 industrial chemicals; other products may be added in the future. Whenever the Conference of Parties to the Convention decides that a given product is to be subject to prior informed consent, the Secretariat circulates a document to the countries containing information on the product, and the countries provide responses indicating their positions on importing it. The Convention also requires exchange of information between the parties: they are to notify the others of any regulatory action taken with respect to the products listed in Annex III to the Convention, which are subject to PIC, as well as with respect to other chemicals. Table V.2 summarizes the state of implementation of the instruments through which these two functions of the Convention are carried out in the region —i.e., the response to importation issues and notifications of regulatory actions.

Brazil has a system for systematic response on importation of restricted substances. Moreover, its computerized foreign trade registry program (SISCOMEX) is an important tool for controlling imports, pursuant to the obligations established under the Rotterdam Convention.

Table V.2
LATIN AMERICA AND THE CARIBBEAN: IMPLEMENTATION OF THE ROTTERDAM
CONVENTION UP TO 2009

| | Responses on imports of PIC products | | Complete notifications of regulatory actions | |
|------------------------------------|---|-------------------------|--|---------------------------------------|
| | Pesticides | Industrial chemicals | Chemicals <i>not</i> included in Annex III | Chemicals included in Annex III |
| Argentina | 28 | 11 | 0 | 0 |
| Belize | 28 | 0 | 0 | 0 |
| Bolivia (Plurinational State of) | 11 | 0 | 0 | 0 |
| Brazil | 28 | 11 | 2 | 35 |
| Chile | 28 | 11 | 2 | 0 |
| Colombia | 17 | 0 | 0 | 0 |
| Cuba | 27 | 11 | 2 | 0 |
| Dominica | 11 | 0 | 0 | 0 |
| Ecuador | 27 | 5 | 1 | 5 |
| El Salvador | 19 | 2 | 5 | 3 |
| Guyana | 28 | 11 | 3 | 19 |
| Jamaica | 28 | 11 | 1 | 0 |
| Mexico | 28 | 11 | 2 | 0 |
| Nicaragua | 11 | 0 | 0 | 0 |
| Panama | 16 | 0 | 2 | 24 |
| Paraguay | 18 | 0 | 0 | 3 |
| Peru | 28 | 11 | 1 | 1 |
| Dominican Republic | 14 | 6 | 0 | 14 |
| Suriname | 23 | 1 | 0 | 2 |
| Uruguay | 28 | 11 | 3 | 9 |
| Venezuela (Bolivarian Republic of) | 12 | 6 | 0 | 15 |

Source: Overview of the Rotterdam Convention, a presentation given by the Secretariat in Barbados in March 2009, during the Caribbean workshop on SAICM and related chemicals and hazardous waste instruments, Bridgetown, Barbados, 10-13 March 2009, <http://www.saicm.org/index.php?content=meeting&mid=61&def=4&menuid=>.

Some of the challenges that must be overcome in order to fully implement the Rotterdam Convention in the region are: insufficient administrative capacity to meet the prescribed obligations; lack of tools for promoting harmonization and enabling synergies between the Basel, Rotterdam and Stockholm agreements; and lack of intersectoral coordination. Steps proposed to solve these problems include: training in toxicology and risk assessment; dissemination of information and establishment of mechanisms to ensure the participation and commitment of all stakeholders in implementing the Convention; adoption of measures to actively involve customs services and obtain commitments from the industry; and the creation of incentives for information sharing and collaboration between relevant national authorities (Montreal, 2007). Mexico's national report on tasks that remain to be carried out in order to effectively implement the Convention include: better coordination among stakeholders; training; creation of information systems to track incidents; and registration and notification in cases of pesticide poisoning and environmental exposure to hazardous substances (Federal Government of Mexico, 2009). These challenges are similar to those facing other countries in the region.

Under the Convention's technical assistance programme, and with collaboration from the Food and Agriculture Organization of the United Nations (FAO), training activities have been conducted in the region to promote progress in preparing National Action Plans, and to expand awareness of, and national support for, these initiatives. There have also been meetings with relevant national authorities on the issue of trade in pesticides. The work agenda of the Rotterdam Convention for providing technical assistance in 2009-2011 emphasizes regional cooperation and better use of existing capacities and regional networks, such as the regional offices of FAO and UNEP and the regional centres of the Basel and Stockholm Conventions. (The Rotterdam Convention has no regional centres.)

Box V.1

REDUCING RISKS ASSOCIATED WITH PESTICIDES

The use of polluting pesticides in agriculture is one of the main sources of chemical contamination in the region. A number of these products are the object of the international conventions reviewed in this section. The serious consequences of pesticide pollution have led various countries in the region to ratify the international conventions and, in the framework of these agreements and of national priorities, to implement legislation to eliminate the production, importation and use of hazardous pesticides and to eliminate stocks of prohibited products, among other measures. Instructive in this regard, for example, is Colombia's national report, and the measures adopted under its Environmental Policy Guidelines. In some countries, actions have also been taken to reduce the use of agrochemicals. In Cuba, as a result of initiatives in this regard, such chemicals are used on only approximately 10% of crops (Ministry of Energy, Environment and Telecommunications, 2009). Brazil put in place a plan to monitor the health of populations exposed to toxic agrochemicals.

The International Code of Conduct for the Distribution and Use of Pesticides, prepared by FAO and signed by a majority of the region's countries, provides a frame of reference for pesticide management.^a It sets voluntary standards for the conduct of public- and private-sector organizations that play a role in distributing or using pesticides or that are linked to the trade in, or use of, these substances. The Code was adopted in 1985, and later revised, with a new version published in 2002. It includes provisions relating to the prior informed consent procedure established in the Rotterdam Convention, and addresses other positive developments in international standards and a number of ongoing problems in pesticide management. The revision also incorporated the concept of "life cycle" management of pesticides. There has been progress in the region in terms of the Code's parameters. Standards on pesticides are more advanced than they are for other toxic chemicals. As in other developing regions, however, many countries do not fully enforce their national pesticide legislation, due to lack of funding and technical capacity.

Some particularly important issues in pesticide management for the region include:

- Cross-border effects. The use of hazardous pesticides can have cross-border repercussions, highlighting the need for regional measures. In this connection, in 2008 the Central American Council of Ministers of Agriculture, Environment and Health approved the Regional Environmental Strategy. One of the Strategy's essential elements—sustainable land management—includes measures such as the identification and creation of technological options for rationalizing, reducing and replacing the use of agrochemicals and preventing the improper use of persistent organic pollutants. Another strategic pillar—agro-environmental businesses—deals with promoting clean agricultural production. A project is also in progress to reduce pollution in the Caribbean Sea from pesticides used in agriculture on the Caribbean slopes of Nicaragua, Costa Rica and Colombia (Ministry of Energy, Environment and Telecommunications, 2009). Water quality is being monitored, and demonstration projects are being conducted to test technological solutions for more rational pesticide use for key crops. Businesses and research firms play an important role in this process.
- Hazards related to deposits of obsolete pesticides:^b Pesticides are often inadequately stored, exposing people to their harmful effects. Moreover, when these substances enter the soil and water, they turn these resources into hazardous wastes. The following table provides an estimate of the stocks of obsolete pesticides in Latin America and the Caribbean, in comparison with other regions.

LATIN AMERICA AND THE CARIBBEAN: STOCKS OF OBSOLETE PESTICIDES

| Region | Stocks (kg) |
|---------------------------------|-------------|
| Latin America and the Caribbean | 11 283 594 |
| Eastern Europe | 240 998 000 |
| Middle East | 4 528 211 |
| Asia | 6 462 655 |
| Africa | 27 394 660 |

Source: Food and Agriculture Organization of the United Nations (FAO): <http://www.fao.org/WAICENT/FAOINFO/AGRICULT/AGP/AGPP/Pesticid/Disposal/en/49274/103415/index.html>.

Many of the region's countries have passed specific legislation and created institutions to implement it, but there are major deficiencies in funding for the purpose, as well as a lack of technical capacity and infrastructure. In this respect, challenges facing the Caribbean are representative of broader regional challenges (Williams, 2007). Due to problems of institutional capacity and infrastructure, substances prohibited by international agreements have accumulated in deposits, many of which have yet to be identified. In addition, most of the countries do not provide for any regulation of these deposits. There are few inventories of deposits, and those that do exist have been produced by private entities in a decentralized fashion.

In the Caribbean subregion, authorities in Barbados have initiated a programme to strengthen the Government-run laboratory for detecting persistent organic pollutants (POPs) (Government of Barbados, 2009). One serious problem in this subregion is the insufficient infrastructure. There is a serious lack of facilities designed to store pesticides and other obsolete chemicals, and inspection of existing facilities is inadequate. Trinidad and Tobago's National Hazardous Waste Inventory (2003), which was produced by the Caribbean Environmental Health Institute (CEHI), showed that obsolete pesticides are stored in places such as private laboratories, agrochemical laboratories and sugar cane-growing facilities, in containers that are often seriously compromised. The FAO Programme for the Prevention and Elimination of Obsolete Pesticides provides assistance for addressing the problem of toxic waste containers, as part of an effort to improve the management of contaminated soil.

- Handling of containers for pesticides (obsolete and current). This issue is related to the preceding one, since empty pesticide containers hold pesticide residues, and thus constitute a risk to human health and to the environment if not properly handled. Dangerous disposal practices are common in many countries. These include re-use, destruction and burial of containers in rural areas, disposal in inadequate landfills, and incineration without the necessary technology and precautions. Some countries have promoted proper handling of pesticide containers through triple washing and by building centres for the collection and reconditioning of the containers (Martínez, 2005). Brazil, in particular, has specific standards on the handling of pesticide containers, and has defined responsibilities for proper handling.
- Pesticide residues in foods: These represent a danger to consumers. The Codex Alimentarius sets caps on residues of specific types of pesticides in food, following the recommendations of the FAO Panel of Experts and a designated group at the World Health Organization (WHO). Thirty-three of the region's countries are members of the Codex Commission. As in other aspects of chemicals management, the implementation of these systems is constrained by developing countries' lack of capacity to monitor residues, primarily due to a lack of adequate laboratories. Although progress has been made in controlling residues in exported products, there is, as yet, no satisfactory oversight of production for the domestic market. This has created double standards, a situation that is unacceptable from the perspective of food safety. In some countries, such as Barbados, investments are being made to strengthen the capacity of national laboratories to verify POP levels in blood samples, breast milk and air (Government of Barbados, 2009).

^a See the Codex text at: http://www.fao.org/fileadmin/templates/agphome/documents/Pests_Pesticides/Code/Spanish.doc.

^b For additional information, see: <http://www.fao.org/WAICENT/FAOINFO/AGRICULT/AGP/AGPP/Pesticid/Disposal/es/what/index.html>.

3. Implementation of the Stockholm Convention

The Stockholm Convention on Persistent Organic Pollutants (POPs) promotes coordinated international action to eliminate or reduce the emission of these pollutants in the environment. It also provides for aid to developing countries and transition economies for progressively eliminating the use of these substances, as well as the stocks of certain products. The Convention initially covered 12 substances or groups of substances considered to be POPs (including dioxins, furans, DDT and other pesticides, and polychlorinated biphenyls, or PCBs). Nine other substances were added in May of 2009.

Of the 29 countries in the region that have signed the Convention, only 15 have presented national implementation plans—one of the obligations assumed under the Convention (see table V.3).⁵⁹ An assessment of the technical assistance required in order to make these national plans a reality showed that the region faces other obstacles that must be overcome. These include insufficient monitoring and investigation capacity, problems in the final disposal of POPs, limited dissemination of information, and weakness of legislative and institutional frameworks (Stockholm Convention Secretariat, 2009; UNEP, 2008a). There are, at present, a number of projects in progress to help the countries of the region meet their monitoring commitments as outlined in the Stockholm Convention. These are being financed by the Quick Start Programme and by the Global Environment Facility (GEF).⁶⁰

Table V.3
NATIONAL IMPLEMENTATION PLANS (NIPs) FOR THE STOCKHOLM CONVENTION, BY REGION

| | Latin America and the Caribbean | Africa | Asia-Pacific | Central and Eastern Europe | Western Europe, others | Total |
|--|---------------------------------------|--------|--------------|----------------------------------|------------------------------|-------|
| Parties | 29 | 48 | 44 | 19 | 21 | 162 |
| National implementation plans presented | 15 | 30 | 23 | 11 | 20 | 97 |
| Percentage | 52 | 47 | 52 | 58 | 95 | 60 |

Source: “Stockholm Convention on Persistent Organic Pollutants - Overview and Status of Implementation”, Secretariat of the Stockholm Convention, Barbados, March 2009, updated with information available at <http://chm.pops.int/>.

