



MILLENNIUM DEVELOPMENT GOALS

ADVANCES IN ENVIRONMENTALLY SUSTAINABLE
DEVELOPMENT IN LATIN AMERICA
AND THE CARIBBEAN



UNITED NATIONS

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FOREWORD

By adopting the Millennium Declaration of 2000, the 189 States Members of the United Nations undertook a commitment to redouble their efforts to eradicate poverty in the world. This led to the establishment of the Millennium Development Goals, with targets to be achieved by 2015, taking 1990 as a base year. Environmental sustainability is included among the Goals owing to its great relevance to poverty reduction efforts, health, gender equality and the other components of development. The targets associated with the seventh Millennium Development Goal—to ensure environmental sustainability—aim to ensure the integration of the principles of sustainable development into public policies, reduce the loss of biodiversity and natural resources, cut atmospheric pollution, broaden access to safe drinking water and sanitation and decrease the number of slum-dwellers.

The agencies of the United Nations assumed a commitment to support and monitor progress towards the achievement of the Goals derived from the Millennium Declaration. In Latin America and the Caribbean, the agencies fulfilled this commitment by coordinating their efforts to report in 2005 on all eight Goals; to give an account in 2006 of the progress towards attainment of the third Goal on gender equality; and to examine in 2008 advances towards the right to health, which encompasses Goals 4, 5 and 6.

Ten years after the Millennium Declaration, this report sets forth the progress the Latin American and Caribbean region has made, as well as the challenges it still needs to overcome, in order to meet the targets of the seventh Goal and attempts to offer instruments by which to steer policies and actions to ensure the environmental sustainability of development in the region.

As discussed in the report, significant progress has been made in some aspects of environmental sustainability: the total surface area under protection has increased steadily in the last decade, the consumption of ozone-depleting substances has decreased considerably, and the region has made strides in expanding the coverage of drinking water and sanitation services. These are all positive developments towards achieving the targets of the seventh Millennium Development Goal. Many hurdles remain, however, such as the continued depletion of forest areas and the steady increase in CO₂ emissions caused by the burning of fossil fuels and the production of cement. In both cases, the region has been tending to diverge from the targets. There is also a lack of specific data on issues that are crucial for the region, such as the management of water resources, fishing and endangered species. Indirect and complementary information suggests that the region is not on track to meet the agreed targets in these cases either.

For all these reasons, now, only five years from the deadline for attaining the Millennium Development Goals, it is essential to step up our efforts. In this, the support of the international community will be essential.

Today multiple obstacles—including the financial, climate, energy and food crises—threaten to divert the region away from fulfilment of its promises in the area of environmental sustainability. Although these crises are imposing new challenges on the Latin American and Caribbean countries, they also represent opportunities to instil changes that can propel the region towards a more equitable and sustainable type of development.

This document was prepared by the Economic Commission for Latin America and the Caribbean (ECLAC) in close collaboration with the regional offices of the other agencies in the United Nations system, particularly the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP), the United Nations Human Settlements Programme (UN-Habitat), the United Nations Children's Fund (UNICEF), the United Nations Population Fund (UNPFA), the Office of the United Nations High Commissioner for Human Rights (OHCHR), the Joint United Nations Programme on HIV/AIDS (UNAIDS), the Food and Agriculture Organization of the United Nations (FAO), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the International Labour Organization (ILO), the Pan American Health Organization (PAHO) and the United Nations Office for Project Services (UNOPS).

We trust that this report will be of use to policymakers and all those committed to achieving environmental sustainability in the process of regional development.

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INTRODUCTION

THE SEVENTH MILLENNIUM DEVELOPMENT GOAL

When they adopted the Millennium Declaration, the 189 States Members of the United Nations made a commitment to take on the world's principal development challenges and to combat extreme poverty. This led to the establishment of the Millennium Development Goals, of which the seventh aims to “ensure environmental sustainability”. This consists of the environmental dimension (inseparable yet distinguishable) of sustainable development: meeting present human needs without compromising the environment's capacity to meet such needs in the long term.

A review of the official indicators of the seventh Millennium Development Goal for Latin America and the Caribbean points to progress since 1990, but also to setbacks. Table 1 summarizes the situation in the region for each indicator. Throughout this report, the indicators are analysed in depth, within the socio-economic and institutional context and against the backdrop of climate change. The final chapter sets out some guidelines for progressing towards the achievement of the targets corresponding to the seventh Goal.

Table 1

LATIN AMERICA AND THE CARIBBEAN: SUMMARY OF TRENDS IN MEETING THE SEVENTH MILLENNIUM DEVELOPMENT GOAL

Indicator	Trend	Factors that impede or facilitate achievement of the target	Feasibility of achieving the target
Target 7.A - Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources			
7.1 Proportion of land area covered by forest	The amount of land area covered by forest continues to decline. The region of Latin America and the Caribbean has the highest rate of deforestation in the world.	There is little economic incentive to leave forests standing. As yet there are no consolidated mechanisms to internalize the costs of destroying forests or the benefits of conserving them (their ecosystem services). This means that some economic activities that cause deforestation are more profitable than are activities compatible with forest conservation.	The regional trend is moving away from the target. In recent years, some progress has been made in stopping illegal deforestation (for example, in raising the cost of doing so by enforcing the relevant regulations). For a significant reversal of this trend, these measures must be reinforced and replicated, and mechanisms must be implemented to ensure that the value of the ecosystem services of the forests—and the social and environmental cost of destroying them—is internalized by economic agents.

Table 1 (continued)

Indicator	Trend	Factors that impede or facilitate achievement of the target	Feasibility of achieving the target
7.2 CO ₂ emissions, total, per capita and per \$1 GDP (PPP)	CO ₂ emissions from the burning of fossil fuels and production of cement have increased steadily (even according to official statistics), and are expected to continue to do so in the region, whose population and economy are growing. Emissions have decreased slightly in proportion to GDP. In per capita terms, emissions are relatively stable and comparatively low. Despite the lack of official data series on emissions caused by changes in land use, calculations point to this as the reason for a significant proportion of CO ₂ emissions in Latin America and the Caribbean, which generates more than 48% of all global emissions caused by land use changes.	Emissions stemming from land-use changes are associated with deforestation. The benefits of progress in energy efficiency and in developing renewable energy sources would include a lower rate of increase of emissions.	The region has tended to move away from the target of reducing total CO ₂ emissions. To reverse, by 2015, the rise in emissions caused by burning fossil fuels, investments are needed in energy efficiency and in the development of renewable energy sources. Progress in indicator 7.1 (deforestation) will help to reduce emissions stemming from land-use changes. In this, the technological and financial support of the international community will be essential.
7.3 Consumption of ozone-depleting substances	Emissions of ozone-depleting substances have steadily decreased.	The positive results reflect the efforts made under the Montreal Protocol, which include successful collaboration between the public and private sectors, international cooperation and technological breakthroughs. The challenge is to ensure that a definitive change is brought about.	Based on the current trend, if the actions that have been undertaken are maintained, the region will be able to avoid consumption of chlorofluorocarbons altogether.
7.4 Proportion of fish stocks within safe biological limits	No statistics that accurately reflect this indicator are available. Studies indicate that habitat change, pollution, and increased industrial aquaculture and fishing exert a heavy strain on hydrobiological resources, and this problem is aggravated by climate change.	Sustainable management policies have been incorporated for some species, but they have not yet been applied throughout the region or on the scale needed to reverse the pressure.	If sustainable management practices are not adopted on a larger scale and in a more systematic manner, the problems that have been identified will not be addressed. A more accurate and broader evaluation of the situation in the region requires more systematic information gathering.

Table 1 (continued)

Indicator	Trend	Factors that impede or facilitate achievement of the target	Feasibility of achieving the target
Target 7.B - Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss			
7.5 Proportion of total water resources used	Use-coefficient estimates (on the abstraction of freshwater) indicate that South America and Central America use about 1% of their total available water. In the Caribbean, the coefficient is as high as 14%, compared with a worldwide average of 9%.	Water distribution is highly unequal, and water resources are strained by multiple factors, such as excessive abstraction for agriculture and mining, aquifer depletion, increasing pollution, deforestation and the destruction of catchment basins and replenishment areas.	Although the region is endowed with abundant water resources, it is exposed to significant risks associated with water quality and availability over time and space. Climate change and the expected increase in demand will aggravate water availability problems. In response to these challenges, effective water-resource management is urgently needed in order to progress towards achieving the target.
7.6 Proportion of terrestrial and marine areas protected	The total surface area of the protected areas has increased steadily in the last decade.	There has been a loss of habitats —due to deforestation and coral bleaching— often associated with large-scale economic activities, the introduction of alien species and climate changes.	The increase in the proportion of protected areas is consistent with the target. However, this indicator, in and of itself, does not provide a complete picture of the issue. To reduce biodiversity loss, better management of protected areas and more resources are needed. For protected areas to be an effective mechanism for biodiversity conservation, they must be representative of biomes and ecosystems. In addition to protected areas, other conservation techniques must be used, and national and international regulatory and financial structures must be changed in order to internalize the environmental and social cost of the loss of biodiversity or of the benefits of conserving it.
7.7 Proportion of species threatened with extinction	The information on species threatened with extinction remains unreliable, and the lack of comparable, harmonized statistics impedes the determination of a historical trend. For example, it is estimated that in the last 100 years 75% of the genetic diversity of the region's agricultural crops has been lost.		Despite the lack of historical series of official data, evidence points to a loss of biodiversity. A reversal of that loss will require the consolidation of mechanisms for internalizing the benefits of conserving biodiversity, including the different conservation techniques (one of which is the establishment of protected areas) and an equitable system for sharing the benefits of exploiting those areas.

Table 1 (continued)

Indicator	Trend	Factors that impede or facilitate achievement of the target	Feasibility of achieving the target
Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation			
7.8 Proportion of population using an improved drinking water source	The region has advanced greatly in expanding the coverage of drinking water services. Nevertheless, the countries vary in these advances, as well as in coverage levels between rural and urban areas and among different cities, provinces, states, regions and municipalities, and among groups with different income levels.	To improve and expand drinking water and sanitation services, advances must be made in financing and regulation mechanisms and in integrating the	Access to drinking water is a quantitative target of the seventh Goal, which calls for halving, by 2015, the proportion of persons who lack this service, in comparison with the 1990 level. In the region's urban areas, the target for access to drinking water is being met. Nevertheless, the quality of the service must be improved (especially in terms of the quality of drinking water, proper disinfection, the reduction of intermittency problems and the extent of losses).
7.9 Proportion of population using an improved sanitation facility	The region has made progress in expanding sanitation services. Nevertheless, the distribution of services is highly unequal within and among the countries. The greatest progress has made in urban areas. A greater effort must be made to advance towards attaining the target for sanitation, especially in rural areas and regarding the urban poor population.	corresponding policies with water-resource management. Climate change poses new challenges for expanding the coverage of sanitation and drinking water services, just as it makes it more urgent to do so.	In aggregate terms, the region is close to achieving the target of improving access to sanitation facilities. By 2006, coverage had expanded by 78%, and the target for 2015 is 84%. Moreover, progress must be made in service quality and in wastewater treatment, and the sustainability of the service must be ensured, despite the existence of water pollution.

Table 1 (concluded)

Indicator	Trend	Factors that impede or facilitate achievement of the target	Feasibility of achieving the target
By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers			
7.10 Proportion of urban population living in slums	The number of persons, and the percentage of the urban population, living in slums in the region decreased in the period. Nevertheless, more than 100 million persons in Latin America and the Caribbean still live in unacceptable conditions.	<p>Economic growth from 2000 to 2005, along with redistributive social policies and urban and housing improvement programmes specifically targeting slums, was the key reason for this reduction. Nevertheless, the number of persons living in slums has not been reduced across-the-board. The current economic crisis could cause setbacks in the region regarding this target.</p> <p>Poverty reduction does not automatically reduce the number of persons living in slums, which requires specific policies. In addition, this is part of a larger set of challenges relating to the sustainability of cities, in a continent that has the highest urbanization rates in the world.</p>	<p>Although the number slum-dwellers has decreased, the governments of the region will have to step up their efforts to achieve the 2020 target.</p> <p>Moreover, the target is modest in comparison with the number of slum-dwellers in the region and with the international commitments undertaken by the countries in terms of guaranteeing housing rights.</p>

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

Chapter I

SUSTAINABLE DEVELOPMENT, ENVIRONMENT AND THE MILLENNIUM DEVELOPMENT GOALS**A. THE SUSTAINABLE DEVELOPMENT PARADIGM AND THE MILLENNIUM DEVELOPMENT GOALS****1. Evolution and consolidation of the concept of sustainable development**

Up to the end of the 1980s, the environment (and its relationship with economic growth and social justice) did not feature highly on national or international agendas. This situation began to change with the emergence of the concept of sustainable development, which was consolidated in 1987 with the publication of “Our Common Future”, also known as the Brundtland report.¹

The Brundtland report defined sustainable development as one “that meets the needs of the present without compromising the ability of future generations to meet their own needs”. Implicit in this definition is a two-fold concept of equity: intergenerational and intragenerational. The intergenerational aspect, in other words the need to protect the rights of future generations to their own development, requires economic development to be associated with environmental protection and ways of using natural resources that ensure that future generations also have access to them. From the intragenerational point of view, the report highlights the importance of eradicating poverty and the circular relationship between poverty and environmental degradation.

By recognizing the need to preserve the integrity of ecosystems and ecological processes as a fundamental part of development, along with social and economic priorities, the concept of sustainable development offered a theoretical and conceptual space for national and international policymaking to tackle the inherent risks of globalization and understand its complex economic, social and environmental interrelations. In particular, sustainable development offered an organizing principle for public policy and an opportunity for a more balanced approach in addressing the tension between the need to protect the environment and the need to increase growth to solve problems of social asymmetry, equity and poverty, which many countries (such as those in Latin America and the Caribbean) considered more urgent and therefore a higher priority (Najam and others, 2003).

At the same time, the increasing deterioration of the environment on a global scale was becoming a major problem at the end of the 1980s. In this context, in 1992 the United Nations Conference on Environment and Development, also known as the Earth Summit, was held in Rio de Janeiro (Brazil). From an institutional and political point of view, this Conference was a turning point in terms of awareness of the issue of the environment.

¹ “Our Common Future” (Brundtland, 1987) was published by the World Commission on Environment and Development, which had been set up by the United Nations in 1983. The Commission was headed by Gro Harlem Brundtland, who was the Prime Minister of Norway when the report was published.

The Earth Summit —and the Rio Declaration on Environment and Development— was a formal acknowledgment by the international community of the link between environment and development, through the concept of sustainable development. The principles contained in the Declaration were consolidated at the level of specific action in Agenda 21, which was negotiated to provide guidelines on the plan to achieve sustainable development within national and international policy, and which included perspectives on the various components of sustainable development.² The inclusion of the private sector and civil society was undoubtedly an important aspect of this process. The new paradigm of sustainable development offered a way of achieving this level of association, as it encouraged governments, the private sector and civil society to agree on a set of common objectives.

In Latin America and the Caribbean, the Earth Summit provided a major boost for environmental protection, the creation of environmental legislation and institutions and the establishment of the first instruments for sustainable management of the environment.

At the World Summit on Sustainable Development held in Johannesburg (South Africa) in 2002, 10 years after the Conference in Rio, attention was focused on implementing the principles of sustainable development (including financing) and on stating the importance of integrating the three dimensions of the concept: environmental, economic and social. The Johannesburg Summit also addressed the remaining challenges: sustainable production and consumption; the use of renewable energy; drinking water and sanitation for all; and the right to access information on the environment and environmental justice. Introducing policies to make progress along these lines and seeking sources of financing were key topics. Above all, however, the Johannesburg Summit highlighted the importance of eradicating poverty and promoting human development.

2. Sustainable development and the Millennium Development Goals

The Johannesburg Summit was in step with another significant global event that had taken place two years earlier: the Millennium Summit. The Millennium Summit was held in New York on 5 September 2000 and was attended by representatives of the 189 Member States of the United Nations, who gathered to agree on a process of review for the role of the United Nations in tackling the challenges posed in the new century. The Millennium Declaration, which was the main outcome of the Summit, set out the objectives on which the following eight Millennium Development Goals were based:

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality (children aged under five years)
5. Improve maternal health
6. Combat HIV/AIDS, malaria and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for development

² The link between gender, environment and sustainability was included in Agenda 21 through a process of widely attended preparatory meetings. The proposals put forward during this process came together in a document entitled “Women’s Action Agenda 21 for a Peaceful and Healthy Planet 2015”.

The Millennium Development Goals indicate the development priorities agreed by the international community in the economic, social and environmental spheres, and are reflected in specific targets that Member States must fulfil by 2015 (from the starting point of 1990). Essentially, the targets show the extent to which these commitments have been successfully translated into appropriate practices and policies and measure the response of key actors and institutions in the different countries. Goal 7 identifies environmental sustainability as one of the priorities for development arising from the Millennium Declaration.

3. Climate change and crisis: factors that drive sustainability

One of the phenomena driving the rise to prominence of the sustainable development concept this century and its inclusion among the Goals is climate change. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), published in 2007, dispelled many uncertainties regarding climate change (see chapter III).³ The report highlighted the effects of human activity on the environment and the repercussions on development and welfare of living beings.

In addition, the global economic and financial crisis that broke out in mid-2008 occurred against a backdrop of multiple crises related to climate, energy and food prices, calling to mind a statement made in the Brundtland report 20 years earlier to the effect that environmental, development and energy crises are not isolated but are parts of a whole. As shown in chapter II, this link between various crises is not yet fully accounted for in public policy responses. However, the two-fold need to resolve the economic crisis and mitigate climate change has led some governments to make economic and financial aid to sectors in crisis conditional upon their switching over to sustainable products and production processes, and to promote the development of industries (such as clean energy) that are both economically and environmentally safe (see SEFI, 2009). These could be the first steps towards a new “green economy”, based on the valuation of environmental components using economic and legal instruments that incorporate them into the decision-making processes of governments, companies and consumers. Establishing a regulatory framework for this within the world’s main markets will boost global efforts to implement sustainable patterns of production and consumption, which is one of the key issues identified in the Plan of Implementation for the World Summit on Sustainable Development of 2002 (see chapter II). It is also significant that, despite the economic and financial emergencies, environmental topics have been on the agendas of key international forums such as the Group of Twenty (G20) and the Group of Eight (G8).

The milestones and progress achieved in recent decades and the ground covered by the new sustainable development paradigm certainly deserve acknowledgement. Nevertheless, as underlined in this report, the region of Latin America and the Caribbean has a long way to go in terms of achieving substantial and permanent progress in sustainable development. The region’s countries have taken an increasingly active stance in relation to international commitments and local challenges. Basically, however, they have yet to change the structures of an economic model which, to date, has failed to overcome the region’s problems of poverty and marginality and to protect the environment and ensure the basic needs and prosperity of future generations. These are fundamental challenges in the strategy to improve the quality of life in the region’s countries.

³ IPCC was created in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) as a group open to all Members of the United Nations and WMO. The role of the IPCC is “to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation” (see [online] www.ipcc.ch). To fulfil this role, IPCC publishes periodical reports, the first of which was published in 1990, followed by others in 1995, 2001 and 2007.

B. MILLENNIUM DEVELOPMENT GOAL 7: ENVIRONMENTAL SUSTAINABILITY

Millennium Development Goal 7 seeks to “ensure environmental sustainability”. Environmental sustainability refers to the inextricably linked but nonetheless distinguishable environmental aspect of sustainable development: responding to present human needs without destroying the environment’s capacity to meet these needs in the long term (Millennium Project Task Force on Environmental Sustainability, 2005).

All the Goals are highly interdependent and also interlinked with socio-economic development in general, and Goal 7 on environmental sustainability is no exception. More specifically, there is a close link between environmental degradation and poverty. The poor suffer the most from environmental degradation, including air and water pollution, degradation of forests and fisheries and the effects of climate change (OHCHR, 2008). Achievements in reducing poverty (Goal 1) and other aspects of human development are therefore highly dependent on respective improvements in environmental conditions (World Bank, 2008a). The lack of access to drinking water, sanitation and housing services is both a manifestation of poverty and a cause of disease, and affects maternal and child mortality (Goals 4 and 5) and people infected with HIV (Goal 6). These deficiencies also make it difficult to achieve universal primary education (Goal 2), especially for girls (Goal 3), who are often responsible for fetching water. In turn, persistent poverty in its various forms places pressure on marginal lands while infrastructure problems and difficulties in the environmental management of precarious human settlements result in water and soil pollution.

Many of today’s most urgent issues of environmental sustainability are global in nature and include climate change, depletion of the ozone layer and the loss of biodiversity. Goal 7 therefore establishes global targets to which each State can contribute according to the principle of common but differentiated responsibilities. This principle, which was consolidated in the Rio Declaration, stresses the obligation for States to act in accordance with their contribution to environmental degradation, and with the financial and technological resources at their disposal. Advances in environmental sustainability and the transition towards low-carbon growth with equity will demand financing and technological transfers to the countries of the region. Achieving Goal 7 is therefore largely dependent on reaching Goal 8, which refers to international cooperation for development (see chapter V).

The commitment to Goal 7 to “ensure environmental sustainability” includes four targets that were reviewed and updated in 2007.⁴ The first target (7.A) has two clearly distinguishable components: (i) integrate the principles of sustainable development into country policies and programmes; and (ii) reverse the loss of environmental resources. The other three targets refer to reducing biodiversity loss by 2010 (target 7.B); halving, by 2015, the proportion of people without sustainable access to safe drinking

⁴ The United Nations General Assembly approved the Revised Millennium Development Goal monitoring framework at its sixty-second session held in 2007. Under Goal 7, the targets and indicators were listed, and indicators 7.3 to 7.5 and 7.7 were added; the following indicators were reformulated: 7.2 (to compare carbon dioxide emissions with GDP), 7.6 (previously, proportion of terrestrial areas protected to maintain biological diversity), 7.8 (previously, sustainable access to an improved drinking water source (urban and rural)”) and 7.10 (previously, proportion of households with access to secure tenure). Indicators relating to energy use per dollar of GDP and the proportion of the population using fossil fuels were eliminated. For more information, see [online] http://www.eclac.org/mdg/official_indicators_en.html.

water and basic sanitation (target 7.C); and to have achieved a significant improvement in the lives of at least 100 million slum dwellers by 2020 (target 7.D). Table I.1 shows the official targets and indicators.