The Convention also requires periodic reports on progress in implementing the agreed measures, and on the quantities of POPs, listed in the annexes to the Convention, that are produced, imported and exported. Until the end of 2009, only Argentina, Antigua and Barbuda, Brazil, Chile, Costa Rica, Mexico and Uruguay have submitted reports.⁶¹

⁵⁹ The national reports contain detailed information on the implementation measures adopted by the Stockholm Convention Secretariat, in the format established by that body.

⁶⁰ See: www.chem.unep.ch/pops/GMP/LAC/default.htm.

⁶¹ See: <http://chm.pops.int/Countries/NationalReporting/tabid/254/language/en-US/Default.aspx>.

The absence or inadequacy of available data is a significant obstacle to implementing the Stockholm Convention in the region (UNEP, 2008a). Progress in this area includes establishing inventories of dioxins and furanes in Argentina, Chile, Cuba, Ecuador, Mexico, Nicaragua, Panama, Paraguay, Peru and Uruguay. A number of the region's countries, including Argentina, Chile, Cuba, Ecuador and Uruguay, already have preliminary inventories of PCBs, but these need to be enhanced.

The region has advanced significantly in prohibiting the 12 substances initially covered by the Stockholm Convention, and it now faces the challenge of taking similar action with regard to the 9 substances added in 2009. Another major challenge is the task of managing stocks of obsolete products (see table V.1). The products to be evaluated by the Persistent Organic Pollutants Review Committee, subject to prohibition under the Convention, include endosulfane, which is used in some countries in coffee and soy growing, among other applications, and short-chain chlorinated paraffins, which are used, among other things, in the metal processing industry.

Latin America and the Caribbean have four regional centres that provide technical assistance, promote technology transfer and conduct training to ensure implementation of the Convention. These include the State of São Paulo Environmental Agency (CETESB), in Brazil, the National Environmental Research and Training Center (CENICA), in Mexico City, the Centre for Research and Information on Drugs and Toxic Chemicals (CIIMET), in Panama City, and the Technology Laboratory of Uruguay (LATU), in Montevideo. Adequate financing for these centres is essential to their effectiveness.

Regional priorities for implementing the Stockholm Convention differ from one country to another, according to the country's particular circumstances. In South America, some of the major tasks to be addressed include:⁶²

- Achieving ongoing reductions of furane and dioxin emissions.
- Identifying, managing and gradually eliminating equipment that currently uses PCBs.
- Creating a Pollutant Release and Transfer Register (PRTR) and a complete inventory of POP pesticides and other chemicals.
- Reducing the level of agricultural POPs in the environment and in foods, and eliminating reserves of these chemicals.
- Ensuring sustainable management of contaminated sites under environmentally appropriate conditions.

⁶² "Actualización del estado de aplicación de cada Convenio en la subregión", a presentation by the Secretariats of the Basel, Stockholm and Rotterdam Conventions at the Regional Workshop on Building Awareness and Strengthening Cooperation and Coordination in Implementation of the Basel, Stockholm and Rotterdam Conventions, in Montevideo on 23-25 November 2009. <http://chm.pops.int/Programmes/TechnicalAssistance/hrTrainingWorkshops/SouthAmerica/tabid/662/mctl/ViewDetails/EventModID/1007/EventID/82/xmid/2551/language/en-US/Default.aspx>.

- Disseminating relevant information and building awareness regarding the adverse effects of POPs.
- Building the analytical capacity needed for oversight of POPs.
- Strengthening the legal framework and guidelines for handling of POPs.

D. PRODUCTION OF CONSISTENT AND INTEGRATED DATA: POLLUTANT RELEASE AND TRANSFER REGISTERS (PRTRs)

Pollutant Release and Transfer Registers (PRTRs) are one of the instruments for producing consistent, integrated data on chemicals. These databases on emissions and transfers of potentially hazardous chemicals include information on the nature and quantity of the emissions and transfers involved. Such information is collected at the principal sources of contamination (industrial plants, as well as diffuse sources, such as those involving agricultural activity and transportation). In general, they cover air, water and soil contaminants, and wastes transported to treatment and disposal sites.⁶³ PRTRs are key instruments to ensure that civil society has access to environmental information, while serving as instruments for Governments to manage chemicals and work to meet commitments assumed under multilateral agreements. They also facilitate the process of constructing national inventories and prioritizing action on sources of pollution.

Since the early 1990s, various national and regional organizations have developed systems within the region to collect and disseminate data on emissions and transfers of toxic chemicals from industrial facilities. Mexico pioneered the establishment of PRTRs in the region, a process influenced by its commitments under the North American Free Trade Agreement (NAFTA). Mexico's PRTR includes information on emissions and transfers from industrial plants subject to federal regulation, including automotive, cement, chemical, electrical, oil, iron and steel, and paper plants.

Chile developed its PRTR proposal between 2002 and 2005, and the system began operation in 2008. Chile's PRTR will be strengthened, with regard to POPs, through funding from GEF and support from UNITAR and UNEP, in a project that also provides for designing national PRTR systems to report POPs in Peru and Ecuador. Chile and Ecuador have also developed strategies to integrate data on mercury emissions in their POP inventories. Panama is in the process of designing a national PRTR with support from the Trust Fund of the SAICM Quick Start Programme and UNITAR. The country has a strategy for making mercury emissions reporting part of a future national PRTR.

Trade agreements have been an important force driving PRTRs in the region. In addition to the relation between Mexico's PRTR and NAFTA, the process in Chile was influenced by its free trade agreement with Canada. Currently, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and the Dominican Republic are beneficiaries of a

⁶³ See: <http://www.unitar.org/cwm/es/node/101>.

cooperation programme with the United States, in the context of the Dominican Republic-Central America-United States Free Trade Agreement (CAFTA-DR), for the development of PRTRs. These countries have conducted an assessment of legal, institutional, administrative and technical infrastructure relevant to their national PRTRs and to implementing these in the public and private sectors (on the Costa Rican experience, see MINAET, 2009), with support from UNITAR and the United States Environmental Protection Agency (USEPA). Other projects are underway in the region in the context of CAFTA-DR, in coordination with UNITAR, CCAD and the United States Agency for International Development (USAID) and USEPA. These provide for implementation of a subregional PRTR in seven Central American countries and the Dominican Republic, as one of the goals set forth in the CCAD Environmental Plan for the Central American Region (PARCA) 2010-2014.

However, most of the countries do not yet have wide-ranging systems with rigorous and systematic data entry systems that can provide for accessing and sharing information (Salinas, 2007).

E. IMPLEMENTATION OF THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS

The Globally Harmonized System (GHS) of Classification and Labelling of Chemicals is a classification of chemicals based on types of hazards. It harmonizes the information collected and disseminated on the subject, with the goal of making information on product hazards and toxicity of chemicals available and accessible, so as to make it possible to implement measures to protect health and the environment when these substances are handled, transported and used. Universal adoption of the system will facilitate communication and actions in responding to accidents. The GHS is also a basis for harmonizing regulation of standards at the national, regional and international levels, and will help ensure secure trade in the products involved. The first edition of the GHS was published in 2003, and it has been revised periodically. The third edition was available as of July 2009.

Implementation of the GHS involves actions in a number of sectors. Transportation, industry and agrochemicals, as well as the participation of civil society and labour issues, stand out as the most prominent areas to be addressed. In relation to the transportation of hazardous products in the region, the four MERCOSUR countries are applying the MERCOSUR Agreement on Transport of Dangerous Goods (1994), based on the seventh edition of recommendations on the transport of hazardous goods

—United Nations Model Regulations. The Andean Community (Colombia, Ecuador, the Plurinational State of Bolivia and Peru) has developed a regulatory project based on the thirteenth edition of the Model Regulations, which is in the process of being evaluated. Chile has implemented the GHS for the transportation of hazardous materials. In other sectors, the countries have moved forward in building awareness, training, establishing standards for reporting and certification, and conducting sectoral studies. Implementation of the GHS has been identified as a priority by the MERCOSUR Ad Hoc Group on the environmental management of

chemicals.⁶⁴ In the framework of the cooperation between MERCOSUR and the European Union, the MERCOSUR programme to support the process of economic integration and sustainable development (ECONORMAS MERCOSUR) provides for assistance in implementing the GHS (Government of Argentina, 2009). In the Central American subregion, only Nicaragua has worked to develop an institutional assessment of existing national capacities to identify deficiencies and areas that need strengthening in order to successfully implement the GHS, disseminate GHS information, and train Government officials and people from different sectors involved in the registry, control, management and marketing of chemicals.

Latin America and the Caribbean, like other developing regions, is still in the early stages of working to implement the GHS for certification of pesticides (FAO, 2006)

The problems facing implementation of the GHS include: coordination, which has yet to be achieved, among the governmental entities involved and between these and other relevant stakeholders; deficiencies in institutional capacity and training; and grossly insufficient financial resources for implementation (Colombian Ministry of Foreign Affairs, 2009; Bosch, 2007). Efforts to enhance capacities for implementing the GHS have received support through the global partnership that was created for the purpose at the World Summit on Sustainable Development in Johannesburg, and, more specifically, in the context of the UNITAR/ILO Global GHS Capacity Building Programme.⁶⁵ There is major demand for assistance in education and training for GHS implementation. UNITAR and ILO have projects in progress in Barbados (with support from the SAICM Quick Start Programme Trust Fund. Another 15 countries in the region are requesting this type of assistance and cooperation.

Participants at the Third Regional Implementation Forum on Sustainable Development in Latin American and the Caribbean expressed concern that the lack of uniformity in GHS implementation in the different countries could produce trade distortions.

F. PROMOTING PARTNERSHIPS FOR COLLABORATION AND PARTICIPATION AMONG STAKEHOLDERS

Compliance with international commitments assumed by the region's countries, and other initiatives undertaken at the national level to manage chemicals, entail major financial costs and require investing in technical capacity in the public and business sectors, as well as in infrastructure.

1. Technical and financial cooperation

Technical and financial cooperation (including technology transfer) has been a key element in promoting progress. In the coming years, the region's countries will face increasing technical, financial and infrastructure demands, as chemicals management progresses. However, this

⁶⁴ Minutes of the MERCOSUR Sub-Working Group No. 6, March 2006.

⁶⁵ See: http://www.unece.org/trans/danger/publi/ghs/implementation_e.html for information on the implementation of the HGS in the Latin American and Caribbean countries.

will have to be dealt with in a context of reduced resources, aggravated by the consequences of the global economic crisis. More than ever, it is essential to ensure a flow of funds and technical cooperation to meet these demands.

A number of international organizations have carried out technical and/or financial cooperation efforts with the region's countries to ensure various aspects of sound management of toxic substances. Notable in this regard are the Inter-Organization Programme for the Sound Management of Chemicals (IOMC), which includes FAO, ILO, UNEP, the United Nations Industrial Development Organization (UNIDO), UNITAR, WHO, the Organisation for Economic Co-operation and Development (OECD) and, as observers, UNDP and the World Bank. Support is provided according to the areas of activity in which each institution is active: training; international forums to facilitate agreements and define common guidelines and codes; situation analysis; support for the design of policy and instruments; facilitation of information access; communication to promote awareness and mobilize public support; technical assistance in developing and identifying necessary infrastructure; and technology development and transfer. Major cooperation has also occurred in the context of OAS activities.⁶⁶ Other collaborative efforts include: cooperation among the MERCOSUR, as well as among the Andean Community, countries; support from the United States and Canada, directed principally at Mexico, in the context of NAFTA (through the United States Environmental Protection Agency, or USEPA); and USEPA support for CAFTA-DR countries. The Central American Commission for Environment and Development (CCAD) has conducted various initiatives in Central America with support from other technical and financial cooperation organizations.

The only specific financial mechanism of SAICM is its Quick Start Programme, which supports initial capacity-building activities through a trust fund made up of voluntary contributions. The fund has a limited lifetime and is administered by UNEP. It is open for contributions until 2012, and disbursements can be made until 2013. Between May 2006 and September 2009, 214 requests were received, with 92 projects approved in 85 countries, for a total of US\$ 18.4 million. The region received approximately US\$ 4.4 million after the sixth round of the Quick Start Programme Trust Fund, in April 2009.⁶⁷ The projects are listed in the Information Note of the SAICM Secretariat. Since September 2009, three additional projects have been approved—in Barbados, Chile, and Saint Vincent and the Grenadines. However, the Quick Start Programme covers only a minimal part of the SAICM activities. A key task for the region is to establish a mechanism that goes beyond the Quick Start Programme, and that makes it possible to replicate, provide continuity for and expand the initial SAICM activities—particularly after the Trust Fund closes, but above all to underwrite activities not covered by the programme, such as the creation of infrastructure.

⁶⁶ In addition to the above-mentioned document (OAS, 2009), in order to approve the formulation of regional approaches to sound chemicals management, the OAS has created an online database on the use of different persistent toxic substances (including persistent organic pollutants, heavy metals and other substances) in Latin America and the Caribbean. The goal is to make this a tool for assessment and integral management of chemicals and hazardous wastes throughout their life cycle, thus providing a useful aid to decision-making.

⁶⁷ The Caribbean countries are able to take advantage of the European Commission's capacity-strengthening programme, which is associated with the Multilateral Environmental Agreements (MEAs) in the ACP (Africa, the Caribbean and the Pacific) countries, through the Quick Start Programme.

The Global Environmental Facility (GEF) made a major financial contribution. This organization played a key role in the successful implementation of the Montreal Protocol, and continues to be an important player in the ongoing efforts to eliminate substances that damage the ozone layer. It has also been a major actor in the implementation of the Stockholm Convention. Of 149 projects worldwide, aimed at implementing the Convention, 28 are in Latin America and the Caribbean, with funding for these projects totalling US\$ 13 million. There is currently an opportunity to include the issue of chemicals in the Fifth Replenishment of the Fund. For this, action by the countries participating in the GEF Assembly is vital. At present, the only initiatives eligible for GEF funding are those related to POP and chemical contamination that affects biodiversity, climate change, desertification and land degradation.

2. Public-private partnerships and business initiatives

As in other areas vital to sustainable development, and as recognized in the Dubai Declaration, encouraging private initiatives and the participation of civil society are key elements in public-private partnerships for chemicals management. The region has had varying experiences with regard to agreements between Governments and firms —or groups of firms— aimed at implementing the objectives contained in legislation and international agreements. Mexico's experience demonstrates the effectiveness of coordinated efforts between the public and private sectors to reduce the adverse effects of chemicals. The region's major chemicals firms are participants in the global Responsible Care programme of the International Council of Chemical Associations (ICCA), which promotes effective management of chemicals throughout the value chain, e.g., through product stewardship systems, transparency in industrial activities and global harmonization between programmes of different businesses around the world.⁶⁸ These objectives are aligned with the SAICM objectives.⁶⁹ The Third Regional Forum on Sustainable Development emphasized the importance of expanding funding by the chemical industry for handling of the substances that it produces.

An innovative example of the role of the private sector in chemicals management is the chemicals leasing model implemented in Mexico with support from UNIDO, providing for manufacturers and users to share responsibility for products. Instead of the traditional purchase-sales arrangements, this model calls for selling the benefits of a product throughout its life cycle, rather than merely selling the product itself, thus encouraging collaboration between producer and user. This has helped to reduce the consumption of chemicals, and has encouraged the replacement of chemicals by less hazardous substances, while promoting improved management of emissions and residues (UNIDO, 2008).

Nevertheless, there continue to be vast differences, within the region, between large companies with access to capital and technology and small and medium-sized enterprises (SMEs) that, in many cases, find it difficult even to comply with existing standards, due to lack of knowledge or resources. One example of an effort to enlist the participation of SMEs in managing chemicals is Brazil's "PreparAR" initiative, which was conceived as a way of

⁶⁸ <http://www.icca-chem.org>.

⁶⁹ <http://www.ciqyp.org.ar/templates/default/index.php?archivo=noticias&pagina=43>.

bringing these firms into the Responsible Care regime. Through cooperation with larger firms, the project helps smaller companies implement better environmental, health and safety systems (ICCA, 2008).

The private sector should assume a major role in preventing, preparing for and managing risks related to industrial accidents caused by chemicals. Current initiatives in this area are described below. These receive support from organizations in the international community, and seek to strengthen institutional capacity through guidance, training and consultation on legal frameworks.

- The process and programme known as Awareness and Preparedness for Emergencies at the Local Level (APELL) was implemented by UNEP, with support from industrial associations. It is a modular, flexible tool for preventing accidents and minimizing their effects. The APELL approach, which is supported by the International Council of Chemical Industry Associations has been implemented in Latin America, with successful pilot projects in Bahía Blanca⁷⁰ (Argentina), São Sebastião⁷¹ and Maceió (Brazil), and Barranquilla⁷² and Cartagena⁷³ (Colombia). Due to lack of national support, however, these experiments have not been replicated.
- UNEP implemented an initiative to promote the creation of a flexible framework for chemical accident prevention and preparedness. It provides orientation to Governments to support the formulation, review and strengthening of prevention and preparedness programmes, and uses an approach that takes account of multiple stakeholders at the national level, while promoting cooperation between Government and business.⁷⁴
- The Responsible Production programme involves the business community in all stages of the production chain to promote safer manufacturing practices, more effective communication regarding risks, and better preparation for emergencies. It is conducted under the guidance of a group of international experts comprising representatives of the Ibero-American Programme on Science and Technology for Development (CYTED) and the Brazilian Chemical Industry Association (ABIQUIM). This initiative primarily targets small and medium-sized firms that handle hazardous materials. The world currently has two pilot projects, one of which is in Peru's mining sector; additional activities are scheduled for Mexico and Brazil in 2010-2011.

National and regional development banks could play a more active role in funding public and private measures relating to chemicals management.

⁷⁰ www.bahiablanca.gov.ar/apell.

⁷¹ www.saosebastiao.sp.gov.br/finaltemp/news.asp?ID=N3112009154429.

⁷² www.apellbarranquilla.org.

⁷³ www.andi.com.co/dependencias/ambiental/Documentos/agendabolivar.pdf.

⁷⁴ The Ibero-American Programme on Science and Technology for Development (CYTEC) has worked with UNEP to provide a Spanish translation of the document entitled "Flexible Framework for Chemical Accident Prevention – Guidance for Governments", so that it can be disseminated in Latin America starting in 2010.

3. Non-governmental organizations

The role of non-governmental organizations (NGOs) is also important in a variety of areas, including verification of information in official records and monitoring of progress on initiatives (OAS, 2008). This has been recognized in the various international instruments that make up the SAICM. Some examples of the contributions of these organizations to chemicals management in the region are: the Action Network on Pesticides and their Alternatives in Latin America (RAP-AL)—an effort to develop alternatives to endosulfane; and activities of Health Care Without Harm, whose objectives include encouraging the replacement of mercury in hospitals (IPEN, 2009). However, these organizations continue to face difficulties in accessing information to effectively fulfil their role in chemicals management.

G. REDUCING THE RISKS ASSOCIATED WITH HEAVY METALS

A number of the region's countries have taken measures to reduce contamination from heavy metals—particularly lead and mercury.

The Latin America and the Caribbean countries have succeeded in eliminating leaded gasoline (see chapter IV); the remaining challenge, regarding lead, is that of addressing its effects throughout the product life cycle, and replacing it in products such as toys and paint.

The use of lead in paint was considered an emerging issue by the second International Conference on Chemicals Management (ICCM2). The conference endorsed the idea of creating a global partnership to gradually eliminate the use of lead in paint, and UNEP and WHO were invited to act as the partnership's secretariat. Brazil has had legislation since 2008 establishing maximum levels of lead in paint and other surface materials used in construction, as well as in objects used by children and in schools.

Since 2003, mercury has been recognized as a contaminant meriting attention at the global level, and has been the focus of multiple efforts by countries and international organizations. In Latin America and the Caribbean, a first step towards controlling this substance has been to establish inventories of mercury emissions. With the support of the United States USEPA, UNEP and UNITAR, Chile, Ecuador and Panama have developed inventories of mercury emissions as part of a number of pilot projects that also included creating a risk management plan for mercury and strategies to incorporate mercury inventories in the PRTRs. These pilot projects are currently being replicated in Nicaragua and the Dominican Republic, and future projects are being evaluated. At the Regional Implementation Forum mention was made of the mercury storage project that is being carried out by UNEP.

As indicated in chapter III, one of the main sources of mercury contamination in the region is its use in gold mining, which has had significant effects on the Amazon basin. This has impacted human health, through the mercury ingested in fish (IOMC/UNEP, 2002). There are alternative technical solutions, and these should be promoted through dissemination

campaigns.⁷⁵ As part of Colombia's National Policy for Cleaner Production, projects have been designed and implemented to promote reengineering of technologies to reduce or eliminate the use of mercury in mining activities (Ministry of Foreign Relations of the Republic of Colombia, 2009). Various projects have been conducted, in cooperation with UNEP, UNIDO, and under the SAICM Quick Start Programme. Currently, UNEP is developing a database on mercury use in mining that relies on information from the countries.

Other mercury-related issues include its use in various products (e.g., hospital products) and industrial processes, storage and management of mercury wastes and management of contaminated sites, as well as the serious health effects on workers exposed to mercury.

There are substitutes for most products that contain mercury. The majority of the region's countries have had considerable success in transitioning to alternative products, particularly with respect to thermometers, sphygmomanometers, thermostats, batteries and switches. The main obstacle to further replacement efforts is the cost of certain replacement products, making them a problematic alternative for people with limited purchasing power in developing countries. The issue of mercury use in hospital products has been the object of projects in some of the region's countries. A pilot project is under way in Argentina as part of a global demonstration project to promote best practices. It is funded by GEF, with support from the World Health Organization, UNDP and the Health Care Without Harm programme, a coalition of institutions and professionals dedicated to health and environmental issues. The pilot project also focuses on eliminating dioxins (Government of the Republic of Argentina, 2009). Costa Rica (Minaet, 2009) has been the site of an initiative to reduce the use of mercury in hospitals. It draws on the participation of the United States Environmental Protection Agency, as part of CAFTA-DR cooperation.

Other products that contain mercury for which replacement technologies are available, but whose adoption entails economic, technical or other obstacles, include lighting devices for LCD screens, dental amalgam, and compact fluorescent lamps. In terms of processes, chlor-alkali manufacturers in the region have plans to convert to mercury-free technologies, but there is a need for guidance on when and where to store remaining elemental and metallic mercury from their plants (UNEP, 2008b). In Brazil, a technology to deactivate mercury cells in the chlor-alkali industry has been put into operation.

In 2009, a decision was made to launch negotiations on an internationally binding regime for mercury. These negotiations began in June 2010, in Sweden. It is important for the Latin America and the Caribbean countries to make their positions and priorities known in a timely fashion, so as to ensure the availability of the technical and financial resources needed to implement provisions that are adopted. Coordination among the Latin American and Caribbean countries in the preparatory phases of the negotiations has already yielded positive results, inasmuch as there is agreement on emphasizing the importance of observing principle 7 of the Rio Declaration on the Environment and Development—common but differentiated responsibilities—and on the need to ensure that commitments include funding and technology flows.

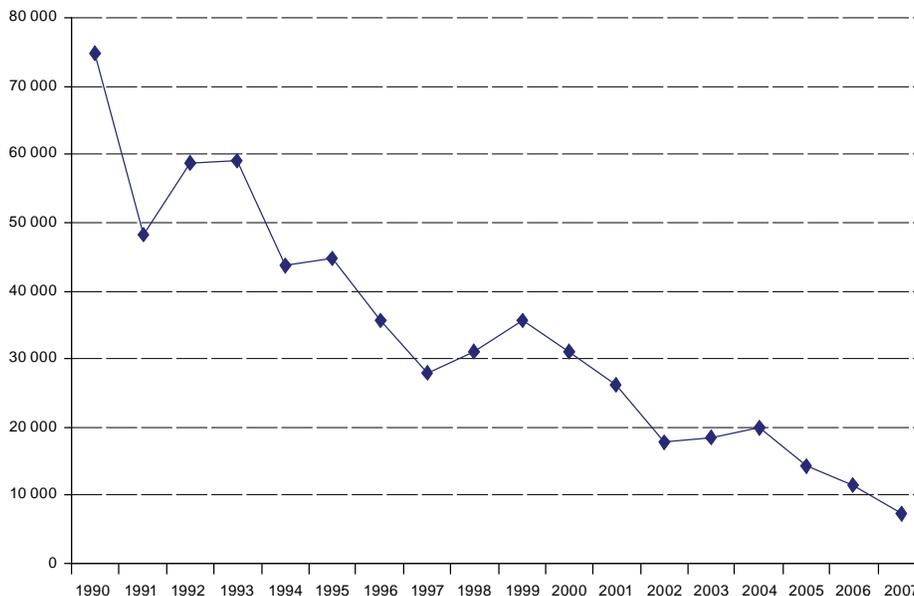
⁷⁵ See UNIDO (1997): *Introducing new technologies for abatement of global mercury pollution, Phase II: Latin America*, quoted in IOMC/UNEP (2002).