Table I.1
OFFICIAL TARGETS, INDICATORS AND VARIABLES FOR
MILLENNIUM DEVELOPMENT GOAL 7

Target	Indicator
Target 7.A Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources	7.1 Proportion of land area covered by forest
	7.2 CO ₂ emissions, total, per capita and per \$1 GDP (PPP)
	7.3 Consumption of ozone-depleting substances
	7.4 Proportion of fish stocks within safe biological limits
	7.5 Proportion of total water resources used
Target 7.B Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss	7.6 Proportion of terrestrial and marine areas protected
	7.7 Proportion of species threatened with extinction
Target 7.C Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation	7.8 Proportion of population using an improved drinking water source
	7.9 Proportion of population using an improved sanitation facility
Target 7.D By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers	7.10 Proportion of urban population living in slums

Goal 7 stands out from the others because of the global effects that local action has on some of its targets. In this sense, the Latin American and Caribbean region has an important role to play in the world, as it provides important global ecosystem services,⁵ such as maintaining biodiversity and storing carbon dioxide, and this must be taken into account during negotiations on world climate. Biodiversity provides ecosystem services such as the regulation of air pollution and of hydrological and climatological cycles, the regeneration of soil fertility, the decomposition of residues, the absorption of pollutants and the pollination of crops. Biodiversity also provides resources with direct economic value —such as wood, non-wood products, the basis of traditional and modern medicine and germplasm (source of agricultural varieties)— and cultural, scenic and touristic value. The benefits of ensuring environmental sustainability in Latin America and the Caribbean reach far beyond the well-being of the region's inhabitants and have global relevance.

On the other hand, it is vital to recognize some of the limitations of the Goals in general, and Goal 7 in particular. The worldwide scope of this commitment is such that the points considered are those that are relevant and a priority for the international community as a whole, and these do not necessarily reflect the most relevant issues in regional, national or local terms. Furthermore, some of the targets, particularly within Goal 7, indicate direction without necessarily establishing quantitative targets, or else

⁵ According to the Millennium Ecosystem Assessment (MA), ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water, fuel and fibre; regulating services such as climate, flood, drought, soil degradation and disease control; supporting services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious, aesthetic and other nonmaterial benefits (WRI, 2003).

they establish targets that are modest compared with the scale and significance of certain development problems. As noted in the following section, the design of some of the targets and indicators for Goal 7 does not consider some essential elements for satisfying fundamental human rights. This report therefore presents supplementary information and indicators, and goes beyond assessing the prospects for achieving the various targets in order to identify the main challenges in moving towards (or beyond) them on the issues covered by the indicators.

C. ENVIRONMENTAL SUSTAINABILITY, THE MILLENNIUM DEVELOPMENT GOALS AND HUMAN RIGHTS

Underlying the Goals are various human rights and fundamental freedoms that arise from the international obligations accepted by States through the ratification of international agreements on human rights and membership of the United Nations (OHCHR, 2008).⁶ Human rights and the Millennium Development Goals are mutually reinforcing. The latter are indicators of the extent to which some economic and social rights have been implemented. Human rights strategies can in turn offer increased legitimacy, equity and sustainability to the types of policy needed to achieve the Millennium Development Goals.

The rights-based approach to human development recognizes this link. It is a conceptual framework whose operational aim is to promote and protect human rights. It seeks to assess the underlying inequities of development problems and correct discriminatory practices and unfair forms of distribution that hamper progress. In this approach, States have the duty to protect human rights, including those relating to economic, social and environmental well-being. This helps to promote the sustainability of development efforts, by empowering people themselves —especially the most marginalized— to participate in policy formulation and demand State intervention (OHCHR, 2006). In terms of the concept of sustainable development, a rights-based approach emphasizes the need to improve systems of accountability and guarantee access to information on environmental issues, and obliges developed countries to help the most vulnerable, especially with regard to the impact of climate change (OHCHR, 2008). The following rights are directly linked to Goal 7:

- The right to environmental health was basically enshrined in Article 12.2 (b) of the International Covenant on Economic, Social and Cultural Rights, which entered into force in 1976, and is also mentioned in Article 24.2 (c) of the Convention on the Rights of the Child, which entered into force in 1990, and in other international instruments. This right has also been incorporated into many constitutions, and national laws and institutions have been set up to ensure improved protection of the environment. General Comment No. 14 of the Committee on Economic, Social and Cultural Rights (2000) clarifies the scope of the right to health. The Comment, along with the above-mentioned legal framework, is an effective tool for implementing commitments such as appropriate legal recognition of the right, ensuring information for and participation by rights holders, and benefiting from international cooperation in accordance with international human rights standards. Targets 7.A and 7.B are related to this right.

⁶ For a detailed study of the scope of States' international obligations in terms of economic, social and cultural rights, see Committee on Economic, Social and Cultural Rights (1990); Commission on Human Rights (2002); and Anton (2008).

- The right to water and sanitation, reflected in target 7.C, is based on Articles 11 and 12 of the International Covenant on Economic, Social and Cultural Rights, and is also mentioned in Article 27 of the Convention on the Rights of the Child and Article 14 of the Convention on the Elimination of All Forms of Discrimination against Women. General Comment No. 15 defines the State's main obligations in this regard, particularly those to respect, protect, serve and not discriminate in the enjoyment and exercise of this right (see box I.1).⁷

Box I.1

THE HUMAN RIGHT TO WATER: WHAT DOES IT MEAN IN PRACTICE?

It is important to distinguish between human rights obligations in terms of access to water as a natural resource, and obligations relating to access to drinking water and sanitation services. Access to water as a natural resource can be a human right under certain circumstances, for instance in the case of ancestral use in indigenous and rural settlements, or manual extraction for basic human needs. However, not everyone necessarily has the right to water as a natural resource when the resource is scarce or when no effective and beneficial use is intended. It is therefore crucial to implement suitable legal criteria to regulate access to water resources by economic agents, and to recognize and protect ancestral use and rights.

Access to drinking water and sanitation services is a human right. This access should be equitable and non-discriminatory; appropriate in quality and quantity; economically, socially and environmentally sustainable; and affordable. This last aspect does not mean that such services should be free, but that those able to pay should be charged reasonable rates that reflect efficient costs, and that the poor should have an effective system of subsidies to ensure basic minimum consumption. The State's obligations include protecting people from water disconnections and pollution, forbidding private individuals and companies from infringing upon the rights of others, allocating resources that promote access and quality and serving groups such as women, minorities or indigenous peoples.

Given that these services are expensive, and the region's poverty and indigence levels are high, the poor will not be able to exercise their human right to water if they do not receive well-organized State support. Government priorities are therefore extremely important, and should be reflected in the State budget and in the construction of efficient and stable institutions.

Efficiency reduces costs, which implies greater opportunities for use. By artificially inflating costs, inefficiency damages equity. As a result, efficiency and equity are not in opposition but rather complement each other. In this sector, efficiency is fundamentally dependent on the regulatory framework and conditions. Accordingly, the importance that governments attach to the human right to water can be seen in how seriously they tackle the issue of regulation and the promotion of efficiency.

Source: Andrei Jouravlev and Miguel Solanes, "Human rights and access to water", Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), unpublished, 2007.

- The right to housing, the subject of target 7.D, is enshrined in Article 11 of the International Covenant on Economic, Social and Cultural Rights, and is also mentioned in Article 27 of the Convention on the Rights of the Child and Article 5 of the International Convention on the Elimination of All Forms of Racial Discrimination, which entered into force in 1969. General Comment No. 4 establishes the main obligations of States to ensure this right, including guaranteeing secure tenure and protecting against forced evictions.⁸

⁷ See Committee on Economic, Social and Cultural Rights (2002) and OHCHR (2008).

⁸ See Committee on Economic, Social and Cultural Rights (1991).

On the other hand, in some respects, the targets of Millennium Development Goal 7 diverge from the human-rights approach: for example, not enough consideration is given to the poorest segments of the population or to inequalities within countries. The targets are therefore somewhat timid given the seriousness and scale of the problem. Because target 7.C is measured as a proportion, it does not ensure help for the most disadvantaged groups. In addition, access to water does not include key aspects of the right to water such as affordability and regularity. Where the available data allow, this report makes reference to inequality in achieving the targets. Target 7.D, which has a longer time frame than the other targets (up to 2020), is very modest, and leaves out almost 90% of slum dwellers (OHCHR, 2008). Chapter VI provides guidelines on achieving targets and identifies the main shortcomings of the targets as effective measures of environmental sustainability and related human rights.

Ensuring human rights—including those relating to environmental sustainability and Goal 7—is not an option for governments but an obligation in the framework of commitments undertaken internationally. This has to be reflected in the priority given to these issues in public programmes and budgets.

D. STRUCTURE OF THE REPORT

This report provides tools for considering and taking action on the main trends within the various aspects of environmental sustainability as reflected in the targets of Goal 7. The aim is not to present an exhaustive overview of environmental progress and problems in the region, but rather to highlight progress towards the targets of Goal 7 in the context of the region's characteristics and the global setting.⁹ The following chapter tackles aspects of the socio-economic, institutional and policy context that are relevant for achieving the targets of Goal 7, as well as the new challenges generated by the crisis. Chapter III deals with the new scenario emerging given the imperative to act on climate change. Chapter IV presents progress and setbacks in terms of the targets and indicators of Goal 7. In addition to the analysis of official indicators, information is also provided on topics of particular interest for the region in the achievement of the targets of Goal 7. Chapter V provides an analysis of the contribution of Goal 8 (develop a global partnership for development) to Goal 7, through its important role in terms of financing, market access and technology transfer. Chapter VI summarizes the conclusions and offers guidelines for actions that are crucial to making progress towards environmentally sustainable development in the region, and which will require the attention of governments, the private sector, civil society and international agencies.

The document refers to many projects, programmes and policies implemented in the region and which have proved successful in driving progress towards the targets of Goal 7. A major source of these experiences has been the Network for Interchanging and Disseminating Excellent Experiences for Achieving the Millennium Development Goals (Net IDEEA-MDGs), set up by the Latin American and Caribbean Institute for Economic and Social Planning (ILPES), a permanent agency in its own right that is part of ECLAC (see box I.2).

⁹ For an exhaustive overview of the region's environmental problems and progress, see specific reports by the United Nations Environment Programme (UNEP). In particular, the series *Global Environment Outlook* (GEO) provides a full picture of the environmental situation in the region, as well as in specific countries and cities.

Box I.2

NETWORK FOR INTERCHANGING AND DISSEMINATING EXCELLENT EXPERIENCES FOR ACHIEVING THE MILLENNIUM DEVELOPMENT GOALS (NET IDEEA-MDGS)

An effective way of helping to achieve the Millennium Development Goals is to facilitate access by government officials and professionals working on socio-economic development to information on initiatives that have proved successful in the countries of the region.

With this in mind, the Latin American and Caribbean Institute for Economic and Social Planning (ILPES), which is part of ECLAC, has set up the Network for Interchanging and Disseminating Excellent Experiences for Achieving the Millennium Development Goals (Net IDEEA-MDGS), whose website (<http://ideea.cepal.org/ideea/ideea.htm>) reports on successful projects, programmes and policies from institutions working towards achieving the Goals. This initiative is funded by a project of the United Nations Development Account (see [online] <http://www.un.org/esa/devaccount/>).

As well as disseminating successful experiences, the Network also seeks to foster links and communication among participating institutions and countries. The aim is not only to share knowledge but also to establish a network of individuals and experiences.

The database, hosted at ECLAC in Santiago, Chile, is administered by ILPES/ECLAC. It contains over 130 experiences, 25 of which contribute to achieving Goal 7. Some of these experiences are described in boxes in the following chapters.

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

Chapter II

**OVERVIEW: ENVIRONMENTAL SUSTAINABILITY IN THE
LATIN AMERICAN AND CARIBBEAN CONTEXT**

The inclusion of environmental sustainability in the Millennium Declaration gave recognition not only to the intrinsic value of the environment, but also to its importance for poverty reduction, health, gender equality and the other components of human well-being. These aspects of development, in conjunction with the economic and institutional setting, affect the quality of the environment—and capacity to attain the targets of Millennium Development Goal 7—in a cycle that could be either vicious or virtuous depending on the prevailing incentives and behaviour patterns. Knowledge of the socio-economic context (section A) and the institutional backdrop (section B) of Latin America and the Caribbean is therefore crucial for understanding the status of progress towards Goal 7 in the region and prospects for achieving it. While the global economic and financial crisis poses new challenges for attaining the targets associated with the Goal, it also motivates the search for new growth and development models (section C).

These contextual factors overlay far-reaching global changes, including the vigorous economic expansion of a number of developing countries and their integration into international markets. Economic growth in these countries represents one of the key advances of our time because it generates better living standards for hundreds of millions of people. Nonetheless, the concomitant increases in the demand for resources—energy, food, minerals, among others, especially in China and India—is exerting growing pressure on natural resources and the environment. The consumption patterns consolidated in developed countries, and also among the wealthiest groups in developing nations, show clear signs of being unsustainable on a global scale. As the corresponding modes of consumption and production do not attribute value to environmental externalities, they endanger the stability of various ecosystem services that underpin both the continuity of production activities and the quality of life.

The second global transformation in this analysis is climate change. Over the last few decades, the scientific community has issued continual warnings about the planet's rising average temperature. Since 2007, conclusive evidence has emerged of the reality of this phenomenon, the nature of its effects and its potential costs. Unlike other environmental problems addressed internationally, climate change is caused mainly by the externalities generated by the consumption of fossil-fuel-based energy and land-use change, which are crucial to a broad spectrum of activities that drive the economies of the world. Evidence of the economic costs of climate change requires the environment to be taken into account—especially considering that Latin America and the Caribbean is one of the world's most vulnerable regions—in decisions that have traditionally been based on economic efficiency alone. Chapter III of this report considers climate change in relation to Millennium Development Goal 7.

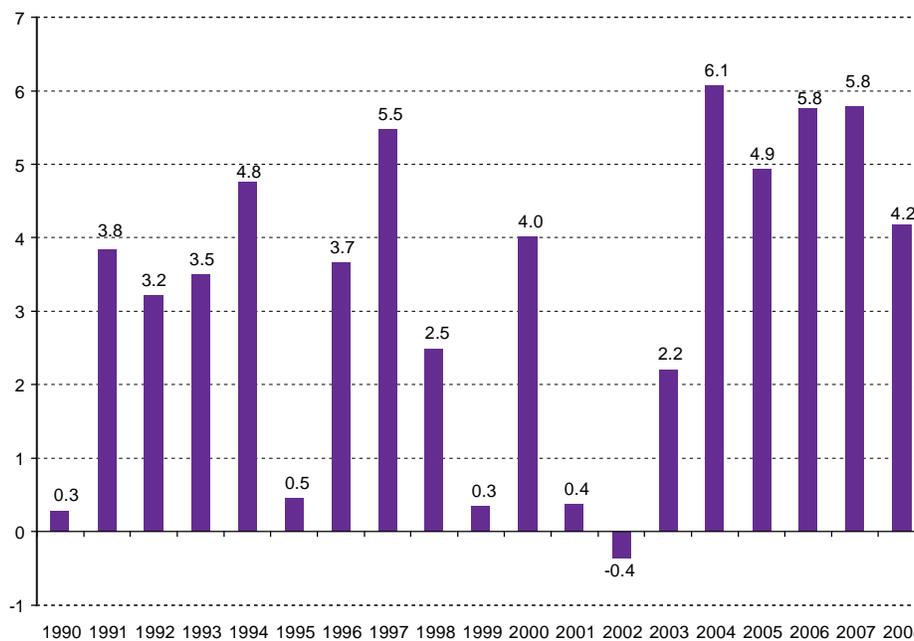
A. SOCIO-ECONOMIC SETTING

When attempting to identify the economic and social development factors that most heavily influence the region's progress towards Goal 7, key issues include high levels of poverty and inequality, production specialization patterns and public-services and infrastructure deficits.

1. Poverty and inequality

Development in Latin America and the Caribbean has persistently displayed three characteristics: low growth rates, high volatility and a very unequal income distribution (ECLAC, 2008a). This combination of factors has generated high and persistent poverty levels. The poverty indices of the region improved in the period 2003-2008, when it achieved historically high growth rates and implemented significant income redistribution policies (see figures II.1 and II.2). Nonetheless, in 2007, just before the outbreak of the global economic and financial crisis, 184 million people in Latin America and the Caribbean, representing 34% of the total population, were still living below the poverty line; and, of these, 68 million (13% of the population) did not have enough income to satisfy their food needs (ECLAC, 2009a). The number of urban residents living in poverty or indigence in that year fell back to the same level as in 1990, having risen throughout the 1990s and until 2005.

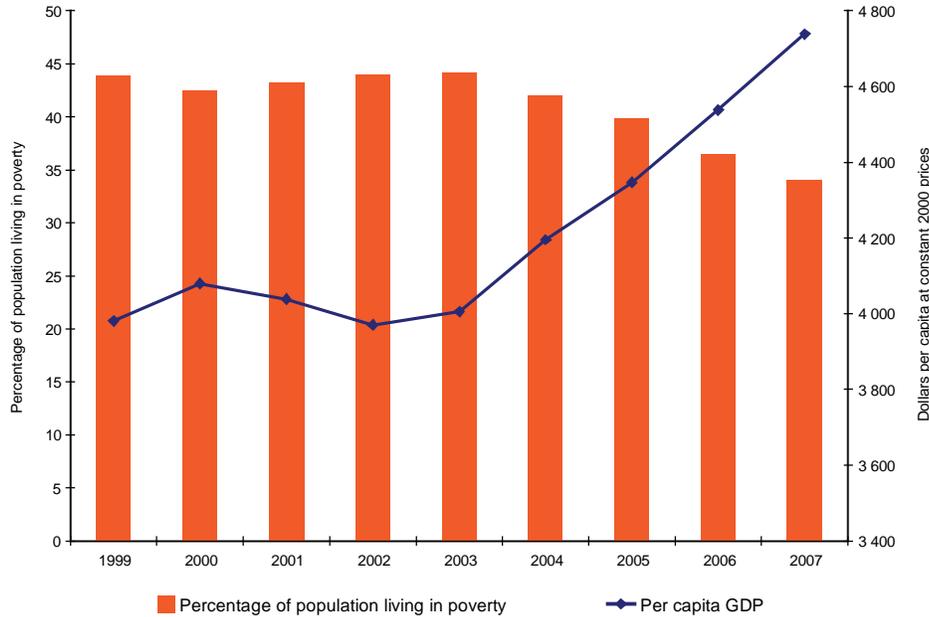
Figure II.1
LATIN AMERICA AND THE CARIBBEAN: REAL GDP GROWTH RATES^a
(Percentages, calculated on the basis of figures in dollars at constant 2000 prices)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Economic indicators and statistics (BADECON) [online database] <http://websie.eclac.cl/sisgen/ConsultaIntegrada.asp>.

^a Preliminary figures for 2008. GDP growth figures for Barbados, Dominica, Guyana and Jamaica are calculated on the basis of GDP at factor cost.

Figure II.2
LATIN AMERICA (18 COUNTRIES): PER CAPITA GDP AND INCIDENCE OF POVERTY, 1999-2007
(Percentages and figures in dollars at constant 2000 prices)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Economic indicators and statistics (BADECON) and Social indicators and statistics [online databases] <http://websie.eclac.cl/sisgen/ConsultaIntegrada.asp?idAplicacion=6>.

The relation between poverty and the environment is circular: poverty underlies a number of major environmental problems; and the poor, in turn, are the worst affected by environmental degradation.

The high level of urbanization in Latin American and the Caribbean means that one of the clearest aspects of this relation is the persistence of large numbers of people living in slums—a social and environmental phenomenon that is deplorable and is recognized as such in target 7.D of Goal 7. Historically, the formation of slums in the region was associated with high demographic growth rates, accompanied by large-scale migration from rural to urban areas, mainly by people already living in poverty. This process was not met by suitable housing policies in the cities; on the contrary, the general thrust of the policies pursued in the region was to resist migration, which forced migrants to occupy marginal land that was ecologically fragile and unsuitable for housing, given its high vulnerability to landslides, exposure to pollution and other factors. The more recent process whereby slums have consolidated and become permanently established is more directly linked to the natural expansion of urban areas and the persistence of high urban poverty rates (UNFPA/IPEA, 2007). The exclusion of large sectors of the population from basic utilities such as drinking water, sanitation, housing and waste management, compounded by the overcrowding and poor ventilation of living spaces and workplaces characteristic of slum dwellings, aggravate health risks, particularly for people who are already weakened by inadequate diets (UNFPA, 2007).

Table II.1
LATIN AMERICA: POOR AND INDIGENT POPULATION, 1980-2007^a
(Millions of people and percentages)

	Millions of people			Percentages of total population		
	Total	Urban	Rural	Total	Urban	Rural
1980	135.9	62.9	73.0	40.5	29.8	59.9
1990	200.2	121.7	78.5	48.3	41.4	65.4
1997	203.8	125.7	78.2	43.5	36.5	63.0
1999	211.4	134.2	77.2	43.8	37.1	63.7
2002	221.4	146.7	74.8	44.0	38.4	61.8
2005	209.0	137.9	71.1	39.8	34.1	58.8
2006	193.5	127.2	66.3	36.3	31.0	54.0
2007	183.9	121.0	62.9	34.1	28.9	52.1

Source: Economic Commission for Latin America and the Caribbean (ECLAC), *Social Panorama of Latin America* (LC/G.2402-P), Santiago, Chile, March 2009. United Nations publication, Sales No. E.08.II.G.89.

^a On the basis of special tabulations of household surveys conducted in the respective countries.

Other aspects of the relation between poverty and environmental deterioration, including land degradation and desertification, are discussed in box II.1, referring specifically to the case of Haiti.

Box II.1

THE VICIOUS CYCLE OF POVERTY AND ENVIRONMENTAL UNSUSTAINABILITY

Poverty and degradation of land

Twenty-five per cent of the land area of Latin America and the Caribbean consists of arid, semi-arid, and sub-humid dry zones. Of this total, 75% displays serious problems of degradation. Most people living in these areas face major constraints on access to land, water, markets and technology. In the attempt to exploit all ways of increasing incomes to secure subsistence for the family unit, marginal factors of production are used, such as low-yielding land and work done by older persons and children. The over-exploitation of land and progressive incorporation of marginal areas result in degradation and desertification; and these, in turn, fuel the search for alternative income sources, triggering migratory processes that break up social and family structures. Migration to the cities shifts the problem of poverty towards urban areas and generates extreme insecurity and vulnerability in rural zones, mainly among women and children, thus perpetuating the cycle of search for marginal land and degradation (Morales, 2005).