With regard to cadmium, UNEP is preparing a review of available scientific information, particularly as related to cross-border movements. UNEP has a programme to support governmental efforts to address the health and environmental effects of products throughout their life cycle, and to seek alternative products.

H. REDUCTION OF EMISSIONS OF OZONE DEPLETING SUBSTANCES (ODS)

All of the region’s countries have ratified the Vienna Convention for the Protection of the Ozone Layer, as well as the Montreal Protocol on Substances that Deplete the Ozone Layer—in most cases prior to 1993. Regional implementation of the International Regime to Protect the Ozone Layer, and the Montreal Protocol in particular, have been considered successful in the region. The use of substances harmful to the ozone layer was reduced by close to 90% between 1990 and 2007—from 74,652 tons to 7,445 tons (see figure V.1) (United Nations, 2010).

Figure V.1
LATIN AMERICA AND THE CARIBBEAN: CHANGING CONSUMPTION OF OZONE DEPLETING SUBSTANCES (ODS) 1990-2007
(Ozone depletion potential (ODP), in tons)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), using statistics from the official United Nations Millennium Development Goals (MDG) site, based on data compiled by the Ozone Secretariat of the United Nations Environment Programme (UNEP). Online, as of October 2009, at: http://ozone.unep.org/Data_Reporting/Data_Access/.

The Multilateral Fund for the Implementation of the Montreal Protocol on ODS has played an important role in funding these efforts. From its beginning until July 2009, the Multilateral Fund managed contributions from the developed countries in amounts totalling US\$ 2.5 billion, to cover the additional costs of eliminating ODS in developing countries operating under protections of Article 5 of the Montreal Protocol. The World Bank, UNIDO, UNDP and UNEP function as implementation agencies for projects submitted by the developing countries, including Latin America and the Caribbean countries. Such projects have promoted technology transfer, while helping to build institutional capacity so that the developing countries can meet their commitments under the Protocol. Examples of activities funded in the region include: formation of institutions; research on users and major investment projects; creation of tools for interaction and problem solving, in close cooperation with the countries; licensing systems to regulate imports and exports of ODS, in conjunction with training customs employees and other relevant national officials to prevent illicit trafficking in these substances; activities to increase public sensitivity and awareness; reengineering of production processes that use ODS; and reengineering and suspension of the production of CFC-12 in plants located in national capitals.

A number of the region's countries have achieved the objectives agreed to in the Montreal Protocol earlier than the stipulated time periods. Examples of advancements towards the elimination of ODS include:

- Costa Rica has succeeded in eliminating the use of methyl bromide, which is used as a pesticide in the cultivation of flowers and tobacco. Technological alternatives were also identified for replacing this substance in the production of cantaloupes and watermelons (Minaet, 2009).
- All household and commercially used refrigerants and aerosol products produced in Mexico at present are free of chlorofluorocarbons (CFCs). Support was provided to over 200 firms in the automobile, construction, shoe-sole manufacturing subsectors and in other applications, to effect technological changes and provide training in the use of alternatives to CFCs. As of September of 2005, Mexico permanently stopped production of CFCs .
- Colombia succeeded in eliminating the use of CFCs in manufacturing household and commercial refrigerators and in polyurethane and polystyrene products; ceased importation of halones (used in fire extinguishers); discontinued use of methyl bromide in agricultural applications, and reduced by 90% the baseline amount of carbon tetrachloride; and reduced methyl chloroform and CFC imports by 90% (as of December 2008). These imports are expected to be eliminated entirely by 2010.
- Cuba succeeded in eliminating the use of methyl bromide in tobacco, thus reducing the use of CFCs by 77% (higher than the country's commitment of 50%).
- In Nicaragua, consumption of CFC dropped by 97% (Marena, 2009).

I. REGIONAL CHALLENGES

Despite the advances cited above, and the fact that some countries have managed to overcome major challenges with regard to chemicals management, the region lags significantly in critical areas. While circumstances vary from one country to another, there has been progress in ratifying international instruments and in designing legislation, policies and programmes. However, the institutional capacities required to implement the commitments undertaken and to define and effectively implement national measures, is seriously deficient. The documents and declarations issued so far by the countries and by the relevant international organizations, combined with the debates engaged in at the Third Regional Implementation Forum on Sustainable Development, suggest that chemicals management is a horizontal issue that encompasses other, additional issues. Following is a listing of some of the challenges and needs that have been identified in connection with meeting the objective of sound chemicals management by 2020 (OAS, 2009; SAICM, 2009b; IPEN, 2009):

(a) Information

- Information available in the region on pollutants is clearly inadequate, and there are few satisfactorily and systematically maintained inventories and registries of pollutants. There are also few wide-ranging, up-to-date studies on the effects of chemical pollutants on human health and on the environment. The lack of information on the use and disposal of dangerous chemicals makes it difficult to build adequate awareness of the costs incurred by pollution and by inaction (in terms of human health, soil degradation, etc.). This, in turn, prevents the issue of chemicals management from gaining priority on the region's policy agendas, and from being duly incorporated in sectoral policy and poverty reduction strategies. Even when the matter is given proper attention, the lack of information is a barrier to effective management of the substances, and to adequate measures to prevent accidents.
- Improving access to information is a necessary condition for the effective participation of civil society in chemicals management efforts. There needs to be investment in education and in the dissemination of knowledge and information on the importance of appropriate chemicals management.

(b) Public agenda, legislation, regulation, policy instruments, and administrative procedures and processes

- The region's public agendas do not generally assign high priority to the issue of pollution from chemicals, and it is not effectively integrated in sectoral and social policies. Even within the environmental policy area, it has been a secondary concern, overshadowed by global issues such as climate change and biodiversity. This has also occurred at the international level, with scant attention to the costs—in terms of chemical pollution—of using technologies that contribute to climate change.

- Governments have not clearly established the importance of chemicals management for achieving the Millennium Development Goals and other development and human rights goals. Sound management is an instrument for ensuring better health conditions (especially for children and mothers), access to potable (unpolluted) water, better air quality, enhanced food security, increased soil productivity, etc. (OAS, 2009). In order to achieve effective chemicals management, it is essential to secure the participation of different sectors —particularly the health, labour and agriculture sectors— at the local, national, subregional and regional levels. There is also a need to incorporate this issue in national development plans and programmes, for which purpose the incorporation of inter-institutional coordination mechanisms could be of assistance.
- Although some countries have progressed in this area, many still lack adequate legislation and regulations on importation, exportation, transport, use, production, emission, storage and disposal of potentially hazardous substances. There is room for improving the administrative procedures and processes involved in implementation, and communication with relevant stakeholders needs to be strengthened
- It is vital to establish mechanisms for assigning responsibility for compensation for damage caused by poor chemicals management.
- While a number of innovative experiments have been conducted, there has generally been little use of market instruments, which can be effective tools for achieving sound management throughout the product life cycle.

(c) Infrastructure to eliminate and monitor pollutants, and to develop replacement products

- In almost all of the region's countries, infrastructure for disposal of hazardous wastes is precarious. There are few laboratories equipped for monitoring, and scant technological capacity for developing alternative, accessible products adapted to local circumstances. Thus, there is a need for investment in infrastructure to facilitate the proper disposal of hazardous wastes and to establish accredited reference laboratories, as well as technology centres capable of developing solutions to specific problems in the region, including finding substitutes for chemicals whose health and environmental risks cannot be mitigated.
- Institutions devoted to the issue lack resources and personnel to effectively meet legal mandates.
- Lack of training creates a serious bottleneck in all of the countries. There are deficiencies in the public sector —e.g., among customs officials— as well as in the private sector, and especially among small and medium-sized firms.

(d) Financial resources and cooperation

- Financial resources must be secured, in the budgets of national Governments, to address national challenges and to contribute to joint regional initiatives.
- In terms of international financial cooperation:
 - A mechanism must be established to finance the SAICM —one that goes beyond the Quick Start Programme, which is due to end in 2013, and that provides resources for projects involving later stages of the SAICM implementation process.
 - International agreements must envisage not only commitments to action, but also commitments to financial assistance to ensure implementation of the measures contained in such agreements.
 - There is a need for more GEF funds earmarked for chemicals management, in order to meet increasing international commitments in this area.
 - Regional development banks have an important role to play in dealing with chemicals management.
 - International resources are especially necessary in the context of the global economic crisis and its repercussions.
- Development banks could be more active in funding measures to improve chemicals management.
- Technical cooperation by international organizations and between countries is essential in order to overcome lack of information, insufficiency of technical, technological and institutional capacity, and policy-making deficiencies.

(e) International and regional articulation

- It is essential that subregional integration schemes —CARICOM, the Andean Community and MERCOSUR— be more involved in the question of sound chemicals management. This is true for various reasons, including the commercial and economic importance of the measures involved.
- Each country must establish solid links between SAICM national focal points and the United Nations Commission on Sustainable Development, in order to maximize the efficiency and effectiveness of the Commission's biennial 2010-2011 work cycle.
- Progress was made in formulating a regional implementation plan at the Second Latin American and Caribbean Regional Meeting on the Strategic Approach to International Chemicals Management. It is important that countries continue to work on preparing national SAICM implementation plans.

- The region's countries must coordinate to work jointly on negotiating a binding agreement to eliminate mercury, as well as on exploiting synergies between the Basel, Rotterdam and Stockholm Conventions.
- The international and regional organizations whose mandates include the issue of chemicals management must take a more active role in identifying and dealing with relevant issues or issues of regional scope, as well as in encouraging the sharing of experience and South-South cooperation.
- In addressing the issue of chemicals at the international level, it is important to consider the function and value of traditional knowledge and practices. It is essential to reach a fair and balanced agreement in this regard, during the negotiations that will take place in 2010 regarding access to and distribution of benefits under the Convention on Biological Diversity.

(f) Stakeholder participation

- Effective chemicals management requires greater participation by civil society, industry, academia and the general public, at the local, national, subregional and regional levels. As mentioned, it is critical to have information available and accessible, so as to enable these groups to take an active part in chemicals management, as contemplated in the Dubai Declaration.
- The private sector should play a key role in funding and implementing necessary chemicals management measures. Governments must provide mechanisms to ensure that businesses contribute to the process and accept their responsibilities with regard to the life cycle of products. Support must be provided to the region's SMEs so that they can better manage production and make improved use of chemicals, implementing best practices throughout the value chain. In this respect, the Latin American and Caribbean countries can draw important lessons from experiences in other regions.
- The communications media play a critical role in bringing information to the general public —consumers and citizens— on the implications of using and producing chemicals, as well as on the benefits of sound management. Countries and international organizations can play an active role in implementing communication strategies to disseminate information on these subjects throughout the society.
- The risks of exposure to chemicals for vulnerable groups (women, children, workers, older people) must be addressed, and these groups must be persuaded to participate in designing and implementing appropriate measures.
- Finally, with regard to international articulation, it should be borne in mind that the region's countries are stakeholders in the measures adopted by third-party countries with which they conduct trade, as either importers or exporters. It is essential to create channels through which countries in the region can participate in the decisions that affect them.

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VI. WASTE ⁷⁶

“Prevent and minimize waste and maximize reuse, recycling and use of environmentally friendly alternative materials, with the participation of Government authorities and all stakeholders, in order to minimize adverse effects on the environment and improve resource efficiency, with financial, technical and other assistance for developing countries. This would include actions at all levels to: (a) Develop waste management systems, with the highest priority placed on waste prevention and minimization, reuse and recycling, and environmentally sound disposal facilities, including technology to recapture the energy contained in waste, and encourage small-scale waste-recycling initiatives that support urban and rural waste management and provide income-generating opportunities, with international support for developing countries; (b) Promote waste prevention and minimization by encouraging production of reusable consumer goods and biodegradable products and developing the infrastructure required.”
(Johannesburg Plan of Implementation, paragraph 22, chapter III: Changing unsustainable patterns of consumption and production, United Nations, 2002)

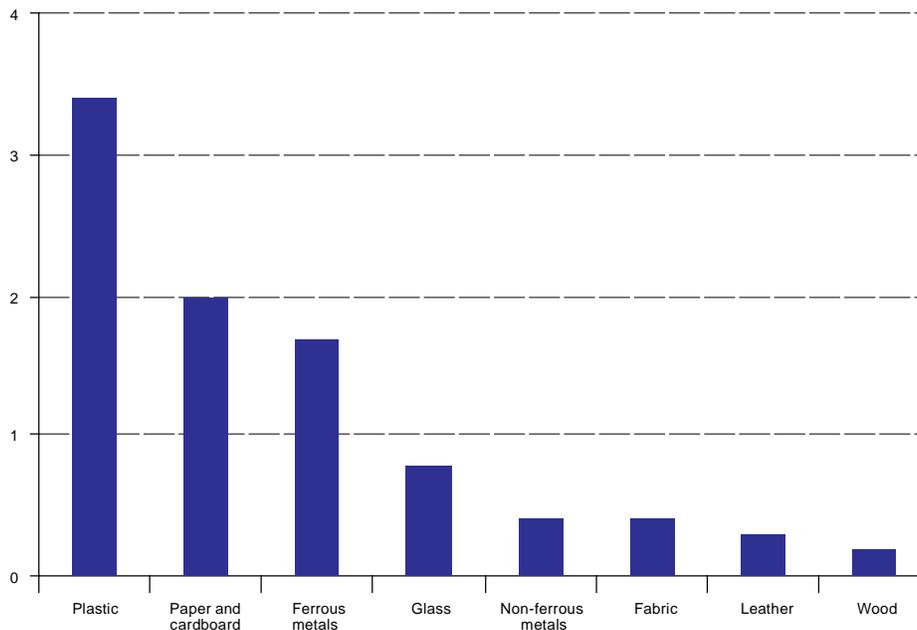
A. DESCRIPTION OF WASTE MANAGEMENT IN THE REGION

Comprehensive waste management is one of the major challenges facing central and local governments, health and environmental authorities, businesses, and society in general in Latin America and the Caribbean. The problems are directly associated with styles of consumption, and with the production methods used in industry, since both of these processes are responsible for increasing both volumes and types of wastes. Solutions must be developed to facilitate waste collection, transportation, treatment and final disposal. Only 23% of the region’s municipal waste disposed is conducted under adequate sanitary conditions (PAHO, 2005). Waste management in the region’s households, hospitals and industries is a highly complex issue. While this chapter focuses on urban household waste, it should be borne in mind that comprehensive management of different types of waste has produced positive results in some countries. In Brazil, legal treatment of waste, as one of the components of sanitation, has provided greater legal security for investments in this sector.

Daily waste generation averages 0.91 kg/inhabitant in the region. This is less than in industrialized countries such as the United States (2.02 kg/inhabitant/day), France (1.29 kg/inhabitant/day) or Japan (1.12 kg/inhabitant/day) (PAHO, 2005). Apart from the potential to implement programmes to influence consumption habits, there are many still-unexploited possibilities for improved final disposal of wastes. Recycling programmes in many cities are in the early stages, as evidenced by the low percentage of recycled materials in the region (see figure VI.1).

⁷⁶ At the Regional Implementation Forum on Sustainable Development, mention was made of the distinction between the Spanish terms “residuos” and “desechos” —which are both generally translated, without differentiation, as “waste”. However, “residuos” include substances that can be processed for re-use, while “desechos” have no secondary use. This distinction is important if one considers that some restrictions, such as those on commercial materials, apply to “desechos” but not to “residuos”. This document uses the term “waste” to cover both categories. A distinction is made when it is important.

Figure VI.1
LATIN AMERICA AND THE CARIBBEAN: RECYCLED MATERIALS
(Percentages)



Source: Pan-American Health Organization (PAHO), 2005.

As a consequence of limited purchasing power, approximately 56% of the region's waste is compostable organic material. This contrasts with figures of 24%, for instance, for the United States. In cities with populations of higher socioeconomic levels, the percentage of waste materials such as paper, plastic and cardboard is higher. In Mexico City, for example, organic compostable materials represent only 44% of all waste (PAHO, 2005).

In terms of public policy on solid waste management and disposal, notable progress has been made in the region, although the situation remains far from ideal. This is clear from national reports to the Regional Implementation Forum, as well as from other recent meetings and documents in the region.

In many countries, this has been made a priority issue, and public policy action has been established as the standard forum for addressing the problem of solid waste. It has become clear that the problem cannot be solved at the municipal level, and that it requires action at the state or national level. Notwithstanding this, private sector participation has, in many cases, had a considerable impact.

As in the case of sanitation, some municipalities may be too small to provide for the most efficient scale for waste collection and disposal. Institutional provisions to facilitate cooperation between municipalities, as well as between subnational states, where relevant, can be highly useful in making certain investments viable, or in implementing needed services. Law 11.107 (2005) in Brazil, for example, opened up the possibility of forming consortia of municipalities or states to deal with this issue.

Approaches used in the region vary in regard to the different aspects of waste management. Some countries are deficient in basic phases of the process, such as collection and disposal. In some cases, although there has been progress, waste collection is incomplete and insufficient, and open-air dumps are common. Measures adopted in all of the region's countries are designed to overcome these problems, with particular focus on the issue of sanitary landfills. Clandestine dumps remain a serious problem, with serious repercussions on health, pollution, soil degradation and tourism (Díaz, 2009).

Collection systems are still inadequate, primarily because of lack of funding. In many countries, service has remained the responsibility of local government, and serious management problems exist. This is evident in poorer municipalities where inhabitants are not able to pay for waste collection. In cases where payment is guaranteed and service has been privatized, collection is usually adequate. However, this does not mean that disposal in proper sanitary landfills is the norm.

In short, the key problems in municipal solid waste management highlight the fact that the fast-paced growth of urban populations has not been paralleled by appropriate long-term planning. The coverage of collection services is limited, there is a lack of appropriate final disposal sites, and inappropriate technologies are being used. Unfortunately, strategies in most of the region's countries are limited to a minimal level of informal recycling, while final disposal in open-air sites is common (Collazos Peñaloza, 2008).

The situation with industrial wastes —hazardous wastes in particular— is more complex, and the issue has aroused major concern. In countries with a higher degree of industrial development, such as Argentina, Brazil, Chile, Colombia and Mexico, regulations have been adopted and are being applied comprehensively. New institutional arrangements have arisen in this context, ranging from laws to standards and regulations. These are closely monitored by health and environmental authorities, by the population and by non-governmental organizations.

1. Collection and disposal

In Latin America and the Caribbean, on average, only 23% of waste is disposed of in sanitary landfills. This is a serious environmental and health problem, since open dumps continue to proliferate. Approximately 284,000 of the 369,000 tons of waste collected in the region on a daily basis end up being disposed of indiscriminately in the environment (Szantó, 2009).

Waste that is not collected is burned or dumped in streets, on highways and in waterways, with no controls in place, causing pollution of the environment and jeopardizing human health. This situation is aggravated by lack of proper management of hospital wastes and other hazardous waste —a problem that is especially acute in cases where these substances are dumped along with municipal waste, as is fairly common practice in a number of the region's countries (Henríquez Gallo, 2009). There are, however, well-tested techniques for improving this situation; some of these involve recovery from dump sites (Szantó, 2009).

Overall, the region still lacks an adequate legal and institutional basis for sound solid waste management. The growth of megalopolises, with their vast amounts of waste, has complicated management of domestic waste to such a degree that special institutional arrangements have been necessary, in countries such as Argentina, Chile, Colombia and Mexico, to deal with the problem.

The rate at which waste is generated in the region —0.25 to 1.5 kg/inhabitant/day— is lower, by a factor of 2 or 3, than that in the industrialized countries. In the United States and Australia, the figure is close to 2 kg/inhabitant/day, and in countries such as France and the Czech Republic it is only slightly lower (Arrieta Bernate, 2009). The density of the waste generated in urban areas fluctuates between 180 and 500 kg/m³. High humidity and high concentration of biodegradable matter are characteristic of the region's domestic waste (Díaz, 2009; Szantó, 2009). In Mexico, the food content of this waste is 32%, in Colombia it is 56%. The corresponding percentage in the United States and France is 20% (Arrieta Bernate, 2009).

Open dumps in the vicinity of airports represent a significant risk, in that they attract large birds. This problem has led to the adoption of standards and measures to prevent bird-related accidents (Páez Piñeras, 2009).

Despite the difficulties, many countries have made progress in various areas —from collection and disposal in sanitary landfills to treatment and use of waste through recycling plants and energy generation. The sections below describe actions taken by some of the region's countries to solve these problems. Some of these initiatives have proven to be sustainable. Although there have been setbacks in some cases due to poor management, the magnitude of the problem has unquestionably stimulated public efforts to study the technical, economic and environmental dimensions of the problem and to find the best possible solutions.

Table VI.1 shows some examples, for selected cities in the region, of the private sector's increasingly important role in providing garbage collection services.

Table VI.1
SOLID WASTE COLLECTION SERVICES PROVIDED BY THE PRIVATE SECTOR
(Percentages)

| Service | Belo Horizonte | La Paz | Lima | Managua | Rio de Janeiro |
|--------------------|----------------|--------|------|---------|----------------|
| Residential | 78 | 100 | 70 | 1 | 40 |
| Commercial | 78 | 100 | 50 | 1 | 0 |
| Scavenging | 90 | 100 | 70 | n/a | 0 |
| Construction | 100 | n/a | 90 | n/a | 100 |
| Recycling | 50 | 100 | 100 | 100 | 38 |
| Sanitary landfills | 0 | 100 | 100 | 0 | 100 |

Source: Hoornweg and Giannelli (2007).

2. Waste treatment and incineration

It is important for the region's countries to evaluate the extent to which particular treatment and disposal methods (including incineration) are suitable to the realities of their respective localities.

Information compiled in 2000 by the Intergovernmental Panel on Climate Change (IPCC), although by no means complete, indicates that the average percentage of incineration of household solid waste is 1% in South America, and 2% in the Caribbean countries, against 6% in the countries of North America. The percentage of composting is as low as 0.3%, making this particular strategy a strictly marginal one at present (IPCC, 2006).

The new forms of treatment and incineration being employed today in the countries of the European Union and North America are, as yet, seldom applied in Latin America and the Caribbean (Hettiaratchi, 2009). However, transnational corporations that use standard technologies for waste treatment and recovery, and that follow international codes of conduct, are demonstrating the viability of practices that contribute to sustainable solid waste management.

Incineration is the most widely used method to treat hospital wastes, which by definition are hazardous. In many municipal hospitals, however, incinerators are in sub-standard condition, while equipment in others fails to meet proper technical standards (Henríquez Gallo, 2009). These problems are present in most of the region's countries (Díaz, 2009). Brazil, however, instituted thorough regulations in this area. In force since the mid-1990s, these regulations have been supplemented by specific provisions, which have been in place since the end of the last century. However, there are vast disparities in the approaches taken by the different states and municipalities (De Andrade, 2009).

One of the mechanisms being used moves beyond sanitary landfills as a waste disposal method, taking advantage of the methane they produce, as will be discussed later in this chapter. Experts are concerned about the problems posed by sanitary landfills—even those that, from a technical perspective, are of the highest quality (Szantó, 2009). Some of the objections to landfills as a solution include their leaching of liquids and the contamination of water basins, their proliferation of vectors that adapt to the conditions created by the landfills, their unpopularity among the population, and the perverse incentives they generate due to the fact that they do not encourage efforts to reduce the amount of waste generated.

3. Recycling and reuse

Experience with recycling and reuse in the region tends to be scattered and isolated. Recycling is often confused with the practice of allowing access to dumps for the purpose of collecting materials—as though this constituted “recycling”. The reality is that, in many of the Latin America and the Caribbean countries, a large number of people depend on such activity for their survival. In some countries, such as Peru and Brazil, this activity has been formalized, in order to improve the living conditions of those who engage in it.

However, recycling has a potential that has yet to be tapped. In Colombia, the percentage of waste that is recyclable ranges between 22% and 31% of the total (Arrieta Bernate, 2009).

Another notable approach, in terms of exploiting the potential value of waste, is Colombia's Industrial Wastes and By-products Exchange (Bolsa de Residuos y Subproductos Industriales, or BORSI) mechanism, created by Colombia's National Cleaner Production and Environmental Technologies Centre. It is designed to encourage trade in waste materials and industrial by-products through two mechanisms: purchase-sales transactions between sources and users, and through recovery, recycling and reintroduction of waste materials for productive use. The BORSI scheme is also being used in Ecuador and Costa Rica.⁷⁷ The Industrial Wastes and By-products Exchange of the Caribbean and Central America (BORSICCA) was created based on the Colombian example.

Many of the region's countries have recycling and reuse campaigns, mostly at the local level. Some of Chile's municipalities have created "green points" for the collection of recyclable materials. In Venezuela, the banking sector has instituted campaigns to reduce waste generation, increase energy efficiency and promote the recycling of paper (Valderrama, 2009). Recycling is strong in Cuba, where the business community is active in recycling metals, plastics, paper, electronic waste and other types of recyclable waste (Leal, 2005).