The vicious cycle of poverty, demographic dynamics and environmental degradation in Haiti

Owing to the high proportion of people living in poverty there, Haiti is an extreme case, but the dynamics of the population-environment relationship are replicated to varying degrees elsewhere the region. People living in poverty, particularly in rural areas, depend directly on natural resources, the biodiversity that these sustain and ecosystem services (including water, microclimates favourable to agricultural production, and landscapes that generate income from tourism activity). The lack of economic and technological alternatives has led to the over-exploitation of resources, and this fed back into poverty in the country. This pattern is aggravated by the country's demographic dynamics: rapid population growth, migration, high fertility and scant use of contraceptives. Manifestations of this vicious cycle include the following:

Box II.1 (concluded)

- 66% of the country's energy needs are met by wood and coal. The extraction of wood to be used as an energy source and sold as a source of income owing to a lack of economic alternatives, has been one of the main causes of the destruction of vegetation. The consequent erosion and degradation of soils has had disastrous consequences for farming systems that could otherwise sustain a food-security strategy to reduce hunger and poverty. Degradation has undermined agricultural productivity —by between 0.5% and 1.2% per year between 1997 and 2006— causing a serious food-security problem for a growing population.
- Life expectancy is estimated to have decreased by 6.6 years as a result of domestic pollution (inside homes) caused by the use of biomass as a fuel. The acute respiratory infections associated with this type of pollution are the leading cause of death among children under 5 years of age.
- In coastal areas, fishing provides direct employment for 30,000 people, but it is characterized by over-exploitation of inshore fishery resources.
- Haiti suffers from high rates of disease (diarrhoea, dysentery, malaria) owing to a lack of sanitation systems, which results in the contamination of water in coastal areas and drinking water sources. Shortcomings in solid waste management have also been identified as serious risk factors for health, particularly in Port au Prince, Cap-Haitien, Gonaïves and Port-de-Paix.
- The increase in capital-intensive agricultural production has triggered a rural exodus, which in turn has fuelled haphazard urbanization and the proliferation and expansion of slum areas. The existence of “concrete slums” generates major problems in terms of water piping and infiltration. The inhabitants of such settlements are particularly vulnerable to flooding and other weather-related phenomena, in a country whose location and topographic characteristics render it susceptible to hurricanes, drought, earthquakes and tsunamis (Ministry of the Environment of Haiti, 2007).
- The huge infrastructure deficit, particularly in terms of watershed management, the handling of domestic waste, water treatment and roads, also exacerbates the vicious cycle of poverty.

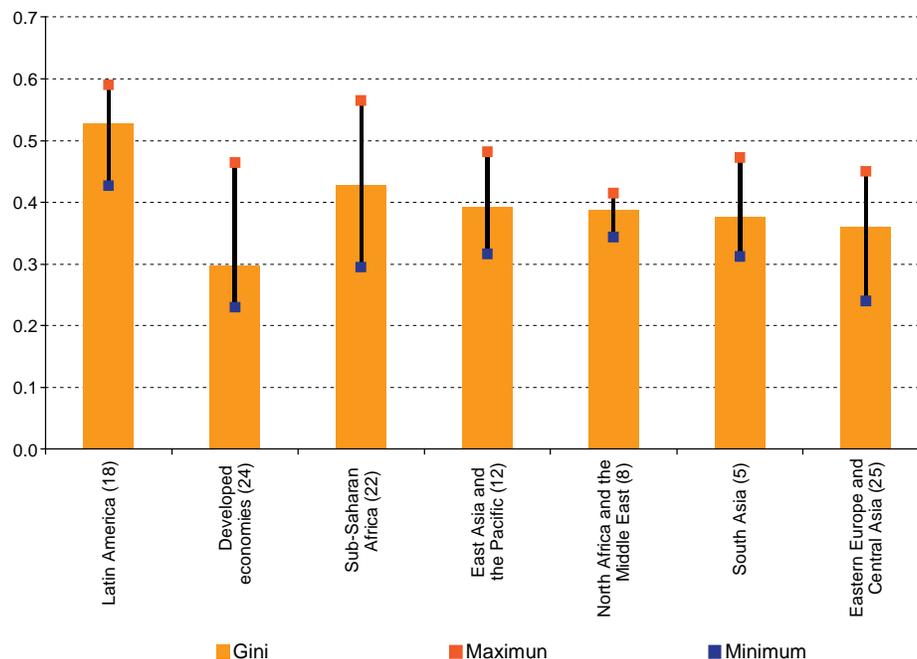
Source: C. Morales, “Pobreza, desertificación, y degradación de tierras”, in *Pobreza, desertificación y degradación de los recursos naturales*, C. Morales and S. Parada (eds.), ECLAC Books, No. 87 (LC/G.2277-P/E), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC)/German Agency for Technical Cooperation (GTZ), 2005, chapter 1; Ministry of the Environment of Haiti, “La rehabilitation de l’environnement et la reduction de la pauvreté en Haïti – Notes d’orientation stratégique destinées a appuyer le processus de consultation pour la prise en compte du secteur environnement dans la préparation du DSRP définitif” [online] <http://www.cepal.org/dmaah/noticias/paginas/9/35479/01-dsrp.pdf>, 18 June 2007.

In societies with high levels of poverty, the most immediate economic objectives tend to take priority over other public-policy goals that are perceived as less urgent. The latter include a number of environmental issues, the solution of which generates benefits only in the medium and long terms, as noted in sections II.B and II.C.

Demographic growth is also linked to poverty. Although the relation between population growth and the environment is neither linear nor direct, there is a consensus that demographic growth puts pressure on the environment, particularly when it is associated with poverty (UNFPA, 2004). Demographic growth rates have fallen in the region as a whole, but they have grown in some of the poorest and most ecologically fragile areas, located, for example, in city outskirts and slums (Martine, 2009). Therefore, fulfilment of the objectives of the Programme of Action of the International Conference on Population and Development held in Cairo, particularly access to reproductive health and family planning services—which people living in poverty typically find difficult to access— could help ease pressures on environmental resources, both short- and long- term and both locally and globally, in addition to their more direct social benefits.

Apart from high levels of poverty, the region also displays high and persistent inequality: 15 out of 18 Latin American and Caribbean countries have Gini coefficients of between 0.5 and 0.6 (ECLAC, 2009b), whereas the equivalent figures in a group of 24 developed countries vary between under 0.25 and around 0.40 (see figure II.3). Given the region's development pattern, distributive inequality can only be reduced through high per capita GDP growth rates (United Nations, 2005). In 2008, following a period of rapid economic growth and the adoption of redistributive policies, the region's Gini coefficients were the lowest recorded since the early 1990s, but they remained high compared to those prevailing in the rest of the world (ECLAC, 2009b).

Figure II.3
**LATIN AMERICA AND OTHER REGIONS OF THE WORLD:
GINI CONCENTRATION INDEX, AROUND 2007^a**



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of special tabulations of household surveys conducted in the respective countries; Luxembourg Income Study (LIS) Key Figures [online] <http://www.lisproject.org/keyfigures.html>; World Income Inequality Database (WIID) [online] http://www.wider.unu.edu/research/Database/en_GB/database/.

^a The regional data are simple averages of the most recent observation available in each country for the period 2000-2006. Owing to differences in data sources, the figures are not strictly comparable and should be used only for reference purposes. The following Latin American countries are included: Argentina (2006) (urban areas), Bolivarian Republic of Venezuela (2007), Brazil (2007), Chile (2006), Colombia (2005), Costa Rica (2007), Dominican Republic (2007), Ecuador (2005), El Salvador (2005), Guatemala (2006), Honduras (2007), Mexico (2006), Nicaragua (2005), Panama (2007), Paraguay (2007), Peru (2003), Plurinational State of Bolivia (2007) and Uruguay (2007) (urban areas).

Inequality has several implications for the achievement of Millennium Development Goal 7. First, in the presence of high levels of inequality, economic growth does not generate a proportional reduction in the number of people living in poverty. This is further evidence that economic growth alone is not sufficient to reduce poverty-related environmental problems.

Second, inequality means that national indicators associated with Goal 7, particularly those relating to the population's socio-economic situation (targets 7.A and 7.B), conceal very different realities in countries and cities, with geographical dimensions that tend to reproduce poverty and social inequality. The fact that a country as a whole is well on the way to attaining a target, or may even have done so, should not diminish the importance and urgency of specific tasks to ensure that the most vulnerable groups and people living in the poorest areas have access to the corresponding services. Box II.2 describes initiatives in this regard. Measurement of these disparities remains limited, however.¹

Box II.2

**FACES, VOICES AND PLACES OF THE MILLENNIUM DEVELOPMENT GOALS
IN THE MOST VULNERABLE MUNICIPALITIES OF THE AMERICAS**

The initiative “Faces, voices and places of the Millennium Development Goals”, implemented by the Pan-American Health Organization (PAHO), is a strategy for attaining the Millennium Development Goals at the local level, starting with the most vulnerable municipalities. It is currently being implemented in 30 municipalities or cantons in 17 countries, based on initial diagnostics that identify the status of the targets and indicators of each Millennium Development Goal, both nationally and at the respective local level. This forms the basis for a participatory diagnostic engaging community leaders and the local mayor's office. Based on specific analyses for each municipality, a baseline is constructed, together with a plan of key interventions for making progress towards the Goals from the health and development standpoints. The strategy aims to strengthen primary health-care systems based in the municipalities, in order to guarantee fair, equitable and sustainable access, facilitating health promotion and addressing the social determinants of health. “Faces, voices and places” is premised on empowering local governments and communities to work towards attaining the Millennium Development Goals from a comprehensive and synergetic perspective. The initiative has been under way since 2007 in the municipalities of Rosario de Mora and Santiago Texacuangos (El Salvador). Using a methodology adapted to the local situation, together with a participatory and multi-sector approach, local health plans address the key social factors that adversely affect health and economic development in each municipality. In relation to Goal 7, a local environmental health board has been set up, and youth groups have been created to promote and organize activities to improve this area.

Source: Pan-American Health Organization (PAHO).

There is also inequality on the supply side of the economy, since modern production structures coexist with large segments of the economy that have lower productivity and income levels and are excluded from technological modernization. Technical progress is concentrated in a few large firms, often linked to the export sector (see section B.2). By way of example, salmon farming has been a major source of export earnings in Chile for 20 years, but it has considerable environmental effects, including the escape of exotic fish species into the marine environment and the production of waste. The fishing activities of the ancestral inhabitants of these zones have suffered, because the fish they used to catch for subsistence have declined sharply in number, driven out by escaped salmon and water pollution. At the same time, coastal zones have been contaminated by a substantial increase in non-degradable solid waste. The presence of a large economically successful, export-oriented industry has thus caused serious environmental deterioration in certain coastal areas and increased local poverty.

¹ The five United Nations regional commissions —ECLAC in Latin America and the Caribbean— are implementing a project funded by the United Nations Development Account, with the following objectives: to propose indicators and additional targets to help measure progress towards achievement of the Millennium Development Goals, taking account of the inclusion of vulnerable groups, the empowerment of women and effective functioning of health systems; to reveal the inequalities that exist at the subnational level and between specific social groups in relation to the Millennium Development Goals; and to disseminate knowledge of the Goals and the social policies needed to attain them.

Also associated with inequality are disparities in access to water, sanitation and adequate housing for the most vulnerable groups—for example indigenous peoples, Afro-descendants and women living in poverty—and in their exposure to the effects of environmental degradation. Estimates based on census micro-data show, for example, that the proportion of people living in overcrowded conditions, with inadequate water supply and deficient sanitary services is higher among the indigenous population.² Some of the national reports on progress towards the Millennium Development Goals (Government of Brazil, 2004; SENPLADES, 2007) also highlight disparities in access to drinking water, sanitation and housing for Afro-descendent people, which are directly linked to the higher levels of poverty prevailing among this population group. In the case of gender inequalities, it is well known that the lack of access to water, sanitation and adequate housing bears more heavily on women than on men. When access to these services is deficient, women and girls spend more time seeking and transporting water, which carries a high opportunity cost by reducing both the time and energy women can devote to productive and paid activities, and the time girls can spend in education (ECLAC and others, 2007).

2. Specialization patterns

During the 1990s and 2000s, Latin American and Caribbean countries intensified their specialization based on static comparative advantages associated with their ample endowment of natural resources or low-cost labour combined with location advantages, or both. In the 1990s, the gathering pace of economic globalization and trade liberalization in the Latin American economies, and the absence of a clear production development and competitiveness strategy, meant that many of the sectors in which local technology capacity had previously been built up were no longer able to compete and became weakened (ECLAC, 2008a).

South America has specialized in natural resources (mining, energy, agricultural) which involve direct and intensive use of land and water, and in energy-intensive and, in many cases, highly polluting natural-resource-based manufactures, which largely coincide with the industries classified by Low and Yeats (2002) as environmentally sensitive.³ This specialization pattern was reinforced by burgeoning demand for the corresponding products fuelled by expansions in emerging economies, such as China, which sustained a commodity-price boom between 2003 and the first half of 2008.

In contrast, the subregion of Mexico, Central America and the Caribbean has exploited its proximity to the North American market and its relatively low labour costs. In the manufacturing sector, these countries have integrated into global value chains mainly at the assembly stage; and, as this stage involves little manufacturing activity as such, the leading industries exporting manufactured products in this subregion have, in themselves, smaller environmental impacts than those engaging in primary activities.⁴

² See the System of Sociodemographic Indicators for Indigenous Peoples and Populations of Latin America (SISPPI) [online] <http://celade.cepal.org/redatam/PRYESP/SISPPI/>.

³ Environmentally sensitive industries consist of 40 three-digit product groups from the Standard International Trade Classification (SITC) that have the highest pollution control and abatement costs. They include paper and pulp, petroleum products, chemicals, wood manufactures, non-metallic mineral manufactures, iron and steel, non-ferrous metals and other metal manufactures. Their pollution control and abatement expenses represent over 1% of their total sales. This classification has been defined in United States on the basis of 1988 data (see Low and Yeats, 1992).

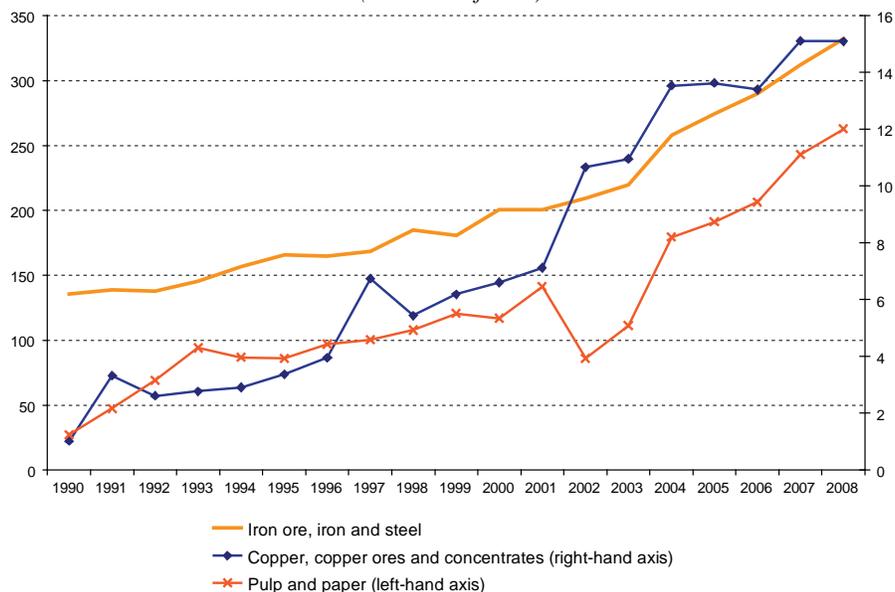
⁴ In fact, the environmental performance of the automotive and electronics industry on Mexico's northern border has improved since the 1990s, as a result of regulatory instruments, certifications and technological progress. The population's access to drinking water in that area also increased from 88% to 93% between 1995 and 2000. Significant progress has also been made in compiling environmental data to produce indicators on atmospheric

Nonetheless, the way that Latin American countries participate in global value chains limits their capacity to upgrade to higher value-added and less environmentally sensitive segments, and to extract greater value from intangible assets such as technology and knowledge. Although the sectors of export manufacturing, particularly in Mexico, may be classified as medium- and high-technology, much of the technology is embedded in imported components, depending heavily on foreign investment and technology. Reliance on low-cost labour as a competitive advantage, compounded by weaknesses in local productive structures, industrial policies and national systems of innovation and technological development in the region's countries, have limited the local linkages generated by assembly manufacturing.

In the Caribbean economies, tourism, developed under various models, has become very important and is a factor of climate-change vulnerability, as discussed in chapter III.

Irrespective of subregional specialization patterns, export volumes of many commodities and environmentally sensitive products have increased significantly since the early 1990s (selected examples are shown in figure II.4). This entails greater use of inputs for their production (natural resources, land, energy, water, agrochemicals), a larger pollution load and heavier pressure on ecosystems and biodiversity.

Figure II.4
**LATIN AMERICA AND THE CARIBBEAN: EXPORT VOLUME OF
 SELECTED PRODUCTS, 1990-2008^a**
 (Millions of tons)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of United Nations Commodity Trade Database (COMTRADE) and foreign trade statistics database (BADECEL).

^a As at October 2009. The product groupings refer to the following codes in the Standard International Trade Classification (SITC), Revision 1: Iron ore, iron and steel - 2813, 2814, 6711, 6712, 67131, 67132, 67133, 6714, 6715, 6721, 67231, 67232, 67233, 67251, 67252, 67253, 67271, 67272, 67273, 6729, 67311, 67312, 67313, 67321, 67322, 67323, 67341, 67342, 67343, 67351, 67352, 67353, 67411, 67412, 67413, 67414, 67421, 67422, 67423, 67431, 67432, 67433, 6747, 67481, 67482, 67501, 67502, 67503, 6761, 6762, 67701, 67702, 67703, 6781, 6782, 6783, 6784, 6785, 6791, 6792, 6793; Copper, copper ores and concentrates - 28311, 28312, 68211, 68212, 68213, 68221, 68222, 68223, 68224, 68225, 68226 Pulp and paper - 2511, 2512, 2515, 2516, 25171, 25172, 25181, 25182, 2519.

emissions and the transport of hazardous waste. Nonetheless, problems of water shortage, atmospheric pollution and hazardous wastes have continued to intensify (Carrillo and Schatan, 2005).

A notable example of the above is the expansion of soybean cultivation in South America over the last decade. According to a FAO study (2007a), in the period 1996-2004 the area cultivated with this oilseed expanded at an average annual rate of 8.4% in Brazil, 11.9% in Argentina, 9.2% in Paraguay, 5.8% in the Plurinational State of Bolivia and 48.2% in Uruguay, compared to a world average of 4.2%. The share of South American countries in the global cultivated area grew from 28.7% in 1990 to 42.6% in 2004 (from 18.8% to 23.6% in Brazil, and from 8.1% to 15.7% in Argentina).

The period of global expansion and high commodity prices between 2003 and 2008 produced major gains for the region, particularly in South America, which benefited from high growth rates and greater fiscal slack to cope with the current global economic and financial crisis. Nonetheless, only a very small proportion of these additional fiscal inflows were channelled into new sources of growth —such as the use of mining rents in activities to build technological and innovation capacity, and up-scaling to higher value-added products within commodity-export processing chains.

Looking ahead, the main opportunities associated with the region's production structure include up-scaling to higher-value-added activities (manufacturing and services), including within natural-resource-intensive sectors, through both product and process innovations (ECLAC, 2008a). There is room to develop new activities of low environmental impact, along with industries producing environmental goods and services, as noted in section II.C and in chapter V. Success in this type of strategy requires a major technological effort and progress in designing incentives for the production sector to ensure levels of profitability that are compatible with business needs. Moreover, as noted in chapters III and V, climate change and the mitigation measures that have been or will be adopted by the developed countries will pose new trade challenges for the region's countries, particularly in high-carbon sectors.

3. The public utilities and infrastructure deficit

The Latin American and Caribbean region endured a long period with little investment in infrastructure, under a predominantly State-directed model that was seriously weakened by the crisis of the 1980s. This was followed in the 1990s by the deregulation and privatization of a number of public services; but this movement raised new problems, and major infrastructure deficits persisted. Deficits in certain key services can undermine environmental sustainability in a wide variety of ways.

Deficiencies in access to drinking water and sanitation, and the persistence of slums —reflected in targets 7.C and 7.D— are directly linked to problems in efficiently supplying public services and infrastructure. In addition to their cost in terms of human health and well-being, these shortcomings also have repercussions on environmental quality. For example, while the large-scale use of on-site systems (such as latrines and septic tanks) can be seen as a suitable alternative in rural areas, it is not the most appropriate technological solution in urban zones, and has resulted in the pollution of groundwater in a number of cities (Ordoqui Urcelay, 2007).

In relation to other aspects of environmental sustainability, the lack of public services leads to inefficient individual consumption decisions. For example, quantity or quality deficiencies (or both) in public transport systems fuel the growth of private transport, generating high user costs and urban pollution and congestion. Between 1990 and 2007, the rate of motorization (number of automobiles per person) rose by 112% (6.6% annual growth) (see chapter IV). The vehicle fleet circulating in Brazil, Mexico, Chile and Colombia tripled (a 53-million increase) between 1990 and 2007, with 40% of this growth occurring between 2003 and 2007 (according to figures from the Database of Environmental Statistics and Indicators for Latin America and the Caribbean (BADEIMA) of ECLAC).

Moreover, the legal and regulatory parameters that steer public and private investment decisions generally fail to measure the social cost of environmental externalities generated by certain activities. Instead, they prioritize technological alternatives that offer higher short-term profitability, even when there are long-term options that are more profitable, more economical and less polluting in the long run.

In terms of energy infrastructure, the models implemented on the basis of the 1990s reforms generally did not encourage investment in renewable energy sources, which have higher fixed costs. On the contrary, the regulatory framework established generated a bias towards hydrocarbons and against hydroenergy, and in general towards projects of shorter-term profitability (Sánchez Albavera and Altomonte, 1997; ECLAC/OLADE/GTZ, 2003). The reforms reduced the State's capacity to affect investment decisions in the sector and failed to generate adequate incentives for investment (in generation, transmission, gas transport and other segments) to make it possible to sustainably meet the growth in demand in the region. Since the mid-1990s, there has been an increase in greenhouse gas emissions caused by the use of fossil fuels in the region's energy systems. Nonetheless, from 2004 onwards, largely in response to the prospect of a sustained rise in oil prices and the priority afforded to consolidating energy security, significant progress has been made towards more sustainable energy models, through energy efficiency and the development of renewable energy sources. The results achieved by the set of programmes adopted to improve energy efficiency in Brazil, Chile and Mexico,⁵ and the promotion of renewable energy sources in Brazil,⁶ are relevant in this regard. In the Caribbean, while relatively little progress has been made on energy efficiency, there are some interesting examples of incentives for renewable energies.⁷

The larger freight volume transported within the region between 2000 and 2007, particularly in South America, was carried mainly by road haulage rather than by less polluting waterborne (maritime, river and lake) modes. The current modal split reflects the structuring of logistics chains, and political and legal constraints that restrict waterborne merchandise transport. This not only has environmental implications owing to transport emissions, but is also reflected in higher product prices. Redesigning infrastructure and transport systems towards a low-carbon infrastructure and less polluting and more energy-efficient modes would help reduce the sector's environmental impact and improve the economy's overall competitiveness and productivity, provided such redesign factored in economic and social development policies rather than implementing measures in the disjointed and unimodal manner seen hitherto.