Coprocessing in the cement industry, for example, appears to be on the rise in the region, and some corporations encourage it in their subsidiaries, with significant environmental and economic benefits (Cortés Otero, 2009). In cement coprocessing, wastes are placed in cement furnaces for final safe disposal, with the operation producing no new residues. The process occurs simultaneously with clinker production (partially burnt limestone). Environmental liabilities are thus reduced, while used catalytic converters, soils contaminated with agrochemicals or hydrocarbons, and other materials serve as inputs.

Recycling is used quite extensively in some sectors, and has itself become a large industry—or, at least, an economic sub-activity in its own right. Thus, for the metallurgy sector, which has traditionally been a recycler because of the nature of its production methods, and, more recently, for the cement and paper industries, recycling has become an important operational strategy. It has even led to technological changes comparable with those occurring in the industrialized countries. In most of the region's countries, however, which are less industrialized, recycling continues to be a marginal activity, albeit one that is important environmentally and for disadvantaged social groups.

4. Methane recovery and use

A number of countries have made progress in the exploitation of methane, which is known to be a powerful greenhouse gas (GHG) with a high potential for increasing global warming. Indeed, it is the second most important GHG. It is a major component of natural gas, however, and is a valuable source of clean energy.

⁷⁷ <http://www.borsi.org/>.

The benefits of methane capture projects have been widely recognized, and include: preventing the loss of a valuable fuel and energy source; improving air quality and reducing odours; and reducing greenhouse gas emissions. Such projects provide a significant contribution to sustainable development. They do, however, face obstacles. Methane emissions levels and their economic consequences are still unknown; and information on available technologies and management practices, as well as training on the use of these technologies, is lacking. Moreover, regulatory and legal structures are inadequate, and there is a limited market and scant infrastructure for the proper handling of methane.

A number of countries have adopted policies in this area, with support from entities such as the United States Environmental Protection Agency (USEPA), in the framework of its Methane to Markets Partnership (M2M)—a programme in which, as of 2009, Argentina, Brazil, Chile, Colombia, Ecuador and Mexico had been involved. The M2M initiative is an international effort that promotes methane recovery and use as a source of clean energy (Ludwig, 2009).

Also of note is the Clean Development Mechanism (CDM) established under the Kyoto Protocol of the United Nations Framework Convention on Climate Change. CDM is an economic or market instrument that allows investors in developing countries to promote sustainable development, while reducing GHG emissions. It offers both Governments and private-sector entities opportunities to develop projects to reduce methane emissions, while at the same time using the gas as an energy source.

More specifically, waste management has great potential for CDM projects in the following areas, to cite only the most important ones: recovery of, and use of, methane from sanitary landfills, conversion of waste to energy, and composting of municipal organic wastes (Leal, 2009).⁷⁸

According to World Bank projections, some of the region's countries with potential to capture methane from sanitary landfills are: Mexico: 1.220 billion m³; Brazil: 1.210 billion m³; Argentina: 580 million m³; Colombia: 320 million m³; and Ecuador: 90 million m³. Successful projects have been reported in Chile (the El Molle, Lo Errázuriz, Lepanto and La Feria projects) and in Mexico (the Monterrey project).

5. Reducing generation of waste

The strategies applied in the industrialized countries, outlined below, highlight the approach that Latin America and the Caribbean needs to adopt. These include:

- Minimizing waste
- Recycling (including biological treatment)
- Reducing the amount of waste deposited in landfills

⁷⁸ In addition to emissions generated by the decomposition of waste, it is important to take into account the methane emissions from livestock, which are of concern because of intensive animal production. There are model experiments being conducted with farms, and these hold the potential for South-South cooperation efforts.

Little progress has been made on the first objective. Chile has made efforts to analyse the issue with a view to creating an economic instrument that encourages the population to generate less waste (ECLAC, 2002).

There is a distinct relation between the issues of waste generation and patterns of consumption and production. This is especially evident in plastics and in the electronics industry, where there has been a tendency to prefer “disposable” packaging. Consumers’ preference for rapidly replacing electronic equipment is striking, and is driven by producers’ policies and by advertising. This results in vast volumes of waste. As in the above-mentioned case of Jamaica, some international agreements on the elimination of hazardous substances have failed to incorporate policy mandates for addressing the treatment of stocks of these products, once the prohibitions enter into effect.

There are also problems due to advertising excesses, which contribute to environmental degradation, especially degradation of the landscape. In this connection, regional action could be developed to reduce the environmental impact of advertising and other market factors. Regional positions with regard to the large industrial groups—for example, the mining, chemicals and automotive sectors— need to be established if the countries’ responses are to be comprehensive and consistent.

Finally, according to available (admittedly incomplete) statistical information, there has been an upward trend in household solid waste generation in the region’s countries, and the situation is similar for industrial and hazardous wastes. In 1996-2006, Mexico was the only country where annual per capita household solid waste generation did not change significantly. In the other countries, it increased, and, as table VI.1 shows, the increase in waste generation paralleled demographic and per capita GDP growth, without observable changes in lifestyle or technology that would tend to uncouple these three variables.

Table VI.2
LATIN AMERICA AND THE CARIBBEAN (SELECTED COUNTRIES): PER CAPITA HOUSEHOLD WASTE
(kg/inhabitant/year)

| Per capita household waste | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Belize | | 168,58 | | | 283,27 | | | 360,84 | 390,71 | 428,99 | |
| Brazil | | | | | 240,30 | | | | | | |
| Chile | 228,40 | | | | 303,90 | 315,85 | 352,71 | 337,84 | 340,38 | 335,57 | 321,79 |
| Cuba | 137,90 | 267,84 | 284,60 | 292,66 | 307,28 | 335,15 | 349,10 | 329,11 | 352,23 | 355,92 | 342,74 |
| Guatemala | | | | | | | 130,30 | | | | |
| Mexico | 273,60 | 246,18 | 242,81 | 242,14 | 237,16 | 240,47 | 253,42 | 247,30 | 257,97 | 261,59 | 264,20 |
| Peru | 50,47 | 51,12 | 56,04 | 55,51 | 55,03 | 57,56 | 58,81 | 81,02 | 79,98 | 71,59 | 75,65 |

Source: Economic Commission for Latin America and the Caribbean (ECLAC) - CEPALSTAT, 2009.

6. Exploiting the energy potential of waste

Brazil has been a pioneer in harnessing energy from waste, and has a number of sanitary landfills that operate under sound technical conditions and that generate electrical energy to varying degrees. In Salvador, Bahia, for example, the Canabrava landfill produces 75 KWh; in Nova Iguaçu, in the state of Rio de Janeiro, the Adrianópolis project produces 9 MW; and in metropolitan São Paulo, the Bandeirantes landfill, which contains 35 million tons of waste, provides 20 MW of installed potential. In Colombia, those responsible for managing a number of sanitary landfills are planning to submit energy recovery proposals in the form of Kyoto Protocol CDM projects.

This process requires moving from so-called “first generation” landfills, which replace open dumps, to “second generation” operations, which include bioreactors that exploit the gas generated (Hettiaratchi, 2009). Developed countries are currently implementing a third generation, with sustainable landfills, or “biocells”. In Latin America and the Caribbean, first-generation solutions continue to be used.

B. ENVIRONMENTAL PROBLEMS ASSOCIATED WITH SOLID WASTE GENERATION AND DISPOSAL

The environmental problems associated with poor solid waste management are well known, and all of the region’s countries have regulations in this area, although in many cases these are obsolete or are inadequately enforced. There is, however, an awareness of the issue, and there have been efforts to move towards a solution. Poor waste management, particularly with regard to open-pit dumps, can have serious health effects, most notably in the form of enteric diseases —typhus, cholera and hepatitis, as well as cysticercosis, trichinosis, leptospirosis, toxoplasmosis, scabies, mycosis, rabies, salmonella and others diseases, depending on local conditions.

Environmental impacts include damage to surface water quality caused by leaching of liquids from waste products in combination with rain-water runoff, with further damaged caused by these liquids percolating into the aquifers. Air quality suffers from gas emissions —particularly biogas (methane)— with its associated effects on climate change. Risk of fire, strong odours from the uncontrolled decomposition of organic matter, proliferation of disease vectors, and poor use and degradation of soils are among the typical environmental impacts from poor management of household solid waste.

The multiple environmental problems associated with dumps combine and increase as treatment and disposal capacity is exceeded, creating serious social consequences. An example of this is the situation at La Chureca, in Managua, Nicaragua, which is said to be the region’s largest inhabited dump. The 40 hectares that it covers are home to 1,200 people, and 3,000 more work there in sub-human conditions, earning US\$ 2 per day. Under international cooperation from Spain, a rehabilitation project to create jobs and better living conditions for this population is being implemented (Díaz, 2009).

There is a correlation between income and per capita waste generation, as shown by a comparison of selected cities in the region (see table VI.3).

Table VI.3
**LATIN AMERICA AND THE CARIBBEAN: PER CAPITA GENERATION OF MUNICIPAL WASTE
 IN SELECTED CITIES WITH MORE THAN ONE MILLION INHABITANTS, 2005**

| Cities | Population (millions of inhabitants) | Per capita waste generated (kg/inhab./day) |
|---|---|---|
| São Paulo | 18.3 | 1.35 |
| Buenos Aires | 12.5 | 0.88 |
| Santiago, Chile | 5.3 | 0.87 |
| Bogota | 6.6 | 0.74 |
| Belo Horizonte | 3.8 | 0.83 |
| Guatemala City | 2.5 | 0.50 |
| Havana | 2.2 | 0.75 |
| Cali | 2.2 | 0.77 |
| Brasilia | 2.0 | 0.75 |
| Medellín | 1.9 | 0.81 |
| Montevideo | 1.3 | 1.23 |
| Córdoba | 1.3 | 1.29 |
| Average waste per capita generated | | 1.048 |

Source: Pan American Health Organization (PAHO), 2005.

In 2005, per capita generation of municipal waste in selected cities of more than one million inhabitants in Latin America and the Caribbean was around 1kg/inhabitant/day. This figure, according to estimates by the Pan American Health Organization (PAHO), was 0.91/kg/inhabitant/day for 2001. This suggests a relationship between economic growth and waste generation, as well as reflecting a lack of public policy to address the problem. The pattern is typical for the region. Chile has carried out studies at the municipal level to propose systems to encourage reduced waste generation, though this has not resulted in the implementation of any actual programmes (PAHO, 2005).

One issue that is important to the small island states whose economies are highly dependent on tourism is illegal trafficking in waste. In Antigua and Barbuda, there has been a proposal to create a regional association to prevent transport of wastes in the Caribbean subregion. It is noteworthy that there has not been broad ratification of the amendment to the Basel Convention prohibiting waste trafficking from the developed nations to developing countries.

C. PROGRESS, OBSTACLES AND BEST PRACTICES

As mentioned above, household solid waste management is seriously deficient in Latin America and the Caribbean. The situation is even more complex with regard to industrial waste. This problem, however, has received priority attention in policy-making, and most of the region's countries have taken action—with the degree of success varying, as is understandable given the economic, social and environmental complexities involved. A number of success stories are described below, including an indication of the difficulties and obstacles that they have faced. This information is based principally on national reports from the countries.

Although there has been progress in waste management in many of the region's countries, there is well-founded concern about the generally precarious state of waste management systems, and about the limited capacity of local governmental institutions to solve the problem. In this context, the use of economic instruments has great potential as a mechanism for reducing waste generation; in certain cases, it could also provide an opportunity for private sector entities to take action.

1. Mexico

(a) Progress

In 2003, the General Law for the Prevention and Integral Management of Waste (Ley General para la Prevención y Gestión Integral de los Residuos, or LGPGIR) was passed; related regulations were published in 2006. In addition, a comprehensive National Programme for the Prevention and Integral Management of Waste was instituted in 2009. The objective of the programme is to foster Mexico's sustainable development through a waste management policy designed to promote changes in the models for production, consumption and management of waste, in an effort to: encourage the reduction and integral management of urban solid wastes, of wastes requiring special handling, and of hazardous and mining/metallurgical wastes. This legal framework is complemented by a Guide for the Integral Management of Municipal Solid Waste and a Guide for Environmental Compliance by Mining Enterprises.

The installed capacity of hazardous waste management operations authorized in the last few years had reached 13.7 million tons/year as of June 2007. The greatest growth has occurred in the recycling infrastructure. In 2000, fewer than 30 companies were authorized to handle hazardous wastes; by 2006, over 200 had been authorized.

(b) Obstacles

The General Law on Ecological Balance and Environmental Protection cites solid waste as the principal source of soil contamination, but it does not take into account contaminants produced by industrial activities, such those from oil refining (including fuels and petrochemicals) or used oils and metals, which are considered hazardous substances.