Experience of the Initiative for the Integration of Regional Infrastructure in South America (IIRSA) reveals the tension that exists between the need to increase and improve the supply of infrastructure in and between the region's countries, and the challenges of dealing with the environmental and social impacts of major infrastructure programmes.⁸ The IIRSA experience also reflects the

⁵ Electricity Conservation Programme (Procel) [online] http://www.eletrabras.gov.br/EM_Programas_Procel/default.asp; Energy efficiency country programme [online] <http://www.ppee.cl>; Official Mexican regulations on energy efficiency [online] http://www.conae.gob.mx/wb/CONAE/CONA_22_normas_oficiales_mex; Electric Power Saving Trust Fund (FIDE) [online] <http://www.fide.org.mx/>.

⁶ Alternative Sources of Energy Incentive Programme (PROINFA) [online] <http://www.mme.gov.br/programas/proinfa>.

⁷ These include the introduction of ethanol (mixed with gasoline) as an automobile fuel in Jamaica, expansion of the use of solar energy for water heating in Barbados, and the exploitation of geothermal energy in Saint Kitts and Nevis.

⁸ The Initiative for the Integration of Regional Infrastructure in South America (IIRSA) is a dialogue forum for the authorities responsible for transport, energy and communications infrastructure in the 12 South American countries. It seeks to promote infrastructure development in the subregion and improve connectivity between the various countries.

difficulties of an incipient paradigm shift towards the integration of sustainable development principles in the region's public policies and programmes (see section B). IIRSA has been criticized for having been set up without due attention to its environmental and social impacts, particularly in highly sensitive regions such as the Amazon; for focusing its environmental impact assessments on specific projects rather than the programme as a whole; and for failing to adequately evaluate the costs or provide effective mechanisms to coordinate the stakeholders involved (Killeen, 2007; Cárcamo-Díaz and Goddard, 2008). However, environmental sustainability mechanisms and tools have gradually been incorporated into its institutional framework and a Strategic Environmental and Social Evaluation Methodology has been developed. The Meso-America Project (formerly the Puebla-Panama Plan) has made similar progress, establishing the Meso-American Strategy for Environmental Sustainability, which includes regional measures to address the strategic areas of biodiversity and forests, climate change and sustainable competitiveness (cleaner production actions, strategic environmental impact assessment for infrastructure and mining projects and other economic activities). It is too early to assess the effectiveness of these measures. Since the initial concept—which accorded relatively little value to the environmental and social costs of its projects—was augmented later by economic- and social-impact assessment mechanisms, the practical effectiveness of these is still uncertain.

An important factor in the future of the region's infrastructure and its capacity to contribute to environmental sustainability is population growth and geographical distribution. Although migration from rural areas has diminished, it still affects urban growth; and the fact that it does so alongside intra-urban migration calls for urban management and infrastructure development mechanisms. Within metropolitan areas, higher-income groups tend to converge in the centre, while the poor are dispersed in outlying areas, which in the absence of adequate and accessible transport services poses an additional challenge for their engagement with the labour market. Suburbanization is also occurring among higher-income groups, who make long daily journeys that have a corresponding cost in terms of emissions and demand for road space, compounded by the pressure of real estate development on potentially environmentally sensitive areas. Intermediate-sized cities are also expanding, in some cases as a result of net negative migration of the large cities (Jiménez, 2009; Rodríguez, 2008). Moreover, new migratory movements may occur as a result of climate change, as noted in chapter III. All of these factors impose new demands for infrastructure development. Chapter IV mentions a number of the specific challenges of sustainable urban development.

While the regional infrastructure deficit imposes major fiscal challenges, it also represents an opportunity for the region to leapfrog certain stages and adopt environmentally sustainable technologies and practices, if it makes the investments needed to overcome existing shortcomings. The injection of resources to overcome the current global economic and financial crisis represents such an opportunity (see section C).

B. THE INSTITUTIONAL AND POLICY SETTING

The various issues addressed in Millennium Development Goal 7 depend on numerous stakeholders, both in the public domain and in the private sector and civil society. This section discusses the key characteristics and trends seen in the region with regard to the main stakeholders and their work.

1. The State, institutions and public policies

Target 7.A calls for integration of the principles of sustainable development into country policies and programmes and a reversal of the loss of environmental resources. In this regard, most of the political constitutions of the Latin American and Caribbean countries have been reformed or rewritten in the last 20 years—in some cases more than once—as part of the consolidation and continuity of democracy; and environmental rights and duties have been defined in the new laws.⁹ In addition, all countries of the region, without exception, have now enacted framework laws, some of which have already been reformed, and have set up public institutions devoted to the environment.

At the same time, a wide variety and large number of environmental protection policies have been implemented in the region, dealing with sustainable management of forests, coastal zones and other environmentally sensitive areas; conservation of biodiversity; and reduction of atmospheric pollution, among other issues. Internationally, the countries of the region have signed the main environmental multilateral agreements, and the trade integration processes in which they have participated address environmental issues.

Nonetheless, the data contained in chapter IV of this report, supported by other assessments of environmental status in the region (UNEP, 2003a and 2009a; World Bank, 2008a) show that this progress has not been entirely effective. The creation of an environmental public sector—comprising legislation, policies, institutions and professionals devoted to this issue—has encountered major obstacles to progress, compared to other public sectors backed by vested interests which attach little value to the environment (and, therefore, to the benefits of conserving it), even for their own sector objectives. Moreover, many public policies relating to the targets of the Millennium Development Goals are reflected in regulations that are sometimes ineffective and inefficient, either in their formulation or in their application.

As early as 1992, the Rio Declaration on Environment and Development established the principle that the environment must form an integral part of the development process and cannot be considered in isolation from it. Millennium Development Goal 7 refers specifically to this challenge, by making its first target the integration of the principles of sustainable development in the formulation and execution of public policies and programmes, which have other key objectives such as economic growth, expansion of trade, job creation, energy security, agricultural development or mining activity. Nonetheless, environmental policies continue to function more in terms of a regulatory framework and specific institutions, which are often ranked below other spheres of public policy, and have a lower priority in the allocation of financial and human resources.

A first step in this integration entails accepting and integrating the principles of sustainable development into the guidelines of government policies, plans and programmes. Some progress has been achieved on this in the region, as shown by various programmatic policy documents (see box II.3).

⁹ See UNEP (2001).

Box II.3

**EXAMPLES OF PROGRESS MADE BY LATIN AMERICAN AND CARIBBEAN COUNTRIES
TO INCORPORATE THE PRINCIPLES OF SUSTAINABLE DEVELOPMENT
INTO GOVERNMENT POLICIES, PLANS AND PROGRAMMES**

Brazil's Production Development Policy (2008) states that production development should go hand in hand with reducing environmental impact and exploiting the opportunities created by clean technologies.

The new guidelines of Chile's energy policy treat compatibility with sustainable development as a guiding principle (Tokman, 2008).

In Mexico, the 2007-2012 National Development Plan includes environmental sustainability as one of the five pillars of the country's development policy. The crosscutting strategy adopted aims to promote sustainable development through inter-sectoral coordination of strategies, actions and targets contained in sector programmes; integrating and ranking the various public policies, and generating synergies between economic growth, well-being and sustainability.

In the Caribbean, several countries have incorporated sustainable development principles into their strategic plans. Trinidad and Tobago's "Vision 2020" document, adopted in 2007 as a strategic plan for the country's economic transformation, refers to human development in its economic, social, security and environmental components. It calls for the environment to be valued as a national asset and expresses concern for the benefit of future generations and the international community. Jamaica's national development plan "Vision 2030" includes sustainability among its strategic principles and priorities, in the sense of integrating economic, social and environmental issues. The 2006-2025 national strategic plan in Barbados proclaims the principles of protecting the environment, strengthening physical infrastructure and shifting the economy's energy base towards renewable sources. Aruba is currently developing its plan for the period up to 2025, which deals with the topic of energy and climate change in an integrated way.

Source: United Nations, on the basis of official documents.

These declarations are important in demonstrating acceptance of the concept of sustainable development as a desirable objective for societies and their Governments. Nonetheless, in practice, the corresponding policies have often been designed and implemented on an isolated basis, within sector institutional frameworks that operate relatively autonomously, in some cases reflecting conflicting goals. Moreover, despite the concept's extremely wide dissemination, sustainable development has not yet been reflected clearly and stably in the institutional mechanisms of public policies in the region's countries. The mandate of the Rio Declaration to set up sustainable development councils, either with specific power to influence decision-making processes or of a consultative nature—which have predominated in practice—has not generated debate or a reorientation of policies and programmes towards sustainable development. Slow to consolidate and with unstable activities, they remain a social desire rather than clearly established vehicles for debate and adoption of recommendations.

A lack of coordination and consistency in policy and decision-making within the public apparatus has been a recurrent theme in most of the region's countries. This has generated conflicts that have manifested themselves in a wide variety of ways: ranging from those that are merely latent in simple policy ineffectiveness, to more explicit conflicts that can become violent. Despite regulatory development, the definition of standards, constitutional guarantees and the whole established legal framework, socio-environmental conflicts have become more visible, and litigation seems to have proliferated. The seriousness of some of these disputes has had repercussions beyond national borders, for example when they have involved the use of shared resources. The emergence of opportunities or major obstacles to policy integration is associated with the winds of change in subregional and national agreements, partnerships with key countries, public investment strategies and priorities, among other things (see box II.4).

Box II.4

**CHANGES IN REGULATIONS GOVERNING FOREIGN INVESTMENT AND LAND USE
AND THEIR IMPACT ON SOCIAL GROUPS: INDIGENOUS CONFLICT
OVER LAND IN THE PERUVIAN AMAZON**

In June 2009, protests broke out among the indigenous communities of the Peruvian Amazon and other settlers in the eastern region of Peru against a set of laws issued by the government in June 2008 to encourage investment in Peru's Amazon region and adapt domestic laws to the free trade agreement signed with the United States. Implementation of the most disputed decrees, Nos. 1090, the Forestry and Wild Fauna Act, and 1064, which defines the legal regime governing agricultural land, has been suspended indefinitely by the authorities, while they assess the dispute.

Indigenous communities blame the conflict on the lack of opportunities to participate in drafting the content of these laws, which directly affect them, and they claim they are unconstitutional because, despite being referred to as legislative decrees, they have not been properly discussed in the Peruvian Congress. The protests extended beyond the decrees promoting investment in land areas that were already under a special regime: they also questioned the political discourse and policies in general, which are seen as threatening property rights and the use of their land.

The debate and dispute drew attention to the persistent political and social failure to grasp the complexity of the issue of Peru's Amazon peoples, who in fact represent several and total around 300,000 people or 1% of the country's population. For the native peoples, who in many cases have a warrior culture, defence of the land and its environment are vital, so a battle to prevent the extinction of nature is also a struggle against the extinction of their culture, which is intimately linked to the natural world.

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of "Hechos y aspectos vulneratorios de los decretos legislativos 1090 y 1064", *Derecho, ambiente y recursos naturales (DAR)*, June 2009; and *El País*, Madrid, 14 June 2009.

A second step towards effective integration of the principles of sustainable development into public policies involves reviewing and subsequently altering or eliminating measures or distortions that produce imbalances between sector objectives and environmental protection. There are persistent distortions in many countries, generated by public guarantees provided in the form of contingent liabilities (in other words, State compensation for damage caused in accidents attributable to environmentally risky business behaviour), and subsidies, tax relief and exemptions implemented to encourage specific economic activities or to promote demand, such as subsidized credit for livestock breeding in areas prone to deforestation (Acquatella and Bárcena, 2005, p. 19).

At the same time, policy measures and tools need to be identified and proactively adopted, along with management technologies or techniques that allow sector objectives to be achieved alongside environmental sustainability. In Latin America and the Caribbean, significant progress has been made in implementing measures that respond to environmental and sector objectives simultaneously, such as energy efficiency and an expansion of renewable energy sources. Nonetheless, the implementation of "win-win" solutions has been the exception rather than the rule; and in decision-making disputes, sector objectives tend to prevail over environmental ones. Evidence of this is the scant importance accorded to the environment in the response by the region's countries to the global economic and financial crisis (see section II.C).

The difficulty of integrating environmental sustainability into policies and programmes can be blamed at least partly on information failures that lead to inappropriate resource allocation. The separation and ranking of environmental protection objectives on the one hand, and public policy goals (growth, employment, poverty reduction) on the other, is, at least in part, a result of an as yet incomplete understanding of the role played by the environment in sustaining economic activity and long-term prosperity. Analogously to the behaviour of private agents in the absence of adequate regulation, by

failing to consider environmental degradation as a cost, public agents in many cases prioritize activities that generate short-term benefits but are not environmentally desirable.

In addition to the difficulties mentioned above, another environmental management problem is that political or administrative structures seldom coincide with land areas that are physically connected through watersheds and ecosystems. Integrating environmental aspects into urban management policies is particularly important in this situation (see box II.5).

Box II.5

THE INSTITUTIONAL CHALLENGE IN URBAN MANAGEMENT

Latin America and the Caribbean is the world's most urbanized developing region. Urban growth processes show cities moving towards re-densification and changes in land-use intensity, along with increases in intra-urban inequalities. The greatest urban growth is currently taking place in small cities, some of them under pressure from tourism, and in industrial conurbations pursuing efficient scales for national and global production.

The region stands out in the developing world for its high level of political and administrative decentralization. Issues such as the approval of urban development and building, supply of drinking water and sanitation services, and solid waste management, among other issues, are handled subnationally in nearly all Latin American and Caribbean countries. Nonetheless, despite some progress, there is still a mismatch between administrative and financial decentralization; in other words, many subregional governments have sufficient administrative autonomy to fulfil their tasks but lack the financial resources to do so (Cetrángolo, 2007). The urban-territorial management schemes and public-private partnerships for the provision of services and urban infrastructure existing today in the region show poor understanding of the inter-sectoral complexity of urban issues. The structures and tools for promoting urban development and sustainable housing are institutionally, functionally and operationally obsolete and there is no strategic vision of urban-territorial management that links habitability, functionality, productivity and governance in the local area concerned. All of this delays improvements in the quality of life among the poorest and most vulnerable population groups, particularly in terms of access to basic public goods and services.

Source: Economic Commission for Latin America and the Caribbean (ECLAC) and United Nations Human Settlements Programme (United Nations-Habitat), on the basis of O. Cetrángolo, "Financiamiento municipal y combate contra la pobreza: ejes de análisis", *Medio ambiente y desarrollo series*, No. 134 (LC/L.2796-P), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), December 2007.

The prominence that climate change has acquired on public agendas (see chapter III) could help to effectively integrate the concept of environmental sustainability in the formulation and execution of public policies. Due to its likely impact on the global economy and economic and business models, the importance of climate change and measures taken globally to mitigate it could afford environmental issues a more central position in public economic, production development and infrastructure policies, particularly if the economic and social costs of climate change inaction are taken into account in decision-making by public and private agents, and the regulations are appropriately adapted. The other face of this opportunity, however, is the risk that the importance accorded to climate change by public and private entities eclipses the numerous other environmental problems and priorities that exist.

The State provides the framework for action by the other stakeholders. The persistent difficulties in integrating the principles of sustainable development into public policies is a key factor in private-sector behaviour (an issue that is analysed in the following section) and in the investment decisions of public and private agents, as mentioned above in relation to infrastructure. An important area of interaction between the public and private sectors is the commitment assumed in 2002 during the World Summit on Sustainable Development in Johannesburg, South Africa, to move towards sustainable

patterns of consumption and production (see box II.6). Progress in terms of policies and the institutional framework for access to environmental information and justice —key factors for the capacity of action of civil society on environmental issues— are described in subsection 3.

Box II.6

SUSTAINABLE CONSUMPTION AND PRODUCTION IN LATIN AMERICA AND THE CARIBBEAN

The World Summit on Sustainable Development, held in Johannesburg, South Africa, established the commitment to develop a 10-year framework of programmes for sustainable consumption and production. Sustainable consumption has been defined as the “the use of goods and services which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as emissions of waste and pollutants over the life cycle of the good or service so as not to jeopardize the needs of future generations.” The concept of sustainable production is similar to cleaner production, which in turn is defined as “the continuous application of an integrated preventive environmental strategy to processes, products and services to increase overall efficiency, and reduce risks to human health and the environment” (UNEP/CEGESTI, 2009).

Although the adoption of sustainable consumption and production patterns depends directly on private behaviour, progress in this area cannot be made without government initiatives and mechanisms. A recent diagnostic on the state of progress in the region shows the following:

- Countries have started to formalize mechanisms to move towards sustainable consumption and production patterns, although implementation is as yet incipient.
- Greater progress has been made in production than in consumption, where initiatives have been limited; a recent example is the establishment of sustainable government procurement mechanisms.
- In sustainable consumption and production strategies, the evolution of the private-sector towards corporate social responsibility has been little exploited.
- Investments have been made in training, but these initiatives could be better exploited through greater exchange within the region.
- Weaknesses persist in the legal framework and its applicability to sustainable consumption and production issues (such as solid waste, water, maximum pollution levels, and responsibility for environmental damage, among other issues) and the potential of economic instruments has not been exploited.
- The various subregions have different production specialization patterns that need to be taken into account when defining sector priorities. Cleaner production experiences developed by the subregions for their own production sectors are a major factor to be considered in potential intraregional cooperation programmes.
- Social exclusion and poverty undermine the successful implementation of sustainable consumption programmes. Alongside poverty reduction programmes, it is important to consider the supply of sustainable products at affordable prices, particularly food (which accounts for 70% of consumption among most of the population).

Source: United Nations Environment Programme (UNEP)/CEGESTI, *Consumo y producción sustentable (CPS) - Estado de avances en América Latina y el Caribe*, 2009.

2. Business and the private sector

Substantial progress has been made in terms of business environmental performance since the early 1990s. Two examples of this progress are the development of corporate social responsibility strategies and the adoption of environmental management technologies and systems to combat pollution and fulfil environmental regulations and standards, as shown, for example, through the growing number of firms possessing ISO 14001 certification. This trend is explained, among other factors, by the development of environmental legislation, as described in the previous section, and by the conditions imposed by markets, particularly at export destinations. Initiatives that promote corporate responsibility —such as the United

Nations Global Compact Initiative— have taken hold in a growing number of firms in Latin America and the Caribbean.

Progress in terms of business behaviour is by no means homogeneous throughout all production sectors and firms, but varies widely according to firms' size, ownership and financing mechanisms, among other points.

Large firms —whether transnational or local— linked to the global market through exports, investments and access to international capital markets, have several advantages over smaller businesses, both in terms of their capacity to implement environmental management measures and corporate social responsibility strategies, and in terms of the profitability they obtain from such initiatives. In addition to financial capacity and access to technologies and management practices that enable them to minimize their environmental impacts, the fact that they are subject to stricter legislation in some parts of the world than in others has led many of them to adopt global corporate practices that reflect the highest standard. Staying one step ahead in complying with the law opens up opportunities that they tend to exploit ahead of the competition. As these firms sell to environmentally demanding markets, they are quicker to recoup the cost of the investment in environmental management and certification systems.¹⁰ The transaction costs of certification processes are relatively lower for large firms than for SMEs. Moreover, as many of them are corporations with publicly traded equity and hold a significant part of their net worth in the form of intangible assets, such as brands, they are highly susceptible to public opinion. In other words, good environmental behaviour is a key factor for their competitiveness and economic performance.

Nonetheless, critics claim that these actions, which are usually intensively publicized, have a relatively small impact on the environment and communities, and do not compensate for the broader environmental damage and social consequences inherent in the scale of their activities.¹¹

The environmental effects of business activities depend largely on the nature of those activities, which, in turn, is determined by the specialization pattern in each country or region. As noted in section A of this chapter, a significant share of the region's economies, is accounted for by sectors and activities that are highly sensitive environmentally, since they involve the extraction of natural resources, compete for land use with ecosystemic services such as carbon dioxide capture and biodiversity protection, or consume large amounts of energy, such as many manufacturing industries. Of the 50 largest firms in the region, 25 (including the five largest) operate in primary activities or the processing of natural resources (hydrocarbons, mining, agribusiness, steel-metallurgy, petrochemicals). Many smaller firms, including SMEs, operate within productive chains associated with the large firms in these sectors. Despite some progress towards production diversification, the specialization patterns are not showing clear signs of change (ECLAC, 2008a).

¹⁰ ISO 26000 is currently being developed (expected to be in force in 2010), to certify the implementation of social responsibility structures or frameworks. There are also a variety of international and national standards, both general and at the sector level, which firms are adopting on a voluntary basis. At the national level, for example, Brazil has implemented social responsibility standards (ABNT 16001) (Alonso, 2006).

¹¹ Corporate social responsibility strategies cover a wide range of approaches, with different degrees of transparency and specific focuses. Not all of them address environmental issues, nor have indicators been developed to measure enterprise environmental performance. Despite these shortcomings, the potential of corporate social responsibility as a tool of competitiveness makes it worth promoting, alongside legislation and the necessary regulatory tools to ensure the environmental sustainability of business activity. To play a more important role, an institutional framework is needed to facilitate public-private partnerships and integrate a social and environmental agenda within the domain of business activities. See further details on the global framework of development strategies and public-private partnerships in chapter IV of ECLAC (2008a).

SME behaviour has been highly heterogeneous, reflecting their various motivations and challenges. Export SMEs and those participating in global value chains have made more progress in terms of environmental management and corporate social responsibility strategies.¹² The most frequent voluntary initiatives are consumption efficiency programmes (water and energy), which suggests that they are motivated mainly by economic considerations (Vives, Corral and Isusi, 2005). Nonetheless, numerous SMEs still do not comply with current environmental legislation, among other reasons because of ignorance of the law or of the environmental impact that they actually generate. Compliance is weaker among the smaller firms, which is associated with financing and technical constraints and informality (see box II.7).

Box II.7

DIFFICULTIES IN MOVING TOWARDS SUSTAINABLE DEVELOPMENT FOR SMEs IN LATIN AMERICA AND THE CARIBBEAN

Over the last few years, a variety of tools and instruments have been proposed and implemented to promote triple outcome management (economic-financial, environmental and social). These include the IFC guidelines for implementing and evaluating responsible management systems (see [online] <http://www.ifc.org>); the guide for SMEs of the Global Reporting Initiative (GRI) (see [online] <http://www.globalreporting.org>); the IndicaRSE indicators system, developed by CentraRSE in Guatemala and now used in several Central American countries (see [online] <http://www.centrase.org>); the indicators tool of the Business Council for Sustainable Development in Colombia (CECODES), implemented since 1995 (see [online] <http://www.cecodes.org.co>); and the systems proposed by Ethos in Brazil and the Argentine Institute of Business Social Responsibility (IARSE) (see [online] <http://www.iarse.org>). There are also specific indicators for each industrial sector, such as those proposed by the Forest Stewardship Council (FSC) on sustainable forestry management (see [online] <http://www.fsc.org>); the sustainable development indicators for tourism destinations of the World Tourism Organization (UNWTO) (see [online] <http://pub.unwto.org/>); or the Standard Zero for Fair Trade Artisanal Gold and Associated Silver and Platinum (see [online] <http://www.communitymining.org/spanish>).

Nonetheless, the results of various research projects and experience gained by those working in this field in the region reveal the difficulties faced by SMEs in adopting environmental protection measures. One of the main problems is poor understanding of the business benefits to be gained from social and environmental management. A recent study stresses the importance of in-depth knowledge of firms and understanding the motivations and obstacles driving their environmental behaviour, because the diversity among SMEs in many cases outweighs the shared characteristics owed to their size. This study also proposes a social responsibility vision as a process of change, integrated into the management of the business itself, with the aim of generating financial value from social and environmental considerations that are increasingly valued by markets. Improving a firm's responsibility is a matter not of integrating complex concepts or installing processes and measurements that are unrelated to the business, but of using common sense to find ways to improve it, by applying social and environmental considerations. The major importance of SMEs in the region's employment and economies and their well-known lack of resources make them preferential targets for support in initiatives to promote sustainable consumption and production (UNEP/CEGESTI, 2009).

Source: M. E. Correa, "Promover la responsabilidad social corporativa en pequeñas y medianas empresas en América Latina y el Caribe", report of the second phase of the project "Promotion of Corporate Social Responsibility (CSR) among Small and Medium-sized Enterprises in the Caribbean region, Organization of American States (OAS), Economic Commission for Latin America and the Caribbean (ECLAC), Young American Business Trust (YABT), 2009, forthcoming; and United Nations Environment Programme (UNEP)/CEGESTI, *Consumo y producción sustentable (CPS) - Estado de avances en América Latina y el Caribe*, 2009.

¹² A recent study shows that 48% of Latin American SMEs undertake corporate social responsibility activities in relation to the environment. In the Caribbean, 34% of SMEs in Trinidad and Tobago, 17% in Jamaica and Saint Lucia and 18% in Guyana reported that their corporate social responsibility programmes contributed to the national sustainable development targets, according to the results of the survey on social responsibility in this type of firm (Nuñez, 2008).

The financial sector has major potential to affect the behaviour of the private sector. Several of the region's banks —and transnational banks with operations in the region— have adopted measures aimed at financing environmentally safe and sustainable investments. The financial sector has also undertaken initiatives to value environmental risk in its investment decisions, and to demand fulfilment of environmental legislation from its customers. These measures have been promoted through international actions such as the UNEP Finance Initiative (UNEP-FI) and the Equator Principles of the International Finance Corporation (IFC). Nonetheless, the scope and effectiveness of sustainability strategies in the banking sector are not yet clear. The initiatives implemented have not elicited an exhaustive review of financing criteria for the range of projects financed by each institution. There are different channels for projects directly related to environmental objectives, instead of ecological and sustainability criteria being applicable to all of the institution's projects. This has generated distortions, such as parallel financing of projects to solve environmental problems and economic activities that could aggravate those same problems.¹³

Several private initiatives have directly contributed to the fulfilment of Millennium Development Goal 7 and, in particular, targets 7.A and 7.B (associated with reducing the loss of environmental resources and biodiversity). The “Soybean moratorium” in Brazil, established in 2006 and renewed until 2010, is a promising example. This is an agreement between industry and environmental organizations that commits large firms of the Brazilian Oilseed Processors Association (ABIOVE) and the National Association of Cereals Exporters (ANEC), which account for 90% of soybean purchasing power in Brazil, to refrain from purchasing this oilseed from recently deforested Amazon areas.

On a voluntary basis, firms have also contributed to the financing of protected areas and forest reserves, projects to recover degraded areas, strategies for sustainable use of forestry and marine resources, control of atmospheric pollution with higher standards than those imposed by governments, and support for projects to conserve threatened species, among other initiatives. They have also been very active in the development of markets for environmentally safe goods and services, such as organic agriculture. In general terms, significant progress has been made on specific aspects such as the consumption of ozone-depleting substances (see chapter IV). Nonetheless, as a whole, business activity in the region, which is natural-resource-, land- and energy-intensive, continues to have powerful direct and indirect impacts on environmental resources. The expansion of the agricultural frontier to the detriment of native forest in the Amazon region, the destruction of habitats by large-scale extractive or tourism projects in the Caribbean, over-exploitation of fishery resources and the environmental and social consequences of salmon farming in Chile are just some examples. Furthermore, the environmental performance of the private sector in the region is limited by capacity constraints and lack of knowledge among many firms, particularly SMEs, compounded by high indices of labour market informality.

The private sector has a very particular relation with the fulfilment of target 7.C (access to drinking water and basic sanitation services). In the 1990s, several of the region's countries implemented systems for private-sector participation in the supply of water and sanitation services. Argentina and Chile privatized the provision of services to most of the urban population, whereas in other countries the private sector has participated in only a few regions or cities. In some cases, private participation in the sector helped finance infrastructure and raise the efficiency of service provision and improve coverage and quality. Nonetheless, regionwide, service coverage was broadly similar in areas with and without private participation (Clarke, Kosec and Wallsten, 2004).

¹³ Public banks are facing the same challenge. Work has been done to include sustainability criteria in banking operations, such as the 1995 Green Protocol of Brazil's public banks, which was renewed in 2008. These initiatives are still maturing, however.

Moreover, the characteristics of the privatization process—including the speed with which changes were carried out, prejudices and ideological notions regarding the State’s regulatory role, lack of knowledge of the structural constraints on national economies, macroeconomic instability, lack of regulatory experience and the low initial level of service charges, among other things— have resulted in multiple controversies, disputes, renegotiations, and many failures (for example in Argentina and the Plurinational State of Bolivia). An estimated 75% of private participation contracts in the sector have been renegotiated, with an average time lapse between renegotiations of just 19 months. In most cases, renegotiations have meant delays and reductions in investment obligations, together with price hikes (Estache, Guasch and Trujillo, 2003).

An important lesson to be drawn from the failures of several privatizations in the sector is that, if national economies are unable to generate sufficient resources to pay for services through wages and taxes, foreign investors alone will not contribute additional economic resources, since the services will not be sustainable. Hence the need to analyse carefully the economic and financial sustainability of the respective contracts, the population’s payment capacity, the sources or conditions of financing, and other structural constraints arising out of national economies.

It should be added that some of the strategies adopted by the region’s countries to attract private foreign investment into the sector carry a high risk of generating contingent liabilities for the State. This not only undermines service sustainability, but also results in regressive distributions and lower economic growth potential, since the resources used to finance the payment of services are not adapted to local conditions. The most common examples of strategies of this type are the foreign-currency indexation of prices, and contracts containing compulsory purchase and stabilization clauses that prohibit the amendment of national laws and regulations.

3. Civil society: access to information, participation and environmental justice

Since the early 1990s, civil society has played an increasingly important role in countries’ environmental and sustainability performance. The community is not only spontaneously organizing to react against the various environmental issues that could affect their quality of life, but is increasingly participating in organizations that seek to improve sustainability in the local, national and global domains.¹⁴ The effectiveness of civil society’s contribution to the environmental process, and to Goal 7 in particular, depends largely on access to the mechanisms included in Principle 10 of the Rio Declaration on Environment and Development: (i) access to information; (ii) arrangements for citizen participation in decisions affecting their communities; and (iii) access to justice. States have made notable efforts in this regard, particularly in terms of legislation on these issues. Examples include the federal law on access to information and transparency in Mexico (2002) and the recent transparency law in Chile (2009).¹⁵ In general, the challenge is to consolidate the implementation of these regulations.

¹⁴ A recent study in Brazil shows that the number of non-profit organizations working on environmental issues grew by 60% between 2002 and 2005, in contrast to an average of 22% for all. Nonetheless, in non-profits absolute terms, environmental organizations remain relatively few (under 1% of the total), compared to associations associated with religion, defence of rights or culture, and professional associations (IBGE, 2005).

¹⁵ In Chile, the recently enacted Law No. 20.285 on civil service transparency and access to information on State administration (August 2009) recognizes people’s right to access public information, and identifies exceptions justifying the reserve of information. In addition, the law assumes all information held by government bodies to be public, unless subject to legal exceptions; establishes a procedure for accessing information held by government bodies; requires government bodies to make permanently available to the public, through their websites, a set of information relevant for inspecting their work (active transparency); establishes sanctions for

Access to relevant information, in appropriate media and formats that can be understood by the population, is particularly important in the case of environmental issues. The environment and its link with human well-being and production activities raise complex and relatively new issues. Thus an ongoing and major effort is needed to disseminate information and raise awareness. Many Latin American and Caribbean countries have enacted legislation requiring a designated authority to submit information on the state of the environment with a particular frequency. In some special cases, such as in Colombia, the obligation to produce environmental status reports is established in the Constitution.

A recent diagnostic study undertaken in the region —Access Initiative (2005)— found that, although legal frameworks have been developed to guarantee public access to environmental data, specific tools need to be implemented to enforce it. An associated challenge is the consolidation of schemes and mechanisms for periodic reporting on the status of the environment and the impact of industrial activities (both private and public enterprises). In particular, the study recognizes that much remains to be done to make the industrial sector take responsibility for reporting its emissions. A promising initiative, implemented in Chile and Mexico, as a result of commitments acquired in the free trade agreements that these countries have signed with the United States, involves publishing freely accessible Pollutant Release and Transfer Registers (PRTRs), on the Internet.¹⁶

A recent contribution to this process is the progress made on information production and dissemination (see box II.8).

Box II.8

THE SUPPLY OF ENVIRONMENTAL INFORMATION IN LATIN AMERICA AND THE CARIBBEAN

In recent years much progress has been made in understanding and measuring the state of the environment, levels of degradation and the effectiveness of policies in Latin America and the Caribbean. Two stimuli in this regard have been statistical capacity-building and the preparation and implementation of integrated environmental assessments, published in the UNEP Global Environment Outlook (GEO) report series.

Statistics and indicators

Although in 1998 just three countries had official publications containing environmental statistics and sustainable development indicators, by 2009 many were systematically publishing both statistical compendia and reports on environmental (or sustainable development) indicators. Twenty-one of the region's countries have official environmental statistics programmes, and have produced at least one annual publication on the subject. Nonetheless, 62% of institutions participating in the study had only between one and three people working on environmental statistics and indicators.

Institutionalization of the work of producing environmental statistics and indicators within official statistics systems (national statistics offices and ministries) is still very much an ongoing process, as is the interagency coordination needed to strengthen the national statistics process in the environmental domain. Despite progress, the supply of official and systematic environmental statistics is still incipient and uneven in coverage and quality, and efforts to institutionalize official environmental statistics work in each country need to be redoubled.

authorities that unjustifiably deny access to information or fail to fulfil their active transparency duties; and creates the Transparency Council, an autonomous and specialized body responsible for inspecting fulfilment of the law and guaranteeing the right of access to public information.

¹⁶ Information on the Chilean initiative can be found on the website of the National Environment Commission (CONAMA) [online] <http://www.conama.cl/retc>; and for the Mexican case, on the website of the Secretariat of the Environment and Natural Resources [online] <http://www.semarnat.gob.mx/gestionambiental/calidaddelaire/Pages/retc.aspx>.

Box II.8 (continued)

The organizations of the United Nations system have worked systematically in the field of environmental statistics, by providing technical assistance and training. In 1989 ECLAC organized the first meeting of specialists on national accounts and environmental statistics. Between 2001 and 2005, substantial progress was made through the Network of Institutions and Experts on Social and Environmental Statistics (REDESA) project, which resulted in the first collective environmental database with derived from official national sources (Database of Environmental Statistics and Indicators for Latin America and the Caribbean (BADEIMA)), which today has broader coverage in terms of both variables and countries.^a Another significant milestone was the inclusion of a chapter on natural-resource and environmental statistics in the *Statistical Yearbook of Latin America and the Caribbean*, 2005, published by ECLAC. Also worthy of mention is the Sustainability Assessment in Latin America and the Caribbean (ESALC) project, in which a systemic analytical matrix was constructed for the purpose of deriving regionwide sustainable development indicators. In addition, between 2004 and 2009, activities related to monitoring Millennium Development Goal 7 have helped to strengthen environmental statistics; and recently, ECLAC has supported the formation of the Working Group on Environmental Statistics in the framework of the Statistical Conference of the Americas (SCA) Statistics.

Availability of GEO reports on countries and cities for Latin America and the Caribbean

Since 1999, UNEP has been working with governments and specialist centres in the region, performing integrated environmental assessments with different topics and geographic coverage. Thus far, UNEP has supported the production and publication of some 80 environmental status reports (see table below).^b Integrated environmental assessments are key vehicles for promoting interaction between scientific processes and the various phases of the policy and decision-making cycle. They use the driving force-pressure-state-impact-response model to analyse environmental issues, together with policy recommendations.

Country	National GEO reports	City GEO reports
Barbados	2000	
Saint Lucia	2007	
Chile	1999, 2005, 2009	Santiago (2003), Puerto Montt (2009)
Costa Rica	2002	Greater Metropolitan Area (2006)
Uruguay	2008	Montevideo (2004), Colonia (2009), Canelones (2009), localities in the Department of Rivera (2009)
Panama	1999, 2004, 2009	Panama (2007)
Brazil	2002	Rio (2002), Manaus (2003), São Paulo (2004), Ponta Porã, Marabá, Piranhas, Beberibe (2009)
Argentina	2004	Buenos Aires (2003), Rosario (2008), San Miguel de Tucumán (2007), Córdoba (2009)
Colombia	-	Bogotá (2003), Cartagena (2009)
Cuba	2000, 2009	Havana (2004), Santa Clara, Holguín and Cienfuegos (2008)
Dominican Republic	2009	Santo Domingo (2007)
Ecuador	2008	Esmeraldas (2008), Loja (2008)
Venezuela (Bolivarian Republic of)	2009	-
Mexico	2004	Mexico City (2003), Santiago de Querétaro (2008), Playa del Carmen (2008)
Paraguay	-	Asunción (2008)
Peru	2000	Arequipa (2005), Lima and Callao (2005), Chiclayo (2008)
Belize	2009	-
Guatemala	2003, 2006, 2009	Guatemala (2008)
Nicaragua	2001, 2003	-
El Salvador	2002	San Salvador (2008)
Bolivia (Plurinational State of)	-	Cobija, El Alto (2008)
Honduras	2005	
Guyana	-	Georgetown (2009)
Haiti	2009	-

Box II.8 (concluded)

UNEP also maintains the GEO LAC data portal as a vehicle for consulting variables and indicators to facilitate integrated environmental assessments and contribute to the systemization and dissemination of environmental and sustainable development data across the region. The portal provides easy and systemized access to variables and indicators from the official international sources used by UNEP and its associates. Its online database contains environmental and socioeconomic variables at the national, subregional and regional levels, covering topics such as fresh water, forests, biodiversity, emissions and disasters. The data are displayed in tables and figures. This tool was developed as part of the global GEO Data Portal project.^c

Source: Economic Commission for Latin America and the Caribbean (ECLAC) and United Nations Environment Programme (UNEP).

^a See BADEIMA [online] <http://www.eclac.org/estadisticas/bases/>.

^b The UNEP website [online] <http://www.pnuma.org/deat1/publicaciones.html> contains a compilation of all reports published in the region as of September 2009.

^c GEO LAC data portal [online] <http://geodatos.org/geodatos/>; global portal [online] <http://geodata.grid.unep.ch/>.

Access to mechanisms for participating in decision-making will bear fruit insofar as there is also access to information and mechanisms to enable informed society to give order and meaning to its own initiatives and, in particular, provided the authorities take the population's opinions and comments into account. This is a delicate exercise that needs to balance and complement what can emerge from civil society and institutional mandates, legitimized by representative democracy itself.

According to the diagnostic study performed by the Access Initiative, this latter area needs to be strengthened in most of the region's countries. The same source adds that, while progress has been made in recognizing the topic in national legislations, their scope needs to be strengthened and expanded, and mechanisms need to be consolidated to effectively activate these participation facilities. One reason for this is that social participation in many cases is still limited to stakeholders demonstrating a previously established legal interest vis-à-vis the corresponding authorities; and participation is generally limited to public consultation, without follow up to ensure that society's concerns are comprehensively incorporated. These specific mechanisms fail to fulfil a basic postulate: that participation should be a gradual, informed, transparent and effective process.

Lastly, the Access Initiative draws attention to the fact that numerous participation schemes in the region do not recognize the large number of actors involved; they focus mainly on tasks aimed at including indigenous populations, rural and small-scale-farming organizations, labour unions, producer associations and cooperatives, small and isolated communities and others into participation mechanisms.

An interesting social participation experience in relation to water and sanitation services is the participatory budget system in Porto Alegre, Brazil (see box II.9).

On the issue of access to environmental justice, the national GEO reports note that high-environmental-performance countries have designed and implemented specialized environmental jurisdiction mechanisms both within their legal systems and as mechanisms attached to ministerial or autonomous bodies. These reports also identify problems of access to environmental courts, which tend to be concentrated in urban centres and the main cities. The reports concur on the need to improve mechanisms to disseminate information on access and content of environmental justice, which has specific repercussions on criminal activities such as illegal logging and trade in endangered species.

Box II.9
**THE PARTICIPATORY BUDGET AND WATER AND SANITATION SERVICES
 IN PORTO ALEGRE, BRAZIL**

The Municipal Water and Sewerage Department (DMAE) of Porto Alegre, Brazil, is implementing a project to expand the coverage of sewage treatment in the city from 27% (in 1990) to 83% (in 2015). To achieve this, the municipal government is investing US\$ 160 million in new sewage collection networks, a 17-km emission pipeline and a 4 m³/s capacity sewage treatment plant. The work is scheduled for completion in 2012. DMAE currently supplies 100% of the population with treated water. Universal coverage of sewage collection and treatment services will be completed in 2030 through additional works. Citizen participation has been decisive for the project's success, because the participatory budget has enabled the community to define its priorities and influence political decision-making by the public authorities to allocate resources for the necessary investments. The Porto Alegre participatory budget experience has been pioneering in terms of its scale and its representation and voting methodology, which was adopted in 1989 to ensure effective citizen participation, and particularly by those living in areas of the city with the greatest basic utility deficits. As a result of this process, sanitation was identified as the top urban priority in the early 1990s; and the corresponding investments will finally make it possible to extend services to all of the city's population.

**BRAZIL: SEWAGE TREATMENT CAPACITY
 IN PORTO ALEGRE**

(Percentages of the population served)



Source: Pan-American Health Organization.

The Access Initiative also notes that traditional courts are not suitable mechanisms for dealing with environmental issues, since they operate according to a rationale of administrative, civil or criminal law, rather than an environmental one. Attention is also drawn to the fact that judges or members of the court have insufficient training on ecological issues, despite efforts made by magistrate schools and legal officials. In addition, most countries lack alternative dispute settlement mechanisms, which has fostered a trend towards litigation in environmental disputes, adding costs and significant delays, and does not always provide acceptable or even sustainable solutions for the various stakeholders. Moreover, environmental disputes, especially those in which the public has participated actively by contributing ideas, information and potential solutions, tend to give rise to opportunities for positive change by introducing topics and alternatives that had not previously been considered.

At the Global Judges Symposium on Sustainable Development and the Role of Law, organized by UNEP in 2002, it was considered that the application of environmental law by jurisdictional bodies was producing uneven results mainly because legal frameworks also varied in terms of constitutional, civil, criminal and administrative justice. Further, the greatest problems of access to environmental justice occurred in the civil domain, specifically in terms of compensation for environmental damage, although legislative shortcomings in this area have led to administrative and penal measures being put in place to mitigate this deficiency (see box II.10).

Box II.10

THE JUDGES PROGRAMME OF THE UNITED NATIONS ENVIRONMENT PROGRAMME

At the Global Judges Symposium on Sustainable Development and the Role of Law, organized by UNEP in 2002, in Johannesburg, South Africa, participating judges recognized that lack of knowledge and information was one of the main reasons why the execution, development and enforcement of environmental law was ineffective. To improve those capacities, UNEP developed a cooperation programme to strengthen institutions and train officials responsible for implementing environmental law, in which numerous judges and magistrates from the Latin American and Caribbean region have participated. Over the last few years, the programme has been extended to other legal officials responsible for implementing environmental law.

Between 2007 and 2008, four subregional workshops on access to environmental justice were held in Latin America and the Caribbean, with combined attendance by over 100 judges, magistrates, prosecutors and attorneys. The workshops analysed the status and trends of environmental justice in the region and reached the following conclusions:

- Undoubtedly, the region's countries have recognized the right to a healthy environment and have incorporated it in a general manner in national constitutions, and this implied an acknowledgement of the State's responsibility to do its utmost to protect the environment.
- Although the region's countries have adequate environmental legislation, they find it difficult to apply and enforce. This situation, which effectively restricts access to environmental justice, reflects a number of technical issues but it also stems mainly from the specific nature of the legal asset being protected, in as much as the systems in place are based on defence against the violation of individual rights, but do not contain appropriate mechanisms of environmental stewardship.
- Access to effective justice in defence of the environment requires widespread active legitimization, facilitation of evidence, and rulings benefiting the affected group or collectivity. In this context, the role of the judge needs to be active and socially committed.
- The sanctioning of environmental crimes in several of the region's countries represents progress in the penal governance of environmental issues.
- The creation of specialized prosecutors' offices is producing encouraging results, but specialized environmental courts would also be desirable.
- The region possesses an encouraging flow of jurisprudence representing significant progress in access to environmental justice.

Source: United Nations Environment Programme (UNEP) [online] <http://www.unep.org/law/>.

Over the last few years, however, legislation enacted in several of the region's countries has offered a broader range of procedural remedies, and burgeoning jurisprudence is paving the way towards a more functional form of environmental law. There is also an open debate on the timeliness and advisability of setting up specialized jurisdictional bodies. In this connection, several countries have set up specialized environmental prosecutors' offices: one is Brazil, whose justice promoters' office already has several years' experience. Mexico has a Federal Prosecutor's Office and state prosecutor's offices, Argentina created an environmental fiscal unit and, more recently, Peru set up environmental prosecutors' offices in March 2008.

In addition, the justice system has been proactive in defending environmental rights in several countries, overcoming procedural obstacles and adapting traditional legal institutions to the specifics of environmental law to resolve disputes of great technical and legal complexity. Examples include the decision adopted by the Supreme Court of Argentina in the Riachuelo case and the ruling by the Constitutional Court of Guatemala on an *amparo* remedy which found the Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal to be directly applicable.

All of this shows that Latin America and the Caribbean, which is in the vanguard of modern constitutionalism on environmental issues, is assuming the commitment to effectively apply and enforce this type of legislation.