Poor management of hazardous waste and materials leads to soil contamination and other effects resulting from accidental spills, as well as from ongoing releases into the environment due to poor disposal practices, such as burning, spills, dumping and other improper disposal practices.

Mexico is currently generating an increasingly wide variety of wastes. New products and substances appear in waste, as increasingly sophisticated (and more varied) processes, activities and services develop. The problem of inappropriate management remains unresolved, since there have not been regulatory or other measures instituted to keep pace with the creation of the necessary infrastructure. Waste management involves a wide range of social actors whose interests are affected in different ways, and who react differently, thus adding to the complexity of the challenge.

(c) Best practices

In an effort to take advantage of biogas from sanitary landfills, Mexico has been participating in the Methane to Markets Association (M2M) initiative since 2005. In March of 2006, the country signed an agreement between the Secretariat for Environment and Natural Resources (SEMARNAT), the United States Agency for International Development (USAID) and the United States Environmental Protection Agency (USEPA), for the purpose of carrying out projects for the capture and productive use of methane in Mexico. The USEPA provides M2M support in the form of technical assistance and demonstration projects that promote and create multiplier effects in relevant sectors.

There are currently 30 projects in various stages of the Clean Development Mechanism (CDM) process: 12 are in the proposal stage, 7 consist of registered projects, 2 have pending requests to become official projects, and 9 are currently in the validation process.

2. Colombia

(a) Progress

Through regulatory mechanisms, systems have been created to recover hazardous wastes generated by consumption. Pesticides constituted the first sector to be regulated, under Resolution 693 of 2007, “which established criteria and requirements that should be considered in plans to manage recovery of post-consumer pesticide products”, including containers, packaging and unused pesticides. Resolution 0371 of February 2009 established “the elements that must be considered for plans to manage the recovery of post-consumption pharmaceutical products and expired drugs”, while Resolution 0372, of February 2009, established “the elements that must be included in plans to manage the recovery of post-consumption products, used lead-acid batteries, among other provisions.” This year, Resolution 0503 of 2009 was issued, clarifying Resolution 0372 of 2009, and adopting other provisions.

Encouraging efforts to deal with hazardous waste in sustainable ways is one of the strategies envisaged in the Environmental Policy for the Integral Management of Hazardous Waste and Residues. The strategy focuses on developing instruments to: facilitate access to

exploitation technologies suitable to the country's needs; improve processes designed to reincorporate materials into the production cycle; and discourage informal activity in this area. There has been an increase in the number of firms authorized to exploit and put in place uses for hazardous wastes—from 9 in 2006 to 32 in 2007, growing to 36 in 2008. Resolution 1362 of 2007 created a registry of hazardous waste sources, which will provide data on waste generation and management in individual jurisdictions and help identify and prioritize regional strategies for more appropriate handling of this issue.

The Ministry of Environment, Housing and Territorial Development is using international loans to support the design, construction and optimization of 11 plans that will make use of urban solid wastes in various regions, benefiting over 60 municipalities. The investments total more than CO\$ 800 million through the National Environmental System (SINA II) project, with most projects based on a regional approach.

Moreover, through the Tax Statute, the State is supporting the importation of recycling machinery by exempting it from the value added tax (VAT). Tax benefits of approximately CO\$ 1.062 billion were certified in 2008, representing investments on the order of CO\$ 5.770 billion.

The business sector is also making contributions to the effort. MAC, for example, is a battery recycling company that has a “reverse, or inverse, logistics” programme—an initiative launched by a number of companies to recycle used products.

Locally, there have been some notable successes with closing dumps and converting them into parks, creating new green areas in the process and raising the value of infrastructure and property in adjacent areas. An example of this is the Parque de los Sueños (Park of Dreams) in the municipality of Armenia (Collazos, 2008; Toro Zuluaga, 2009).

(b) Obstacles

Colombia suffers from a lack of comprehensive facilities for the treatment and final disposal of many types of hazardous waste, and needs to identify methods used successfully by other countries for this purpose. It is also important to improve the exploitation and use of recoverable wastes, as well as enhancing efforts to minimize waste generation by promoting responsible consumption.

Among the mechanisms for accomplishing this is the integral solid waste management plan (PGRIS) promoted by the Ministry of Environment, Housing and Territorial Development, since 2004, with support from international technical assistance programmes. To further the process, these programmes contract regional corporations, whose sole job is to provide guidance to municipalities and small manufacturing/processing facilities and to advise municipal working groups on methodological questions (MAVDT, 2009).

An assessment found that 67% of the integral waste prevention and management programmes evaluated needed to be revised and amended, since, despite the fact that their initial designs may have been sound, they have various shortcomings: they are out of date, their projections are largely inaccurate, and there is methodological confusion between activities, projects and programmes, as well as between viable financing plans and

investment plans. Although there has been no lack of assessments in identifying problems, planning has been a weak point. Finally, this mechanism is not being used by municipalities as an ongoing consultative tool (Arrieta Bernate, 2009).

The principal problems currently being reported with regard to integral waste treatment plants concern a lack of planning—the result of failure to conduct market studies. This has led to: an accumulation of materials and a consequent loss of value; failure to bring technology to bear in processing and transforming materials; and operational failures due to management problems and difficulties in distributing costs between final disposal and treatment plants—resulting in a lack of financial sustainability.

Finally, it should be noted that, according to the Ministry of Environment estimates for 2006, 65% of household solid wastes are organic. However, PAHO data indicate that only 2.2% of all such waste is recovered in the Latin America and the Caribbean region, while composting operates on a very limited scale, converting only 0.6% of the organic waste generated.

3. Barbados

(a) Progress

Under the Returnable Containers Act, cash deposits have worked to encourage returns with regard to plastic and other types of beverage containers. The money received for returns encourages this practice, as shown by the high levels of collection and return. In light of the success of this initiative, the Government is exploring the possibility of applying the same principle to other recyclable goods.

The Government of Barbados is also studying the feasibility of generating energy from waste. This could be highly beneficial for the island, since it would simultaneously address the dual issues of waste disposal and energy supply. A law on environmental management (the Environmental Management Act, or EMA) and other complementary provisions are being debated with regard to allocating resources for hazardous waste management for both individuals and commercial establishments.

(b) Obstacles

The Barbados Sanitation Services Authority (SSA) is working with the Solid Waste Project Unit (SWPU) to conduct workshops and promote recycling wherever possible. Thus, although citizens are not given access to the Bulky Waste Disposal Site to recycle materials, they are at times permitted entry in circumstances in which proper conduct can be guaranteed. Various options, including incentives, permits and licenses, are being considered to promote such sites.

The level of infrastructure needed to accommodate recycling is not currently available in Barbados. For example, sorting equipment, specialized trucks, and containers for different types of materials are needed. The private sector is the principal engine of development in this area, with the Government playing a regulatory role.

Another area of concern is illegal disposal and dumping. Trash containers have been placed throughout the country, especially in problem areas such as Bridgetown and other tourist venues. Most of the country's illegal dump sites are in remote ravines. There has been some success in reducing illegal dumping by offering monetary compensation for private recycling efforts, particularly those involving household appliances (refrigerators, washing machines and stoves).

The environmental legislation now being debated includes a section on toxic substances, and covers everything from importation to disposal of toxic substances. Currently, the Environmental Protection Department (EPD) oversees disposal of hazardous waste on a case by case basis, according to a standardized procedure. Disposal is authorized as long as the waste can be neutralized; otherwise, it is exported—under the Basel Convention—generally to Canada. The absence of legislation is one of the principal constraints on the ability of the Environmental Protection Department to function in a range of areas.

Hazardous waste disposal continues to be a daunting problem, due to lack of facilities for managing such waste. The transfer station in Vaucluse, in the parish of St. Thomas, includes hazardous waste storage capacity, but the service is not currently in operation. Once this situation is remedied (in the short or medium term), the Vaucluse Station will be equipped to receive hazardous waste.

4. El Salvador

(a) Progress

El Salvador's Waste Coprocessing project, based on the technique described above, destroys wastes as a part of the cement production process carried out at facilities of the firm Cemento de El Salvador, S.A. de C.V., located in the canton of Tecoma, in the municipality of Metápan (department of Santa Ana).

Coprocessing takes advantage of the high temperatures involved in cement manufacturing (approximately 2000° C) to ensure safe final disposal of wastes, in accordance with national and international environmental standards.

During coprocessing, the waste materials are reduced to elements such as calcium, silicon, iron and aluminium—ingredients needed for the manufacture of cement. The wastes processed include tires, oil (mineral, vegetable and synthetic), treatment-plant wastes, sediment from the bottom of tanks, from chemical processes and from drilling, contaminated water, solvent and hydrocarbon residues, plastics (pure, and those contaminated with lubricants or agrochemicals), expired drugs, textiles, soils, sand, dust, contaminated clays, pesticides, wastes with PCBs, biomass, cardboard and municipal solid waste.

The substances not permitted for coprocessing include: infectious and biologically active medical waste; waste with asbestos that has high concentrations of cyanide; acids; pure minerals; radioactive wastes; and unclassified solid waste. Coprocessing is increasingly widespread in Latin America and the Caribbean. In Chile, the Polpaico Group is employing this process at facilities of its partner firm Coactiva (Porcile, 2006).



5. Brazil

(a) Progress

In Brazil, progress has been made on waste management as a result of regulatory changes under new legislation on sanitation (2007), and through the creation (2005) of the above-mentioned public consortia. Currently, a legislative process is underway to implement a national solid waste policy.

(b) Best practices

In 2008-2009, at the request of the City Government of Novo Hamburgo, UNEP implemented a demonstration project on integrated solid waste management. This was a joint initiative that included the municipality (to guarantee local ownership of the programme) and the Venturi Institute for Environmental Studies (to create local capacity in the country). The project provided a detailed description and quantification of all of the waste flows generated in Novo Hamburgo. In addition, it identified management deficiencies, included a broad survey of the citizenry, and established medium term (2010-2015) and long term (2013-2025) goals.

In the short term, the project would reduce waste generation, as follows: 10% reduction of industrial wastes; 5% reduction of municipal waste; 10% reductions of materials from construction and demolitions; and 100% reduction of segregated hazardous waste. Goals were also established for segregation of organic waste, with targets of 80% for industrial and 50% for municipal waste and recyclables. The long-term goals call for: 90% composting of organic waste, accompanied by biogas recovery; sorting of 90% of inorganic waste at transfer stations, in order to enable recovery of materials; and recovery of 80% of construction and demolition waste at local facilities.

These goals served as the basis for developing an integrated solid waste management plan. In addition to establishing policies, technologies and voluntary interventions, the plan includes descriptions of 30 projects covering various aspects of waste management, such as at-source sorting of waste, trade in residues, waste exchange, generation of methane gas, establishment of an industrial recycling park, and other measures.

Based on the success at Novo Hamburgo, a number of other municipalities have approached the Venturi Institute to request assistance in developing similar plans.

6. Cuba

(a) Progress

Between 2004 and 2007, roughly 75% of the population had access to garbage collection services. In the smallest and most isolated population centres, draft animals are used for this purpose.

Recycling initiatives have received major Government support, due to the efforts of the Union of Raw Materials Recovery Enterprises (Unión de Empresas de Recuperación de Materias Primas, or UERMP) (UERMP, 2003). In addition to expanding traditional recycling efforts, there has been an enhancement of the technological capacities for the recovery of other products previously responsible for environmental pollution, such as accumulators, discarded electronics, etc. In this area, there needs to be a strengthening of commitments to the delivery and collection of materials, as well as to activities that involve the population in the process.

Raw materials recovery from ferrous and non-ferrous metals, glass, plastics, paper and cardboard products increased over these four years.

(b) Obstacles

Problems in recovering materials from waste among the 25% of the population without access to these collection services—principally the rural population—are associated primarily with the deterioration of used vehicles, which cannot be repaired due to lack of replacement parts at maintenance facilities.

In terms of increases in collection of solid waste, there is a wide gap between different provinces in the country. In some, such as Matanzas, Sancti Spíritus, Santiago de Cuba and the Special Municipality of Isla de la Juventud, the volume of solid waste collected has declined—considerably, in some cases. In other provinces, such as Pinar del Río, Camagüey and Las Tunas, volume has doubled, while there have been only slight increases in certain other provinces.

Deficiencies exist in the basic areas of collection and disposal. There is also an evident lack of local Government capacity, and the challenges posed by population growth also demand attention. Other, more specific issues also have to be addressed—for example, inadequate incinerators for hospital waste—and conditions must be created to make it possible to take

advantage of methane generation, while ensuring that the problems of populations living near disposal areas are taken into account. Another important issue relates to the wastes generated by hurricanes, especially in the Central American and Caribbean subregions.