Education is crucial and indispensable for bringing about positive changes towards environmental sustainability through civil society participation. Five years on from the declaration of the United Nations Decade of Education for Sustainable Development, most Latin American and some Caribbean countries have adopted national policies or strategies on environmental education. According to a recent study by the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2009), the remaining challenges to the effectiveness of these policies include lack of sufficient and sustained economic support, deficiencies in teacher training, absence of evaluation mechanisms and the lack of programme continuity. These obstacles have generated institutional weaknesses and made it harder to achieve significant progress (UNEP, 2003a). As in other public-policy domains, the success of environmental education as a tool to consolidate the principles of sustainable development in society requires it to be integrated into education policy at all levels and all forms of schooling, in formal and informal education alike. It also requires the formulation and strengthening of regulatory frameworks, accompanied by procedures, tools of implementation and resources that encourage the emergence and consolidation of initiatives in organizations and among citizens. Lastly, access to new information and communication technologies, which are crucial for improving education overall, needs to be democratized to enable social networks and the media to fulfil their roles as strategic vehicles for raising public awareness on environmental and sustainable development issues.

C. THE GLOBAL ECONOMIC AND FINANCIAL CRISIS AND MILLENNIUM DEVELOPMENT GOAL 7: PROBLEM OR OPPORTUNITY?

1. The crisis and Millennium Development Goal 7

The socio-economic and institutional setting described in the previous sections is currently traversing multiple global crises: economic and financial, food, climate, energy, and water. These are aggravating and exacerbating social problems such as job loss, socio-economic insecurity and poverty, which undermine social stability in both developed and developing countries. These multiple crises are seriously impacting the capacity of countries to achieve the Millennium Development Goals (United Nations, 2009).

The global economic and financial crisis has environmental consequences and affects the region's capacity to attain the targets of Goal 7 in various ways. First, it raises new obstacles in the short and medium terms, including an increase in poverty, with a likely increase in the number of people excluded from basic services and housing markets. Yet the crisis also represents an opportunity to lay the foundations for a more equitable development model that induces sustainable patterns of environmental resource use.

Targets 7.A and 7.B (reverse the loss of environmental resources and reduce biodiversity loss). The global slowdown has diminished the demand for primary goods (energy, mining, agricultural and timber products), which could ease the pressure on forests associated with the expansion of the agricultural frontier or of extractive activities. Moreover, the downturn in economic activity generated by the crisis could lead to smaller emissions of CO₂ and other pollutants (IPEA, 2009). Nonetheless, these effects are transitory and in no way compensate for the environmental and social damage caused by the crisis. In the absence of specific measures, previous trends will not change; production and consumption patterns that generate environmental degradation will return to their pre-crisis levels with the economic recovery. The crisis has also reduced national, local and international fiscal resources available to the countries of the region (ECLAC, 2009c). Given the generally secondary rank of public policies on the environment, resources allocated to environmental protection may well be reduced.

Target 7.C (halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation). In times of crisis, governments, private investors and multilateral lending institutions are subject to tighter capital constraints and pressure from other demands (ECLAC, 2008d). Nonetheless, as part of their programmes to increase public expenditure to cope with the crisis, several of the region's countries have implemented or brought forward the execution of public infrastructure investment programmes, as described below (ECLAC, 2009c).

Target 7.D (by 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers). Poverty and its concomitant problems —such as the expansion or permanency of slum dwellings— are likely to be aggravated as a result of the crisis. In the first quarter of 2009 regional urban unemployment was up by 0.6% year-on-year, which means that more than 1 million people had lost their jobs in urban areas since early 2008. The unemployment rate is estimated to have risen from 7.4% in 2008 to around 9% in 2009, leaving more than 3 million people out of work. Labour informality will also tend to increase (ECLAC/ILO, 2009). All of these factors could fuel an increase in the number of people living in precarious settlements, despite government efforts to improve the quality of life among slum dwellers.

2. The response to the crisis and the environment

Across the world, the economic and financial crisis has been seen as an opportunity to implement changes in development and growth patterns, particularly in terms of the relation between the economy and the environment. In 2008, UNEP launched the Green Economy Initiative to speed the transition towards an environmentally sustainable economy. As part of this initiative, and with a view to targeting an immediate response to the financial and economic crisis with actions that would both hasten economic recovery and stimulate growth in accordance with longer-term development needs, a group of prominent international organizations, led by UNEP, launched the Global Green New Deal. This calls for environmental issues to be taken into account in the short-term fiscal measures announced by governments to deal with the crisis (see box II.11).

Box II.11

THE UNEP GREEN ECONOMY INITIATIVE AND THE GLOBAL GREEN NEW DEAL

On 22 October 2008, UNEP, in conjunction with a group of leading economists, launched the Green Economy Initiative to promote a global plan for a “green industrial revolution” that provides incentives for investments in a new generation of assets, such as ecosystems, renewable energies, products and services obtained from biological diversity, technologies for managing chemical products and residues, mitigation of climate change, and “green cities” (buildings, constructions and transport systems that are environmentally safe). These investments aim to improve incomes, create decent jobs and reduce poverty. The rationale for this initiative is that it could generate the right mix of policy actions to stimulate economic growth while improving the environmental sustainability of the world economy.

In this framework, and with the aim of linking recovery from the crisis to the green-economy concept, UNEP, supported by a wide-ranging group of organizations of the United Nations system, has proposed a new Global Green New Deal as a framework for countercyclical policies (UNEP, 2009b). This set of recommendations is inspired by the New Deal adopted in the United States during the administration of Franklin D. Roosevelt as a strategy to overcome the crisis of the 1930s, but it also aims to re-establish growth on more equitable foundations and incorporates (or affords greater emphasis to) the environmental aspects of recovery and its global scope.

As in the case of the programme that inspired it, infrastructure plays a key role in the Global Green New Deal, whose proposal include the following:

- “Governments are encouraged to use more of their stimulus packages and the financing provided by international financial institutions to develop more energy-efficient, less polluting transport modes and infrastructure, improved public transportation, and the use of greener vehicles;
- Governments of developed countries are encouraged to help finance ongoing clean energy projects, invest in “smart” grids, and expand their investment in renewables infrastructure. Developing country governments are encouraged to support the scaling up and diffusion of small-scale off-grid technologies.
- Governments are encouraged to invest in sustainable agriculture and freshwater systems—for developing countries in particular to increase agricultural investment in infrastructure for value addition and reduce water transmission losses in irrigation canals and traditional water systems, and both developing and developed countries to improve storage and water quality.”

As a result of the analyses undertaken, it is estimated that five sectors will generate greater economic returns, environmental sustainability and green jobs: (i) energy and clean technology, including recycling; (ii) rural energy, including renewable energies; (iii) sustainable agriculture, including organic farming; (iv) ecosystem infrastructure, reduction of emissions arising from deforestation and degradation of forests; and (v) sustainable cities, including planning, transport and green buildings.

In the case of Latin America and the Caribbean, recycling could make a major contribution to reducing the environmental footprint of economic sectors that are heavy users of energy and materials. In Brazil—the world leader in the recycling of aluminium cans—10.3 billion cans were collected in 2006. Recycling has saved Brazil 1,976 GWh of electric power per year—the amount that would have been needed to produce the new aluminium to supply a city of over 1 million inhabitants for one year. The recycling of aluminium cans provides jobs to nearly 170,000 people in Brazil. According to a 2005 survey, some 2,400 Brazilian companies and cooperatives, most of them small businesses or microenterprises, participate in recycling and trade in metal waste. The World Bank estimates that 28,000 formal jobs are associated with paper recycling in the country. Many paper recycling workers in Brazil and Colombia have formed cooperatives to obtain better working conditions and pay.

Another example is payment for environmental services related to ecosystem services. Paying for environmental services (such as the maintenance of a forest to supply water to the city, reforestation of degraded areas to capture carbon dioxide from the atmosphere, among others) could create many jobs or provide an additional income to the rural population that preserves and looks after these services. Some of the region’s countries are already promoting sustainable grazing practices to conserve forests, which have been found to increase the average income of rural workers by between 10% and 15%. These examples and other like them show that a global shift towards this economic model could generate a large number of jobs and contribute to greater social equity.

Other sectors with high potential for green job creation are public transport, for example the rapid bus transit system is implemented in a number of the region’s cities (Curitiba, Mexico City, Bogota); organic farming; the replacement of equipment and practices to achieve greater energy efficiency (such as the Ilumex programme in Mexico); and biofuels. Nonetheless, irrespective of the sector, for these jobs to be compatible with the principles of sustainable development, institutional and legal mechanisms are needed to ensure decent conditions of work and pay.

Source: United Nations Environment Programme (UNEP), *Global Green New Deal. Policy Brief*, March 2009; “Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World”, Nairobi, Worldwatch Institute, 2008.

The countries of Latin America and the Caribbean have taken various steps to cope with the financial crisis, including fiscal measures, the acceleration of public investment programmes (especially in infrastructure), cuts in interest rates, measures to provide liquidity to the financial sector, the financing of exports and social programmes to protect the most vulnerable groups from the effects of the crisis. The sectoral measures announced target mainly agriculture, housing and construction (ECLAC, 2009d, 2009e), and some of these could have a positive effect in achieving the targets of Millennium Development Goal 7 (see table II.2).

Table II.2
**COUNTERCYCLICAL POLICIES THAT COULD FOSTER PROGRESS TOWARDS
 ACHIEVEMENT OF MILLENNIUM DEVELOPMENT GOAL 7**

Policy	Country
Incentives for urbanization and housing projects	Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Paraguay, Peru, Saint Lucia, Uruguay
Incentives for forestation	Belize, Brazil, Chile, Guyana
Incentives for public transport systems	Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Haiti, Nicaragua, Mexico, Peru
Subsidies and financing to replace electrical appliances and automobiles with new, more energy-efficient articles.	Mexico, Peru
Promotion of the manufacture of equipment to produce renewable energy	Uruguay
Increased coverage of drinking-water and sanitation services	Colombia, El Salvador, Nicaragua, Peru, Trinidad and Tobago

Source: Economic Commission for Latin America and the Caribbean (ECLAC), *The reactions of the Governments of the Americas to the international crisis: an overview of policy measures up to 31 July 2009* (LC/L.3025/Rev.3), Santiago, Chile, 2009.

Nonetheless, the measures in question are relatively limited in relation to the region's economies and to the crisis-response measures overall. The response has not elicited a fundamental change in the importance attached to environmental issues in public policy goals. In fact, along with measures that could contribute to Goal 7, incentives have been adopted for purchasing automobiles for private transport (the green alternative would suggest improving public transport systems and creating incentives to renew the vehicle stock with less polluting models); building roads (compared to the alternative of generating infrastructure for less polluting transport modes); and consuming and producing of fossil fuels (the green alternative would be to develop alternative fuels).¹⁷ With regard to support for house-building, no incentives have been given for design and construction of energy-efficient homes, even though this could produce economic benefits in the medium term.

Despite the measures taken, the crisis will continue to have effects at least into the medium term, and sustained government action will be needed to deal with them.

¹⁷ Although most programmes have limited automobile-purchase incentives to small-engined automobiles, they do not encourage replacement by more efficient vehicles—as intended in the “Cash for Clunkers” programme in the United States—but an increase in the total number of automobiles in circulation. The “*bono de chatarreo*” (junk voucher) initiative in Peru is an exception, because its objectives include withdrawing the oldest and most polluting vehicles from circulation.

In short, the Latin American and Caribbean region faces significant challenges in terms of environmental sustainability, reflecting the specific characteristics of its development: high levels of poverty and inequality among a growing, mostly urban, population that shows increasingly complex migration dynamics; specialization patterns based on primary goods and environmentally sensitive industries, often drawing on static comparative advantages that do nothing to foster the transition towards higher-productivity and higher-value-added sectors; and a significant deficit in infrastructure development. The stakeholders —the State, private sector and civil society— have made progress in incorporating environmental protection into decision-making processes, and particularly in terms of environmental institutions and legislation. Difficulties remain in effectively mainstreaming the environment into sector public policies, however. While the global economic and financial crisis, together with climate change, impose new challenges, they also provide an opportunity to shift development and growth patterns towards a more environmentally friendly economy.

Chapter III

**THE NEW CLIMATE CHANGE SCENARIO FOR LATIN AMERICA AND THE CARIBBEAN:
IMPACT, ADAPTATION AND VULNERABILITY****A. STATUS OF THE CURRENT GLOBAL CLIMATE CHANGE DEBATE**

The last few centuries —particularly those following the Industrial Revolution— have witnessed an increase in the concentration of greenhouse gases (GHGs) in the atmosphere as a result of the technologies and practices which have driven the world's economies in recent years. If the current trend persists, the temperature of the atmosphere may rise to levels that would have a negative and irreversible impact on every system on the planet.

Climate change has been attracting unprecedented attention since 2007 (ten years after the signature of the Kyoto Protocol to the United Nations Framework Convention on Climate Change). International will has been mobilized to take concerted action to mitigate the phenomenon, amid growing concern regarding its potentially negative consequences for national development. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) and the Stern Review,¹ both published in 2007, are key contributions to the current debate on the subject.² The former clarified questions regarding human responsibility for the main component of climate change and provided a detailed description of projected increases in average temperature and sea levels and the potential damage which may result from climate change in a variety of future scenarios. The Stern Review provided estimates on the global costs of mitigation and pointed out that delaying action will result in greater losses to global welfare and GDP, underscoring the usefulness of acting promptly.

The Stern Review also advocated what is becoming the benchmark for climate safety in industrialized economies, as well as some emerging ones with significant GHG emission levels (G8 +5): curbing the rise in concentrations of these gases in the atmosphere so that they stabilize at 450 to 550 parts per million (ppm) towards the end of the century. This would entail a global temperature increase of 2° C to 3° C. Beyond that level, the changes that would occur in the planet's systems would allow for little or no adaptation.

It should also be noted that climate change is intrinsically linked to international human rights obligations. The subject has been addressed by the Human Rights Council, which requested, via resolution 7/23, that the Office of the United Nations High Commissioner for Human Rights (OHCHR) perform an analytical assessment of the relationship between climate change and human rights.³

¹ Review of the economics of climate change. The review was carried out in 2006 by Lord Nicholas Stern, at the request of the Treasury of the United Kingdom of Great Britain and Northern Ireland.

² The Nobel Peace Prize was awarded to IPCC and Albert Gore Jr. in 2007 for their efforts to build up and disseminate knowledge about climate change. A number of natural disasters also occurred in 2007. Climate-change-related or not, these disasters helped alert the world's population to the nature and force of the phenomenon's potential effects.

³ Human rights and climate change, resolution 7/23, 28 March 2008.

OHCHR analysed the effects of climate change, international mitigation and adaptation measures and the implications of the phenomenon for the enjoyment of human rights —particularly the right to life, the right to adequate food, the right to water, the right to health, the right to housing and the right to self-determination (OHCHR, 2009).⁴ The effects of climate change on specific groups, such as women, children and indigenous peoples, were also studied from the perspective of international human rights treaties, as were the consequences of climate change for States, given their international legal obligations.

This knowledge, combined as it has been by the industrialized countries with other strategic interests regarding global food security, energy security and protection of economic competitiveness, has produced a fundamental shift in the political will of those countries to take nature's inherent boundaries into account. Complex negotiations are therefore taking place within the context of the United Nations Framework Convention on Climate Change (UNFCCC). These involve a new generation of commitments based on a long-term perspective that match the magnitude of the tasks required and the time available to fulfil them. They aim to make it possible to mitigate the causes of the problem while accommodating the interests of the countries that did not participate or assume binding obligations in the first international agreement in this field —the Kyoto Protocol— but are key to success.

The fifteenth session of the Conference of the Parties (COP 15) and the fifth session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol to the UNFCCC were held in Copenhagen in December 2009. Key issues on the agenda included: (i) commitments on the part of developed countries to reduce emissions after 2012 (when the first stage of the Kyoto Protocol commitments comes to an end) and the role that developing countries will play in the mitigation effort required to keep GHG emissions at a level compatible with the goal of stabilizing the average world temperature by the end of the century; and (ii) the support (financing, capacity building and transfer of technology) that the developing countries will require in order to join in the effort and implement the measures needed to adapt to the inevitable effects of climate change.

The Copenhagen meeting ended without firm agreements or commitments on either of these issues, transferring them to the agenda of the next Conference of the Parties, which will be held in Mexico in December 2010. The Copenhagen Declaration, which was agreed to by all the representatives of the industrialized and developing countries that account for most of the GHG emissions in the world and subsequently by many others as well, was nevertheless hailed by the Secretary-General of the United Nations as “an essential beginning”.

B. CLIMATE CHANGE AND ECONOMIC SECTORS

The situation of Latin America and the Caribbean is different from that of developed countries. The region has contributed little to GHG emissions (its emissions exceed only those of Africa, which has the world's lowest GHG emission levels). Nevertheless, it is, and will continue to be, disproportionately affected by climate change. Visible evidence of the effects of climate change can already be found in the region (see box III.I).⁵

⁴ The report released by OHCHR in March of 2009 led to the adoption by the Human Rights Council of Resolution 10/4, which unequivocally recognizes that climate-change-related impacts have a range of implications, both direct and indirect, for the effective enjoyment of human rights.

⁵ Statistical limitations preclude a precise, up-to-date analysis of the region's share in global GHG emissions. While different methodologies yield different results, they do point to similar conclusions: the region produces relatively few emissions, and those resulting from land-use change account for a relatively high percentage of its

Box III.1

LATIN AMERICA AND THE CARIBBEAN: RECENT EVIDENCE OF CLIMATE CHANGE

Meteorological and oceanographic records show that temperatures in the region rose by 1°C during the twentieth century, while sea levels have been rising 2 to 3mm per year since the 1980s. The temperature changes have produced the following results, among others:

- Glacier retreat in the Andes —particularly small glaciers. The Chacaltaya glacier in the Plurinational State of Bolivia, for example, has lost 82% of its surface since 1982. The situation is critical in countries such as Colombia, Ecuador, Peru and the Plurinational State of Bolivia, where glaciers serve as a source of water for human consumption, as well as production and hydroelectric energy. Glacier retreat has damaged unique ecosystems, such as those found in high-altitude marshes (*páramos*), which provide many valuable ecosystemic goods and services (De la Torre, Fajnzylber and Nash, 2009).
- Coral bleaching in the Caribbean. Coral reefs provide breeding grounds for 65% of the region's fish species. When they are exposed to heat, reefs expel the microscopic algae that live symbiotically in their tissues. This leads to the progressive destruction of the reef as a home for such species (De la Torre, Fajnzylber and Nash, 2009).
- Increased frequency of extreme weather events, and occurrence of such events in historically unaffected locations. This has had a significant economic impact on countries (see chapter IV). The Caribbean is particularly vulnerable to hurricanes, among other extreme meteorological events. The high number of hurricanes in the region in 2004 caused enormous losses for its countries. Caribbean economies are also highly vulnerable to the damage produced by natural disasters, given their dependence on tourism, agriculture, forestry and fishery. In the Andean subregion (Colombia, Ecuador Peru and the Plurinational State of Bolivia) there is evidence that significant hydrometeorological events took place between 1970 and 2007. Over six provinces in Colombia and Peru have been affected by more than 1,000 events since the 1970s. Some areas have been affected by up to 5,000 events (Andean Community, 2008).
- Changes in the productivity of some of the region's crops, due to changes in rainfall and temperature patterns. These changes have had a positive impact on the yields of certain crops in colder environments, such as the Southern Cone; in warmer climates, they have had a negative impact. In most countries, results have been negative (Samaniego, 2009).

Source: A. De la Torre, P. Fajnzylber and J. Nash, *Desarrollo con menos carbono: respuestas latinoamericanas al desafío del cambio climático*, Washington, D.C., World Bank, 2009; J. Samaniego (coord.), "Cambio climático y desarrollo en América Latina y el Caribe: una reseña", *Project documents*, N° 232 (LC/W.232), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), February 2009; Andean Community, *El cambio climático no tiene fronteras. Impacto del cambio climático en la Comunidad Andina*, Lima, 2008.

The future is even more troubling. Projections for average warming in Latin America towards the end of the century vary depending on the model employed. Scenarios that allow for a certain degree of mitigation estimate warming at 1°C to 4°C, while those which do not estimate it at 2°C to 6°C. In most of the region, average annual warming will probably exceed the global average, with the exception of southern Latin America. Numerous studies suggest that future effects are likely, with significant repercussions in various sectors of the region's economy and society (see table III.1, figure III.1 and box III.2). While the effects of climate change are primarily negative, some sectors, in some parts of the region, may experience circumstantial benefits; box III.3 examines the forestry sector in this regard.

GHG emissions (see chapter IV). According to calculations based on World Resources Institute (WRI) data, the participation of Latin America and the Caribbean in annual GHG emissions in 2000 was 5.4%, if emissions resulting from land-use change are excluded. If they are included, emissions were equivalent to 9.9% (Samaniego, 2009).

Table III.1
**LATIN AMERICA AND THE CARIBBEAN: PROBABLE EFFECTS OF
 CLIMATE CHANGE IN DIFFERENT SECTORS**

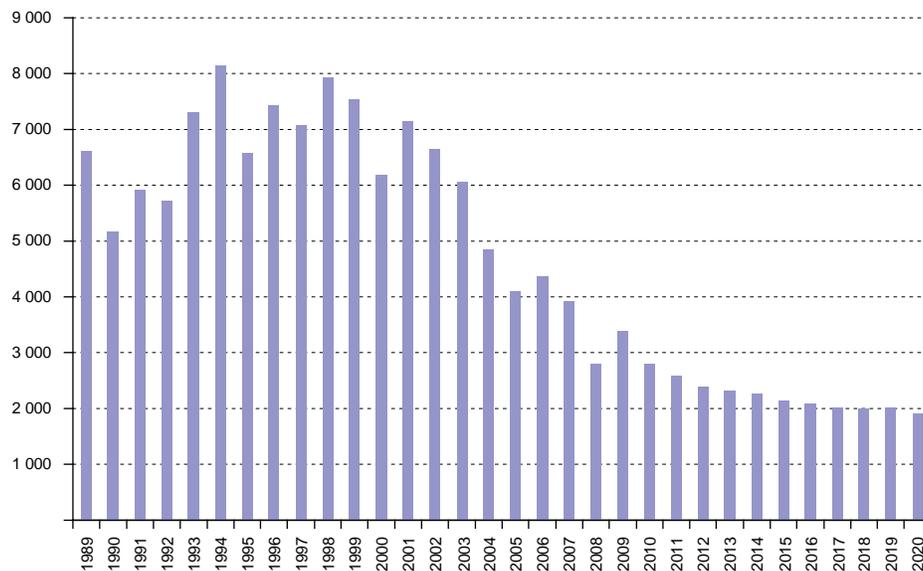
Sector	Effects
Agriculture	Negative effects in most countries. Increased yields in colder climates and reduced yields in warmer ones. Increase in diseases, pests and insects. High probability of crop damage, soil erosion, salinization and desertification as a result of increasingly frequent heat waves, intense precipitation, drought, intense tropical cyclone activity and rising sea levels (excluding the effects of seaquakes). Saline intrusion affects the fertility of farmland and seeps into groundwater; the latter is particularly relevant in countries such as Barbados, which rely on groundwater to meet their demand for water. Lower phreatic levels, increased demand for water for irrigation (more competition). Threats arising from the increased frequency of extreme meteorological events. Adverse consequences for food security.
Forestry	Increased yields in cold environments (accompanied by a possible increase in timber production); reduced yields in warm environments. Other possible effects include soil erosion and the inability to cultivate land due to lack of water, as well as an increased risk of forest fires.
Fishery	Extinction of some local species of fish; changes in the regional distribution and productivity of some species, particularly in cold waters. In some specific cases, productivity may increase. Reduction of surface plankton and changes in its distribution, compromising the fish food supply and leading to the migration of species. In the Caribbean, this could be the case with mahi mahi (dolphinfish) and yellowfin tuna. Coral bleaching could also damage fish breeding grounds. Phenomena like the ENSO (El Niño – Southern Oscillation) could reduce the catch of the major commercial species. Artisanal and subsistence fishing may be ill-equipped to adapt to these changes.
Tourism	Drop in demand for the destinations most heavily affected by extreme meteorological events; Caribbean beaches may be affected by erosion, and diving-related tourism would be affected by coral bleaching. Ski tourism in Argentina and Chile may be positively affected.
Industry, construction, infrastructure and international trade	Higher energy costs; higher transportation costs, particularly for seaborne goods; higher distribution costs; higher construction costs, given the need to use new materials and processes, as well as to ensure the structural integrity of infrastructure in the face of new risks levels. Possible increase in the cost of raw materials; reduced income from the export of fish and fauna species; changes in the region's production and international trade patterns. Increased protectionist pressures in certain sectors, particularly in industrialized countries; this could lead to additional barriers to exports from the region, such as taxes linked to the carbon footprint of exported products. Production will have to adapt to standards and regulations linked to climate change, as well as a shift in consumer preferences toward products with a smaller carbon footprint. Increased trade in environmental goods (for example, wind or hydroelectric turbines, photovoltaic cells, solar-powered water heaters and equipment for the generation of renewable energy and solid and hazardous waste management) and related services will create opportunities. Coastal degradation and extreme weather events will lead to reduced tourism.
Population, human settlements and water and sanitation infrastructure	Risk of drought, flooding and water shortages; fewer sources of potable water; increase in diseases; the poorest members of the population, living in areas at high risk for extreme meteorological events, would be most vulnerable. More frequent interruptions in the potable water supply; increased difficulty in the provision of basic sanitation and sewerage services.
Public health	Direct effects: results of extreme climate conditions such as thermal stress and meteorological disasters. Indirect effects: an increase in vector-borne diseases (exacerbated by climate change and rising sea levels - malaria, diarrhea, dengue fever) and difficulties in accessing health-care services ^a . Changes in the food supply, nutritional security (increased malnutrition) and the water supply will have consequences for human health. Migration will lead to social and economic upheaval ^b .
Most vulnerable groups: the elderly, women and children	The impact of the phenomenon on human settlements and health will be greater among poor persons with rudimentary or nonexistent access to water and sanitation, and who live in shantytowns in high-risk areas.

Source: Prepared on the basis of J. Samaniego (coord.), "Cambio climático y desarrollo en América Latina y el Caribe: una reseña", *Project documents*, N° 232 (LC/W.232), Santiago de Chile, Economic Commission for Latin America and the Caribbean (ECLAC), February 2009; Pan American Health Organization (PAHO), Roundtable on Climate Change and its Impact on Public Health: a Regional Perspective (CD48/16, Add. II), Washington D.C., August 2008; World Health Organization (WHO), *Climate Change and Human Health - Risks and Responses. Revised Summary*, Washington, D.C., 2008.

^a Recent studies highlight the importance of increasing access to reproductive health, in order to improve family planning - a relevant goal from a climate-change perspective (Lancet and University College London Institute for Global Health Commission, 2009).

^b For example, at least 20 million people worldwide are estimated to have been displaced in 2008 by climate-change-related disasters (OCHA, 2009).

Figure III.1
**CARIBBEAN REGION (SELECTED COUNTRIES): EFFECTS OF CHANGES IN TEMPERATURE
 AND PRECIPITATION PATTERNS ON TOURIST ARRIVALS^a**
(Number of persons)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), “Regional Report on the Impact of Climate Change on the Tourism Sector in the Caribbean”, unpublished, 2009.

^a Preliminary results. Countries selected: Aruba, Barbados, Dominican Republic, Guyana, Jamaica, Montserrat, Netherlands Antilles, Saint Lucia and Trinidad and Tobago.

Box III.2

SMALL ISLAND DEVELOPING STATES ARE MOST VULNERABLE TO THE EFFECTS OF CLIMATE CHANGE

Assessments of economic vulnerability show that small countries - particularly developing island States - are the most vulnerable to climate change. The countries of the Caribbean suffer significant negative impacts as a result of climate change and find themselves in a particularly vulnerable position. Following are some of the possible effects of the phenomenon, according to the United Nations Framework Convention on Climate Change.

- The growing season of sugarcane in Guyana would be shortened, hastening the ripening process and reducing profits by 29.8%.
- In Saint Kitts and Nevis, the climate would become so dry that agriculture (which depends on rainfall) would become unviable. Agricultural productivity in Saint Vincent and the Grenadines would fall by 20%.
- The growth of mangroves on land as sea levels rise depends on forest composition, tides and available sediment. A one-metre increase in sea level could result in the loss of 3% of Cuba’s mangrove forests. The same increase would lead to the complete collapse of the Palisadoes-Port Royal wetland (designated Jamaica’s second Wetland of International Importance) since this system has shown little migratory capability over the last 300 years. A 50-cm. increase in sea level would result in the loss of 60% of beach land in some areas of Grenada (UNFCCC, 2007).

Source: United Nations Environment Programme (UNEP).

Box III.3
**LATIN AMERICA AND THE CARIBBEAN: POTENTIAL EFFECTS OF
 CLIMATE CHANGE ON THE FORESTRY SECTOR**^a

Global studies concur that the forestry sector in South America could benefit from climate change. According to a study by Sohngen, Mendelsohn and Sedjo (2001), global timber production could rise by between 29% and 38% by mid-century, with increases in South America and drop-offs in North America and the Russian Federation. Another global study, by Pérez-García and others (2002), employs projections running through 2040 to show that production in the South American forestry sector could increase by 10% to 13%. Projected increases in the region generally exceed those expected globally and in other regions.

Some regions of Latin America could also benefit from the relocation of forest plantations and related operations as a result of climate change. According to one study on the subject, such a shift would occur primarily from tropical regions toward subtropical ones - particularly if warming is significant. This movement would be directed especially towards Argentina and southern Brazil (Easterling and Aggarwal, 2007). The same study suggests that climate change would have significant, highly diverse and regionalised effects on the generation of other forest-related products and ecosystemic services, such as hunting, seeds, nuts, forest fruits and resins and plants used in pharmaceutical and botanical medicine and in the cosmetics industry.

The future of the forestry sector will also be determined by other factors, such as land-use change. Industrial wood harvested on plantations has risen from virtually zero 50 years ago to almost one-third of timber production today and is expected to increase to over 40% by around 2030 and 75% by mid-century. Another non-climate-related factor which could play a significant role in the future of the forestry sector is the competitive development of lignocellulosic biofuel production. The increase in demand that such a development would entail could reverse the decline in timber prices which might occur as a result of climate change.

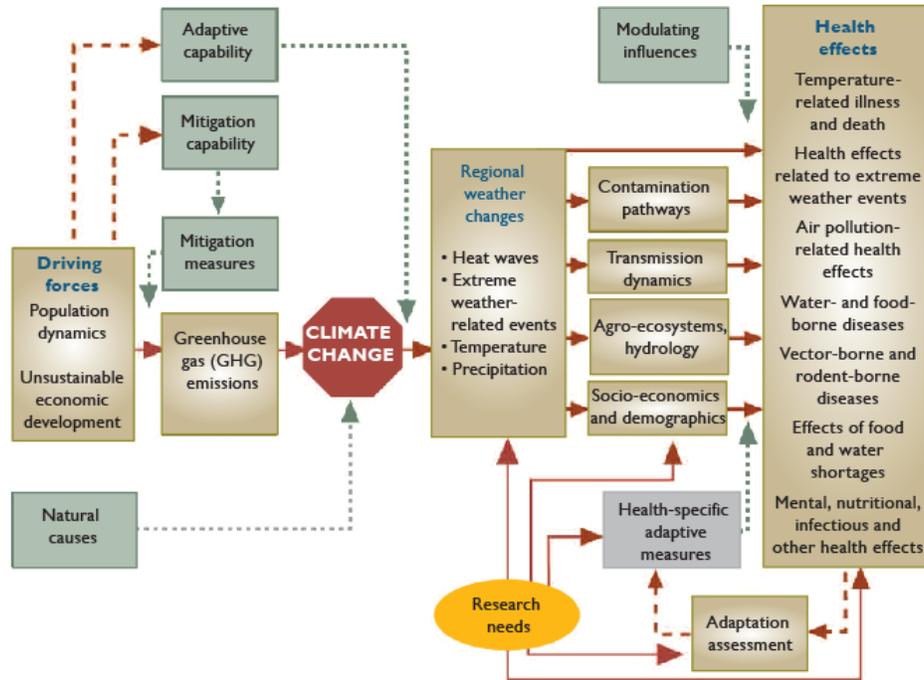
Source: J. Samaniego (coord.), “Cambio climático y desarrollo en América Latina y el Caribe: una reseña”, *Project documents*, N° 232 (LC/W.232), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), February 2009; B. Sohngen, R. Mendelsohn and R. Sedjo, “A global model of climate change impacts on timber markets”, *Journal of Agricultural and Resource Economics*, vol. 26, 2001; W. E. Easterling and A. Aggarwal, “Food, fibre and forest products”, *Climate Change: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge, Cambridge University Press, 2007.

^a The effects highlighted here are primarily positive; it should be noted, however, that this assessment does not take into account potentially negative environmental impacts, such as those associated with the water demand of wood plantations, and their effects on biodiversity. Moreover, it does not take into account the fact that, in the long term, given higher average temperatures and declining precipitation, existing forest plantations (at low latitudes) could be compromised, cancelling out the positive impact described above.

C. CLIMATE CHANGE, HEALTH AND HUMAN WELFARE

Climate change is a challenge for health and human well-being. While some positive effects are expected from a global-health perspective (fewer deaths due to cold, or the disappearance of vectors in very hot, dry areas), most effects will be negative. Climate change will have both direct and indirect consequences. The former will be the result of extreme climate conditions, such as thermal stress (heat waves) and meteorological disasters (hurricanes, floods, droughts). The latter will consist of the influence exerted by climate over the spread of diseases through vectors, water and food, as well as food and water security. They will also include the consequences of social and economic disturbances, such as population displacement (see diagram III.1).

Diagram III.1
PATHWAYS BY WHICH CLIMATE CHANGE AFFECTS HUMAN HEALTH



Source: World Health Organization (WHO), *Climate Change and Human Health – Risks and Responses. Revised Summary*, Washington, D.C., 2008.

In Latin America and the Caribbean, the main concerns regarding the influence of climate change on health are associated with the increase in extreme weather conditions it entails, as well as the resulting changes in the food supply, nutritional security, the water supply, the variety and distribution of vector-borne diseases and sea levels. The repercussions of climate change in cities will become increasingly severe; in some countries, they will be exacerbated by rapid, poorly planned urbanization. At-risk populations live in areas prone to flooding, drought and heat waves. The most vulnerable groups are children under the age of five, pregnant women and nursing mothers, the elderly, marginalized rural and urban populations and indigenous groups. Vulnerability may be aggravated by other stress factors such as poverty, lack of food security, conflict and existing diseases.

Given its high urbanization rate, the Latin American and Caribbean region should strengthen its efforts to improve the determining factors of health in the region's cities, including the potable water supply. Rural areas cannot be overlooked, however, as they are home to some of the most vulnerable population groups. Moreover, given the large number of islands in the region, problems pertaining to sea level rises and the availability of water on small islands should be addressed, as should the health measures which must be adopted in preparation for and in response to emergencies in countries experiencing extreme weather. The availability of food and harvests may be affected in some countries; this, in turn, will have an impact in terms of nutrition and population displacement. Weather-related vector-borne diseases, such as dengue fever, yellow fever and malaria, require special attention. These are only some of the health concerns that must be addressed in a comprehensive action plan (see box III.4).

Box III.4

THE HEALTH SECTOR REQUIRES COORDINATED ACTION

The Pan American Health Organization (PAHO) has proposed a regional plan of action to protect human health from the effects of climate change in the Americas. The plan is intended to ensure that the response to climate change is driven by public-health concerns. It would encourage the development and application of adaptive strategies at the local, national and regional levels in order to reduce the health effects of climate change to a minimum and promote the adoption of vigorous measures to mitigate the phenomenon and avoid other repercussions, which may have disastrous health consequences. The goal of the plan is to empower, equip and strengthen local and national health-care systems in order to protect human health from the risks that climate change entails.

The strategic objectives of the plan are as follows:

Evidence: Encourage and support the acquisition of knowledge on the health risks associated with climate change and the public health response to this phenomenon.

Awareness-raising: Promote awareness of the effects of climate change on health, both among the general public and in different sectors where health workers operate, promoting communication and the dissemination of information within a multidisciplinary approach.

Resources: Strengthen and develop human and financial resources, as well as institutions and policies.

Adaptation: Strengthen and develop the capacity of health systems to formulate, implement, monitor and evaluate adaptive measures in order to improve their response capacity and preparedness to effectively deal with climate change risks.

Partnerships: Promote, structure and establish inter-disciplinary, inter-agency and inter-sectoral partnerships to ensure that health promotion and protection are central to climate change policies.

Source: Pan American Health Organization (PAHO).

D. CLIMATE CHANGE AND THE MILLENIUM DEVELOPMENT GOALS

Several studies have shown that the sustainability of development in the region may be seriously jeopardized if the rise of average global temperature is not slowed soon and significantly.⁶ In economic terms, the cost of climate impacts in Mexico by the year 2100 is estimated to be at least three times higher than the cost of mitigating 50% of the country's emissions. In one of the specific scenarios considered, the impacts of climate change will consume 6.22% of current GDP, given an annual discount rate of 4%, whereas the cost of mitigating 50% of emissions would be equivalent to 0.7% and 2.21% of GDP at 10 dollars and 30 dollars per ton of carbon, respectively (Galindo, 2009).

Table III.2 illustrates the possible effect of climate change on the ability of countries in the region to meet the Millennium Development Goals.

⁶ Numerous recent studies illustrate the impacts of climate change on various sectors of the economy in the countries of Latin America and the Caribbean. The studies carried out by UNEP and the Secretariat of the Environment and Natural Resources of Mexico (SEMARNAT/UNEP, 2006), the World Meteorological Organization (WMO), IPCC and UNEP (2007) and ECLAC deserve special mention, given the thoroughness with which they have compiled and systematized the data on the subject (Samaniego, 2009).

Table III.2
**EFFECTS OF CLIMATE CHANGE THAT MAY AFFECT THE ACHIEVEMENT
 OF THE MILLENNIUM DEVELOPMENT GOALS**

Goal	Potential consequences of climate change ^a
Goal 1: Eradicate extreme poverty and hunger	Climate change is expected to affect the lives of the poorest segments of the population —particularly with regard to health, access to water, housing and infrastructure. Alterations are expected in the modality and rate of economic growth as a result of changes in natural systems, infrastructure, the pattern of trade specialization and labour productivity. Alterations are also expected in food security, due to lower staple grain yields. Social tensions are expected to arise over the consumption of resources; this may result in fewer opportunities to generate income, which would in turn lead to migration.
Goal 2: Achieve universal primary education	The disruption of ways of life (social, natural, physical, human and financial) could reduce opportunities for full-time education. Natural disasters and drought shorten the time available to educate children since they displace populations and cause migration. Malnutrition and disease reduce school attendance, as well as the ability of children to learn in class.
Goal 3: Promote gender equality and empower women	Climate change is expected to exacerbate current gender inequities. A reduction in natural resources and agricultural productivity could increase health problems among women and reduce the time available to participate in decision-making processes and income-generating activities. Natural disasters are known to have serious consequences in households headed by women —particularly when female heads of households have fewer opportunities to start anew.
Goal 4: Reduce child mortality among children under five	Possible increase in mortality and diseases linked to rising temperatures; vector-borne diseases and pressure on water resources will make the target for combating diseases —particularly those which specifically affect children, such as diarrhoea and malaria— difficult to achieve. Children and pregnant women are particularly vulnerable to vector-borne diseases.
Goal 5: Improve maternal health	Climate change could reduce the quantity and quality of potable water. This is a prerequisite for good health; scarcity of this resource exacerbates malnutrition. Climate change could also affect access to sexual and reproductive health services. Natural disasters could jeopardize food security, increasing malnutrition.
Goal 6: Combat HIV/AIDS, malaria and other diseases	Water stress and rising temperatures will lead to an increase in disease. Vector-borne diseases, such as malaria, may be more difficult to control in a climate more hospitable to the vector. Persons living with HIV/AIDS are more vulnerable, and malnutrition would accelerate the negative effect of the disease.
Goal 7: Ensure environmental sustainability	Climate change will alter the quality and productivity of natural resources and ecosystems; some of these changes may be irreversible, reducing biological diversity and aggravating environmental degradation. The impacts of climate change on water resources may make it more difficult to universalize access to potable water and sanitation. The extreme weather associated with climate change may have a negative impact on shantytown and slum dwellers and on indigenous communities.
Goal 8: Develop a global partnership for development	Climate change is a global problem which requires international cooperation, particularly to help developing countries adapt to the phenomenon's negative repercussions. Possible trade restrictions regarding the carbon footprint of products may have immediate negative effects on the export sectors of developing countries. Given the expected effects of climate change, the mechanisms and scope of international cooperation and financial resources need to be strengthened.

Source: J. Samaniego (coord.), “Cambio climático y desarrollo en América Latina y el Caribe: una reseña”, *Project documents*, N° 232 (LC/W.232), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), February 2009, on the basis of United Nations Framework Convention on Climate Change (UNFCCC), “National communications from non-Annex I Parties” [online] http://unfccc.int/national_reports/non-annex_i_natcom/items/2716.php, 2007; and World Health Organization (WHO), *Climate Change and Human Health – Risk and Responses. Revised Summary*, Washington, D.C., 2008.

^a Based on national communications from non-Annex I parties to the United Nations Framework Convention on Climate Change (UNFCCC) and the sixth compilation and synthesis of initial national communications from parties not included in Annex I to the Convention.

Even if the global temperature is successfully stabilized, some impacts are unavoidable, and a wide variety of adaptive measures will need to be taken to adjust to new climatic conditions. These measures will be costly in terms of public expenditures. The region faces economic, social and environmental challenges as well, which means that policy decisions need to be made as to the public funds that will be allocated to adaptation. Adaptive measures are required in agriculture and industry, disaster risk management, human health, water resources and coastal infrastructure and management (Samaniego, 2009).

E. CLIMATE CHANGE AND MILLENNIUM DEVELOPMENT GOAL 7 IN LATIN AMERICA AND THE CARIBBEAN

The link between climate change and Millennium Development Goal 7 is twofold. First, climate change is a factor —primarily a hindrance— in the achievement of the Goal's indicators. Second, progress (or setbacks) in the achievement of those indicators —particularly 7.1 and 7.2— contribute to (or hinder) mitigation of and adaptation to climate change. Climate change itself is one of the clearest manifestations of the fact that prevailing development patterns are neither environmentally friendly nor sustainable.

1. Targets 7.A and 7.B: reverse the loss of environmental resources and reduce biodiversity loss

(a) Indicator 7.1 (proportion of land area covered by forest)

As of yet, there is no clear evidence to suggest that forest cover in the region is being lost at a higher rate as a result of climate change (Samaniego, 2009). Nevertheless, a number of simulations based on IPCC emission scenarios do show a significant risk of climate-change-induced forest deterioration in tropical, boreal and mountainous areas towards the end of the twenty-first century. Other simulations predict a drastic decline in rainfall in the eastern Amazon.⁷ While there is still no consensus on the subject in the scientific community, the Fourth Assessment Report of the IPCC suggests a possible loss of 20% to 80% of forest cover in the Amazon as a result of a 2°C to 3°C temperature increase in the Amazon basin. A vicious circle between climate change and deforestation would thus arise, particularly in the Amazon.

Interactions that may exacerbate the effects of climate change on forests are also a significant concern. The results of the IPCC assessment of the forest sector were mixed with regard to the link between forest fires and some of the effects of climate change. Recent studies suggest that rising temperatures and longer harvest periods may increase the risk of fires owing to the increase in aridity (Easterling and Aggarwal, 2007).

(b) Indicator 7.2 (CO₂ emissions, total, per capita and per \$1 GDP (PPP))

This is the most direct and obvious link between climate change and the indicators associated with the Goal 7. One fundamental issue which requires action on the part of the countries of the region is the fact that regional carbon dioxide emission estimates do not include emissions resulting from land-use change —particularly deforestation (see chapter IV for more details). The relative importance of such emissions in the region, compared to those resulting primarily from energy and cement production (which

⁷ According to UNEP, predictive models suggest the Amazon may be close to a tipping point (UNEP, 2009c, p. 26).

have been quantified) is well known. In this regard, it is estimated that the countries of Latin America and the Caribbean are responsible for 48.3% of worldwide carbon dioxide emissions resulting from land-use change (UNEP, 2007).

With regard to energy, despite the region's relatively small share in global emissions, the current international situation (particularly trade conditions and international treaties), coupled with the need to adopt adaptation strategies consistent with mitigation measures, make a general move towards the decarbonization of the region's economies —particularly energy efficiency and the development of renewable energies— a crucial priority. Box III.5 briefly addresses the aspects of the current international situation which make energy changes necessary.