D. CONCLUSIONS

Almost without exception, environmental policy in Latin America and the Caribbean has placed emphasis on solid waste management, due to the multiplicity of consequences it gives rise to. This has led to improved practices, although major deficiencies remain. In addition, new factors, not given sufficient consideration earlier, have arisen. Examples include the possibility of creating new recycling businesses, exploiting the energy potential of waste, contributing to the mitigation of climate change, and producing fertilizers. In order for these activities to be meaningful within a context of sustainability, there must be a change in the approach that has governed the waste disposal “business” in the past few decades, in which “more waste means more profit”. Public policy must encourage a new perspective. This could produce major benefits to sustainable development efforts in a variety of dimensions.

Institutional capacity building at the national and municipal levels must be an ongoing process. It is primarily the municipalities that are responsible for compiling data on this process. However, no official indicators are available, and national authorities collect very little data relevant to this issue.

The importance of linking the waste problem with the issue of sustainable consumption and production must also be emphasized, along with the bioethical issues associated with waste. It is a positive sign that the region has been moving beyond the old concept of “waste”, with its connotations of a terminal process in which disposal is the only form of management. The concept of “residues” has increasingly been supplanting that of “waste”, pointing explicitly to the fact that this is simply a stage of the product life cycle. The by-products of economic activity have a life cycle that goes beyond mere disposal. Residual materials represent both a productive and energy potential, as well as increased possibilities for jobs and income, a potential contribution to addressing global challenges (particularly in the area of climate change) and an incentive for innovation. This broad range of possibilities deserves attention from Governments and private-sector entities.

It is urgent that businesses assume responsibility for the wastes they generate, and for their management of the processes that generate them. This requires moving from traditional thinking to a concept that takes account of the challenges of sustainability. Civil society organizations can play a significant role in this connection. Solutions must also be sought for the problem of informal recycling in the region, and action to bring this activity into the formal sector must be bolstered. Education and bioethics should be part of the approach to waste management.

Private-sector participation in waste management is essential. However, it is important to ensure that this does not become a perverse incentive for generating more waste. The region should take a cue from measures that the European Union has adopted to

implement uniform standards for electronic products and to reduce turnover of equipment. In connection with illicit trafficking in waste, there need to be controls on port entry and exit and training of customs officials.

Political will on the part of Government is needed in order to adopt a positive approach to the problem of solid waste. National waste management policies must be implemented, and there must be a strategy to retain the necessary personnel in the public sector, prevent corrupt practices, ensure that wastes are categorized based on technical definitions, and institute training programmes for municipal personnel, led by experts in the field.

There can be no excuses for improper solid waste management: even more than a sustainable development issues, this is a public health issue. The States must work with local authorities to organize municipalities in efforts to carry out sound waste management. There must be improvements in the *quality* of waste; this involves sustainable-production and consumption practices, as well as proper waste management *per se*. The serious fiscal problem involved in recycling must also be addressed. A full 40% of solid waste consists of packaging. This problem must be dealt with, and businesses must be persuaded to participate in recycling.

Finally, it should be noted that this document does not attempt to impose a hierarchy of importance on the various processes involved in improving waste management; rather, it attempts to suggest what action is necessary on various levels. For example, while the volume of waste handled through final disposal must be reduced, the reduction and recycling of waste, along with sorting at the point of origin, must be addressed, and new proposals are needed in the area of transportation. In order for the region to progress in the integral management of wastes, all of these issues must be addressed.

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Annex 1

LATIN AMERICA AND THE CARIBBEAN: PROPOSAL FOR THE TEN-YEAR FRAMEWORK OF PROGRAMMES ON SUSTAINABLE CONSUMPTION AND PRODUCTION^a

| Programmes | Policies and measures | Means of implementation and other support mechanisms | Principal stakeholders | Measures of success |
|--|---|--|--|--|
| National Policies and Strategies on Sustainable Consumption and Production (SCP) | <ol style="list-style-type: none"> 1. Integrate sustainable consumption and production (SCP) in national development policies, programmes and strategies. 2. Strengthen SCP information, education and training for the public. 3. Quantify costs and benefits associated with the implementation of SCP in the region, at the national and sub-regional levels. 4. Promote corporate social and environmental responsibility and incorporate the concept of extended producer responsibility and life cycle analysis, among companies that produce mass consumption products that have major environmental and social effects. | <ul style="list-style-type: none"> • Strengthen the institutional entities responsible for SCP in each country. • Create partnerships between ministries of economy/finance and environmental ministries. • Develop links with existing environmental, economic and development forums, as well as with forums that address social and financial issues. • Promote coordination with subregional policy and economic integration systems. • Include SCP issues in research on the region's economy and development. • Define specific indicators for measuring regional progress in SCP. • Strengthen regional capacities through UNEP methodologies (planning for climate change, SCP indicators, etc.). | <p>National Governments; Marrakech Process in relation to SCP; Regional Council of Government Experts on SCP; Economic Commission for Latin America and the Caribbean (ECLAC), United Nations Environment Programme (UNEP); United Nations Development Programme (UNDP); Latin American and Caribbean Initiative for Sustainable Development (ILAC).</p> <p>Subregional organizations.</p> | <p>Number of countries with national/regional plans that include SCP.</p> <p>Number of countries with SCP mainstreamed in national/subregional development plans.</p> <p>Identification of costs, benefits and opportunities of SCP for the region.</p> <p>Number of countries that use life cycle analysis and extended producer responsibility.</p> <p>Active participation by representatives of the Regional Council of Government Experts on the International Advisory Panel on SCP.</p> <p>Incorporating the Latin American and Caribbean countries in the SCP governance framework, including the Marrakech Task Forces.</p> |

| Programmes | Policies and measures | Means of implementation and other support mechanisms | Principal stakeholders | Measures of success |
|--|---|---|---|---|
| Improvement of small and medium enterprise productive sector | <ol style="list-style-type: none"> 1. Give priority to sectors that provide environmental or ecosystemic services at the subregional level. 2. Create or strengthen economic mechanisms and instruments to increase the sustainability of the productive sectors and to enhance their productivity and competitiveness. 3. Define specific sustainable consumption and production indicators within the framework of ILAC. | <ul style="list-style-type: none"> • Create a task force on SMEs and SCP to support implementation, build capacity based on South-South cooperation, exchange information and experiences and assist in developing sound regulations and policies. • Create strategic alliances with stakeholders linked to SMEs, in order to promote business development and production (subregional entities, financial institutions, development agencies, ministries of economy/production/employment) at the national and subregional levels. • Develop specific tools and incentives to implement SCP in SMEs, including the adoption of new technologies, in coordination with other areas of Government. • Establish an information system to support the productive sector in adopting SCP practices. | <p>Ministries of economy, production, etc., subregional entities: MERCOSUR, Caribbean Community (CARICOM), Central American Commission on Environment and Development (CCAD), Andean Community.</p> <p>Development agencies: Inter-American Development Bank (IDB), Economic Commission for Latin America and the Caribbean (ECLAC), United Nations Development Programme (UNDP), World Bank.</p> <p>Industry and labour organizations in the SME sector.</p> <p>Educational and training institutions in the area of business and business administration.</p> | <p>Improved efficiency in the use of basic resources (water, energy, materials).</p> <p>Reduced operating costs as a result of implementing efficiency measures for resource use.</p> <p>Number of SMEs having implemented programmes or other SCP-related measures.</p> <p>GHG emission reduction (support for mitigating climate change).</p> <p>Number of funding mechanisms in the region that include specific SCP-related conditions.</p> <p>Amount of investments in SCP supported by funding mechanisms .</p> <p>Amount of SCP investment supported by funding mechanisms.</p> <p>Number of institutions, including clean production centres, providing SCP assistance to SMEs.</p> |

Annex 1 (continued)

| Programmes | Policies and measures | Means of implementation and other support mechanisms | Principal stakeholders | Measures of success |
|--------------------------------------|---|--|--|---|
| Sustainable Public Procurement (SPP) | <ol style="list-style-type: none"> 1. Promote high-level political leadership that fosters SPP and that involves and incorporates the national public procurement authority. 2. Adopt a strategy to gradually incorporate environmental and social criteria in contracting for priority goods and services. 3. Ensure the inclusion and sustainability of SMEs in SPP programmes, by establishing specific policy measures and instruments. 4. Create a multi-sectoral mechanism to facilitate participation in, and monitoring of, SPP programmes. | <ul style="list-style-type: none"> • Consider the approach and methodology proposed by the Marrakech Task Force on SPP. • Conduct training on life cycle analysis for Government and industry at the national and subregional levels. • Share information and documentation, such as guidelines and bidding materials, as well as documents, through the Regional SCP Information Network (www.redpycs.net). • Establish multi-sectoral groups for SPP implementation under the leadership of the procurement authority, and with participation by suppliers. • Create strategic partnerships with existing forums or groups focusing on SPP, such as the Inter-American Forum on Government Procurement, of the Organization of American States (OAS). • Existing programmes and initiatives at the subregional level, such as the Central American Common Market (CACM), MERCOSUR and others. | <p>National Governments: ministries of environment, economy or finance, or the respective procurement authorities.</p> <p>International Task Force on SPP (UNEP).</p> <p>Subregional organizations.</p> <p>Regional Council of Government Experts on SCP.</p> <p>Organizations and forums focusing on SPP.</p> | <p>Amount of goods and services purchased by public sector based on sustainability criteria (data available at national level).</p> <p>Number of countries that have adopted an SPP strategy.</p> |

| Programmes | Policies and measures | Means of implementation and other support mechanisms | Principal stakeholders | Measures of success |
|------------------------|---|--|---|---|
| Sustainable lifestyles | <ol style="list-style-type: none"> 1. Implement new policies (or adjust existing policies where necessary) to promote the supply of sustainable goods and services at affordable prices to the public. 2. Integrate education for sustainable consumption in formal and informal educational programmes. 3. Conduct studies and carry out systematic measurement to identify and understand the motivating factors behind the region's consumption patterns. | <ul style="list-style-type: none"> • Broaden the participation of the entire community in designing and executing actions to promote sustainable lifestyles. • Facilitate educational campaigns on sustainable lifestyles with the participation of civil society and the business sector at the national and subregional levels. • Promote a common language for addressing SCP, and implement strategies to communicate with consumers. • Encourage transnational corporations to apply the same quality and environmental management standards in Latin America and the Caribbean that they follow in their countries of origin or in countries with more stringent standards. • Promote programmes and initiatives on responsible consumption, fair trade, and youth, among other issues. | <p>National Governments.</p> <p>Industry associations that include transnational corporations.</p> <p>Associations of consumers, students, young people, indigenous groups, etc.</p> <p>UNEP, Marrakech Task Force on Sustainable Lifestyles.</p> <p>Council of experts on the issue; universities.</p> | <p>Indicators of changes in lifestyles (waste generation, transportation, leisure time, etc.).</p> <p>Coverage of aspects of SCP in education.</p> <p>Number of initiatives undertaken to improve the level of awareness and knowledge of the significance of SCP for the region.</p> |

Annex 1 (conclusion)

| Programmes | Policies and measures | Means of implementation and other support mechanisms | Principal stakeholders | Measures of success |
|--|---|--|--|---|
| Knowledge and Information management network | Strengthen REDPYCS (Sustainable Consumption and Production Network) as a high-quality and high-prestige tool for information dissemination, linking different social actors, and strengthening the capacities needed to change consumption and production patterns and to make them more sustainable. | <ul style="list-style-type: none"> • Launch a comprehensive programme to support and strengthen the Network, including: <ul style="list-style-type: none"> – Promoting active participation by entities involved in SCP in the countries, such as nodes of Government and other specific thematic nodes of activity. – Coordinate the use of the Network to support information systems for SCP projects in the region. – Apply the platform’s tools and information to promote awareness, improve evaluation of progress and facilitate capacity building (surveys, forums, e-learning). | <p>Council of experts on the issue; UNEP; other organizations active in SCP.</p> <p>Regional SCP projects (SPP, SMEs, etc.).</p> | <p>Number of users and active focal points in the Network.</p> <p>Availability of updated and systematic information on the status of SCP implementation in the region (policies, programmes, SMEs, SPP, sustainable lifestyles, etc.).</p> <p>Number of persons trained through the e-learning tool.</p> |

^a These priorities are the result of the work carried out by the Regional Council of Government Experts on Sustainable Consumption and Production for Latin America and the Caribbean, as well as the recommendations of priorities to be included at the Forum of the Ten Year Framework Programme (10YFP) of the Environment Ministries of Latin America and the Caribbean, established during the Fifth Regional Meeting on Sustainable Consumption and Production (Cartagena, Colombia, September 2009).