Box III.5

CHANGES IN THE INTERNATIONAL SITUATION REGARDING ENERGY

- Growing energy consumption in emerging economies is occurring within the framework of already enormous consumption by industrialized countries. The resulting increase in demand has led to an increase in the international price of hydrocarbons.
- An international regime to tackle climate change, even if it is applied only in countries belonging to the Organization for Economic Cooperation and Development (OECD) and the countries of Latin America and the Caribbean opt out of it, would lead to significant changes in the international landscape facing the region. This is true both because of the regulatory changes that would be enacted in OECD countries that serve as export markets for the region and the possible impacts that such an international regime may have on various economic variables associated with the energy sector. With regard to the first issue, the emerging scenario suggests that the greenhouse gas emissions which accompany exports from the developing world, either during the production or shipping faces, will face restrictions in their destination markets. These restrictions may take the form of border fiscal measures (for example, taxes linked to the carbon footprint of exports) or stricter environmental labelling requirements, as well as an increasing preference for environmentally friendly products on the part of consumers. As for the possible effects of such measures, the following is to be expected: (i) changes in the international prices of various types and sources of energy; (ii) increased investment and financial flows toward clean energy projects, energy efficiency and reduction of emissions; (iii) a rapid decline in the unit cost of renewable energies, as well as the emergence of new financing mechanisms to promote the global dissemination of such energies; (iv) faster dissemination of technologies which have thus far been commercially unavailable (for example, carbon capture and storage technologies).

Source: J. Samaniego (coord.), "Cambio climático y desarrollo en América Latina y el Caribe: una reseña", *Project documents*, N° 232 (LC/W.232), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), February 2009, and J. Acquatella, "Energía y cambio climático: oportunidades para una política energética integrada en América Latina y el Caribe", *Project documents*, N° 218 (LC/W.218), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), December 2008.

(c) **Indicator 7.3 (consumption of ozone-depleting substances)**

Ozone-depleting substances are themselves GHGs. The effective reduction achieved in the consumption of such substances (see chapter IV) constitutes a positive effect of this indicator on climate change. Climate change is not expected to have a significant impact on the consumption of such substances.

(d) Indicators 7.4 (proportion of fish stocks within safe biological limits), 7.6 (proportion of terrestrial and marine areas protected) and 7.7 (proportion of species threatened with extinction)

The effects of climate change on biodiversity are linked to the functions needed to support ecosystems, as well as the imbalances generated in such systems. In many tropical areas of Latin America, significant species are threatened with extinction. Parts of the tropical jungles of the eastern Amazon and southern Mexico may be replaced with savannah, and the semi-arid vegetation of certain areas of north-eastern Brazil, as well as most of central and northern Mexico, may be replaced by arid vegetation due to the combined effect of changes in land use and climate. It is also quite likely that climate change will drastically affect the survival of species given its impact on their reproductive cycles and geographical distribution (De la Torre, Fajnzylber and Nash, 2009).

With regard to marine species, as noted above, rising ocean temperatures resulting from the changing global climate have led to the bleaching and deterioration of coral reefs, at a high economic cost to the region —particularly the Caribbean. These biological formations are a unique tourist attraction; when they are bleached and disintegrate, they lose both their aesthetic value and their role as a support system for biodiversity. Given the temperature increases expected over the next few decades, forecasts predict that all of the area's coral reefs will have died by 2060 or 2070. If warming increases beyond the expected level, all such reefs may die by 2050. In addition to a loss of biodiversity, such a development would have direct, significant socio-economic impacts, not only in terms of the tourist industry or the role of coral reefs as a natural barrier against storms, but also with regard to the biological safety of fishes. A high percentage of Caribbean species depend, to a certain degree, on coral reefs; the collapse of the latter could have a broad-ranging impact on the area's fishing industry and ecology.

(e) Indicator 7.5 (proportion of total water resources used)

The region receives a large share of the world's rainfall, and accounts for a significant portion of its freshwater (see chapter IV). Consequently, given the relative abundance of this resource, this indicator has not been a matter of special concern in the region, except in arid and semi-arid subregions. Climate change could change this situation in some watersheds.

While the forecasts of global climate models with regard to changes in local precipitation patterns are not as consistent as forecasts of temperature alterations, those regarding large-scale changes in certain areas are. In arid and semi-arid regions of Argentina, north-eastern Brazil, northern Mexico and Chile, future declines in rainfall could lead to serious water shortages. In Latin America, the number of persons living in watersheds suffering from water stress was estimated to be approximately 22 million in 1995. When the effects of climate change are taken into account, according to IPCC scenarios, the number of persons in the region living in areas experiencing water stress would increase by between 6 and 20 million by 2055 in three of the four scenarios considered. While the economic consequences of this grave water shortage have yet to be analysed, they are likely to be significant, particularly if they lead to major changes in the region's hydroelectric potential —either in terms of overall capacity or location (De la Torre, Fajnzylber and Nash, 2009).

Most General Circulation Models (GCMs) predict relatively significant precipitation anomalies (both positive and negative) in the tropical regions of Latin America. Smaller anomalies are expected in the extra-tropical region of South America. Despite the high level of uncertainty regarding future precipitation patterns, there are strong indications that climate change could intensify the extreme weather already observed in the region. Thus, many areas which are continuously exposed to drought and flooding

may have to deal with drier conditions and increased precipitation, respectively. This would be the case throughout Chile, Guatemala, El Salvador and Mexico. Similarly, 47% to 100% of the areas most exposed to flooding in Argentina, Peru and Uruguay are expected to experience even higher levels of rainfall (De la Torre, Fajnzylber and Nash, 2009).

2. Targets 7.C and 7.D: sustainable access to safe drinking water and basic sanitation; improvement in the lives of slum dwellers

Climate change will cause additional difficulties in the achievement of goals pertaining to access to safe drinking water. Declining rainfall in certain areas as a result of climate change, coupled with increasingly frequent droughts and flooding, will affect both the availability and the quality of water. According to IPCC predictions, the number of persons experiencing water shortages in the region will range between 12 million and 81 million in 2025, and 79 million to 178 million in 2055 (Arnell, 2004). Another study which analyses future climate scenarios in terms of water stress (Warren and others, 2006) shows that rising temperatures, combined with changes in population growth, will probably worsen the water situation for millions of people. According to this study, South America will be the subregion that is worst-hit in terms of the number of people affected by water stress.

These results are related to the tendency to retreat shown by the glaciers in the region—particularly in areas where the population is dependent upon thawing glaciers as a source of water; such populations would be severely affected during the dry season. They include millions of people in the Andean region (particularly Colombia, Chile, Peru and the Plurinational State of Bolivia), where signs of glacier retreat have already been observed, and production sectors have suffered as a result.

With regard to sanitation, future climate change would not, in principle, have any direct effects on the positive evolution of this indicator in the years to come, thanks to policy decisions, regulations or both. Nevertheless, climate change could have an indirect effect, by redirecting public spending towards adaptive measures, making potable water less available, raising costs or increasing disease. Climate projections suggest that Latin America and the Caribbean will have experienced a significant increase in mortality levels by 2030, largely as a result of deficient access to safe drinking water and sanitation. This underscores the urgent need to universalize such services.

(a) Human settlements and natural disasters in the context of climate change

With regard to human settlements, studies of natural disasters by the ECLAC and studies on the Human Development Index (HDI) by the United Nations Development Programme (UNDP, 2007 and 2008) show that the main impact of recurring extreme weather in regions with rural communities is migration to cities. Such migration leads to increased social inequity, vulnerability, poverty and the growth of slums and this rapid urbanization, in turn, has a negative environmental impact and erodes the quality and safety of basic services.

Studies on the effects of natural disasters generally show that the population most affected by increases in the frequency and intensity of such phenomena is the poor population, which usually inhabits high-risk areas. Infrastructure in such areas is generally precarious; given their lack of access to high-value land, poor persons are forced to live and work in areas prone to landslides, flooding and drought. Their economic status also limits their capacity to invest in disaster prevention. The challenges which climate change poses in cities is not limited to the vulnerability of slums, however. The need to both

mitigate and adapt to climate change underscores the need to increase urban functionality, by improving infrastructure and public services and making them more efficient (see chapter IV).

Socio-economic analyses of disasters during the 2004-2005 hurricane season show that extreme weather aggravates existing social vulnerability. Such was the case in Guatemala and El Salvador, where the HDI was already very low. In Guatemala, the social impact of these events exceeded their economic impact. Estimates show that the main victims in this case were indigenous women, who lost their assets—namely looms and the tools and materials needed to sustain their livelihood (Zapata Martí, 2006).

Vulnerable groups, such as poor women, indigenous communities and landless farmers, face limitations such as lack of access to credit or restrictions in obtaining legal title to land. Members of these groups rarely have formal proof of land ownership, marketing capacity, investment capacity or the technical knowledge required to recover their assets and continue performing a productive activity that would enable them to recover from the effects of a natural disaster (UNDP, 2007).

To make matters worse, extreme weather often occurs in areas that have already been hit in the past, and which have been unable to fully recover. This leads to a cumulative effect which is difficult to overcome. According to the IPCC (2001), slums are usually located in vulnerable areas such as ridges and hillsides, which are more vulnerable to periodic natural disasters. This is exacerbated by overpopulation and unreliable basic services (which make such areas potential breeding grounds for vectors and organisms that transmit diseases), poor preparedness to deal with the damage caused by disasters and lack of planning (Zapata Martí, 2006).

F. CONCLUSIONS

While the contribution of Latin America and the Caribbean to global climate change is small, the region is disproportionately exposed to the risks it entails. Climate change has created new challenges for the achievement of the Millennium Development Goals in general, and of Goal 7 in particular. It poses new difficulties for reaching the targets for the reversal of the loss of environmental resources and the reduction of biodiversity loss, as well as the targets for the expansion of potable water and sanitation services and the improvement of the lives of slum dwellers. These measures have become all the more urgent given, as regards the first set of targets, the importance of the environmental services provided by the region's ecosystems and biodiversity, and as regards the second set, the extreme vulnerability of persons living in poverty—without access to water, sanitation or housing—to the effects of climate change.

In addition to the challenges involved in achieving the Millennium Development Goals, the region must assume the equally significant challenge of obtaining the financial, technological and administrative inputs required to implement the adaptive measures needed to tackle climate change. These measures must also be implemented in a manner consistent with existing multilateral rules, such as those of the World Trade Organization (see chapter V).

The cross-cutting nature of the effects of climate change and its close relationship to the energy base of the region's economies underscore the importance of the institutional challenge posed by target 7.A: to integrate the principles of sustainable development into sectoral policies. As with other environmental problems, the issue of climate cannot be dealt with solely through institutions and laws enacted to address climate change issues in isolation; on the contrary, it must be part of the agendas of production, infrastructure and social development.

Chapter IV

LATIN AMERICA AND THE CARIBBEAN: PROGRESS TOWARDS ACHIEVEMENT OF THE TARGETS OF MILLENNIUM DEVELOPMENT GOAL 7

As noted in chapter I, Millennium Development Goal 7 comprises four targets and a total of 10 official indicators. This chapter describes progress and setbacks in Latin America and the Caribbean in the achievement of those targets. It analyses the information available on each of the indicators, particularly at the regional and subregional levels and, in some cases, at the national level.¹

The targets and indicators do not always fully and sufficiently reflect the reality of a particular region or subregion. This is because the worldwide scope of the Goals makes it necessary to consider priorities for the international community as a whole, which do not necessarily correspond to regional, national or local specificities. The advantage of being able to compare differing geographical realities is set against the drawback of lower precision in the analysis of specific geographical situations. Be that as it may, the combination of local, national, regional and global perspectives offers complementary viewpoints on situations that are difficult to capture precisely using a small group of indicators. Since official environmental statistics in the countries of the region tend to be insufficient and uneven, this report makes use of complementary indicators and additional information which may be useful in understanding the dynamics of environmental sustainability in Latin America and the Caribbean from a regional perspective.

Other indicators were thus included in the analysis in order to complement the official ones and offer a more thorough explanation of some of the targets. Also considered were three cross-cutting complementary issues which are essential for understanding environmental sustainability issues in Latin America and the Caribbean. Table IV.1 summarizes the indicators and the information presented in this chapter.

Despite great progress over the past 10 years, the statistical data available for calculating the official and complementary indicators are still insufficient, particularly in certain countries and for certain variables. For example, there are no data for the calculation of indicator 7.4, the proportion of fish stocks within safe biological limits. Also, since indicator 7.7 —the proportion of species threatened with extinction— has been added recently, there are no historical series of comparable, harmonized statistics; there is only one estimate at the global level.

From the statistical viewpoint, there are many data sources —such as international, regional and national bodies— all of them legitimate and aiming to meet varying information needs. In preparing this chapter, the most appropriate and up-to-date sources of official statistical data have been selected for each indicator, in order to include the greatest possible number of countries for which quality statistical data are available (see methodology notes).

¹ The value of the indicators presented in this chapter corresponds to the revisions of official databases with a closure date of 5 October 2009.

Table IV.1
**TARGETS AND INDICATORS USED IN CHARACTERIZING MILLENNIUM DEVELOPMENT
 GOAL 7: ENSURE ENVIRONMENTAL SUSTAINABILITY**

Targets of Goal 7	Official indicators	Indicators and complementary information by target	Cross-cutting complementary issues
7.A i) Integrate the principles of sustainable development into country policies and programmes		<ul style="list-style-type: none"> • Public spending on the environment as a proportion of GDP • Evolution of budgetary execution as a proportion of GDP • Evolution of staff numbers assigned as a proportion of total public-sector employees 	Ecological efficiency and sustainability in cities Incidence and impact of extreme weather events Environment and health
7.A ii) Reverse the loss of environmental resources	7.1 Proportion of land area covered by forest 7.2 CO ₂ emissions, total, per capita and per dollar of GDP 7.3 Consumption of ozone-depleting substances 7.4 Proportion of fish stocks within safe biological limits 7.5 Proportion of total water resources used	Desertification and land degradation: <ul style="list-style-type: none"> • Proportion of land becoming degraded • Intensity of fertilizer use • Intensity of pesticide use (fungicides, herbicides, insecticides) Atmospheric pollution: <ul style="list-style-type: none"> • Concentration of particulate matter (PM10) in major cities in Latin America and the Caribbean • Biomass consumption (indoor pollution) 	
7.B Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss	7.6 Proportion of terrestrial and marine areas protected 7.7 Proportion of species threatened with extinction		
7.C Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation	7.8 Proportion of population using an improved drinking water source 7.9 Proportion of population using an improved sanitation facility		
7.D By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers	7.10 Proportion of urban population living in slums		

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

As noted, this chapter describes the main regional trends in each indicator, mentioning the situations of specific countries when relevant. Attention is drawn to cases in which progress towards the target regionwide diverges substantially from the situation at the national or subnational level.

Lastly, owing to uneven availability of official environmental data and the lack of information in many of the countries of the region, this chapter uses text boxes to describe some key issues relating to Goal 7. Although not representative of the region or the various subregions, these at least facilitate concrete discussions on a number of subjects, while illustrating certain points using official data from the countries.

A. PROGRESS TOWARDS ACHIEVEMENT OF THE TARGETS OF MILLENNIUM DEVELOPMENT GOAL 7: MAIN TRENDS

More than half of the period agreed by the countries for achieving the Millennium Development Goals has now passed, and the official indicators for the Goal 7 show considerable progress since 1990, but also some setbacks and challenges. Table IV.2 summarizes the situation for each indicator by subregion. The figures represent the percentage change for the values concerned over the period 1990-2005.

Table IV.2 shows that there has been progress at the regional level regarding some of the variables contained in the targets of Goal 7. For example, growth of protected areas for biodiversity conservation, significant reduction in consumption of ozone-depleting substances, increased coverage of drinking water and sanitation services and reduction of the urban population living in slums. Total and per capita CO₂ emissions, however, have increased. The carbon intensity of the region's GDP, excluding land-use change, shows a slight fall. The worst deterioration in 1990-2005 was the increasing loss of forest cover. The summary table of the various indicators at the beginning of the report offers a contextualized overview of the situation.

The aforementioned positive trends do not necessarily mean that the targets have been achieved or that the conditions have been created for their achievement by the agreed dates. In the following sections and chapters, complementary indicators are used to analyse and contextualize the progress achieved and size up the challenges still to be overcome if the targets are to be achieved.

Table IV.2
**LATIN AMERICA AND THE CARIBBEAN: OFFICIAL INDICATORS FOR MILLENNIUM
 DEVELOPMENT GOAL 7, CUMULATIVE VARIATION FOR 1990-2005^a**
 (Percentages)

Indicator for Goal 7	Title of indicator ^b	South America	The Caribbean	Meso-America	Latin America and the Caribbean
7.1	Proportion of land area covered by forest	-6.71	13.23	-10.35	-6.97
7.2 a	CO ₂ emissions, total	55.70	41.14	19.06	40.82
7.2 b	CO ₂ emissions, per capita	22.33	18.18	-7.85	10.66
7.2 c	CO ₂ emissions per dollar GDP ^c	-5.47	-8.87	-27.94	-14.29
7.3	Consumption of ozone-depleting substances	-89.41	-87.76	-93.55	-84.56
7.6	Proportion of terrestrial and marine areas protected	121.73	39.34	127.19	119.95
7.8	Proportion of population using an improved drinking water source	9.93	8.86	16.01	9.94
7.9	Proportion of population using an improved sanitation facility	11.58	-3.16	37.89	16.53
7.10	Proportion of urban population living in slums	-31.06	-32.43	-32.42	-31.27

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

^a Each cell records the cumulative variation of the value of each indicator over the period between 1990 and the latest year for which data are available.

^b There are no statistics from which indicators 7.4, 7.5 and 7.7 can be evaluated quantitatively and accurately.

^c GDP at constant 2000 prices.

B. REVERSING THE LOSS OF ENVIRONMENTAL RESOURCES

Target 7.A

Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources

1. Target 7.A (i): Integrate the principles of sustainable development into country policies and programmes

There are no official indicators on the first component of target 7.A, but it is so crucial for sustainable development that it is worth carrying out an analytical approximation by means of complementary or proximal indicators such as the budget executed by environment ministries, public environmental spending, and data from the integrated economic and environmental accounting system.

The first part of target 7.A of Millennium Development Goal 7 asks countries to “integrate the principles of sustainable development into national policies and programmes”. The situation in Latin America regarding public policies and institutions, as described in chapter II, shows widespread progress in environmental legislation and institutionality. Nonetheless, it clearly needs to be quantified in some way. There have been a number of discussions in the region on indicators which might be used to measure this institutionality, and some of the proposals put forward may be statistically viable in certain countries in the region.²

For the purposes of this analysis, two indicators were adopted as appropriate and relevant, as well as statistically viable and reliable, in at least a few of the region’s countries. They relate to resources spent by environmental authorities and to inter-institutional or cross-cutting public environmental spending. For illustration purposes, information is also provided at the end of this section on integrated economic and environmental accounting in Mexico.

(a) Financial and human resources of ministries and departments of the environment

The scale of the resources which have been effectively available to ministries and departments of the environment in the region serves as an indicator, albeit incomplete, to measure actual budgetary execution over time. ECLAC conducted an exercise in 2009 to collect the relevant statistics by means of a specialized tool, and some early results of this are now available (see table IV.3).

Table IV.3
**LATIN AMERICA (8 COUNTRIES): TOTAL BUDGET EXECUTED BY MINISTRIES
 AND DEPARTMENTS OF THE ENVIRONMENT^a**
(Dollars at current prices and cumulative percentage variation)

Country	1995	2000	2005	Cumulative percentage variation 1995-2000	Cumulative percentage variation 2000-2005	Cumulative percentage variation 1995-2005
Argentina	17 342 051	16 878 338	15 349 971	-2.6	-9.0	-11.4
Uruguay	1 591 269	3 222 016	1 676 786	102.4	-47.9	5.3
Chile	10 375 448	20 224 588	18 341 236	94.9	-9.3	76.7
Guatemala	4 999 332
Brazil	...	315 696 239	490 132 036	...	55.2	...
Mexico	107 252 680	1 569 965 185	2 612 000 848	1 363.8	66.3	2 335.3
Colombia	47 965 823	16 514 081	79 307 549	-65.5	380.2	65.3
Belize	...	126 880	218 041	...	71.8	...

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of information provided by the ministries and departments of the environment in the countries concerned.

^a Preliminary figures.

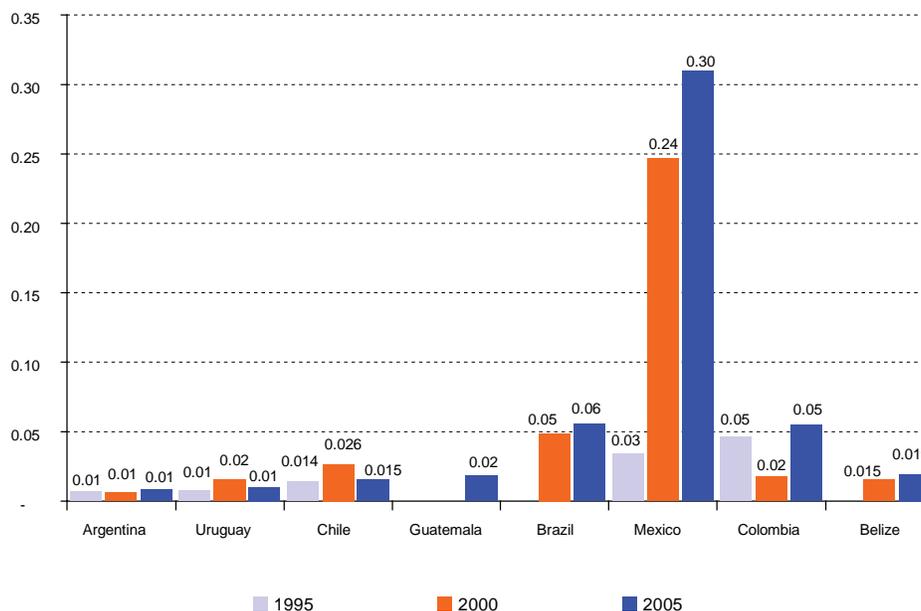
² One of the proposed indicators is described in Quiroga (2007).

The preliminary results show that the total budget in current dollars executed by the ministries and departments of the environment has evolved unevenly among the countries. Between 2000 and 2005, spending fell in Uruguay (-48%), Chile (-9.3%) and Argentina (-9%), but rose by over 50% in Brazil, Colombia and Mexico. After that date, however, the amount of budgetary resources actually executed appears to have increased in most of the countries studied.³

As for the magnitude of those resources relative to GDP in each country, in 2005 they made up 0.3% of GDP in Mexico and 0.06% in Brazil. In Argentina, Belize, Chile, Colombia and Uruguay, however, the proportion was substantially smaller, varying between 0.01% and 0.05% of GDP (see figure IV.1a).

In addition to the environment ministries as the governing bodies of specialized institutions, the countries of the region generally also have related inter-agency systems for sustainable development, which comprise other sectoral entities that perform some environmental management function. Such entities have to be accounted for within the financial and human resources allocated to environment issues, which makes measurement more complicated. For this reason, the figures presented have certain limitations and likely underestimate the execution of the public budget for environmental sustainability.

Figure IV.1a
**LATIN AMERICA (8 COUNTRIES): TOTAL EXECUTED BUDGET OF MINISTRIES
 OR SECRETARIES OF THE ENVIRONMENT, AS A PROPORTION
 OF CURRENT GDP, 1995, 2000 AND 2005^a**
(Percentages)



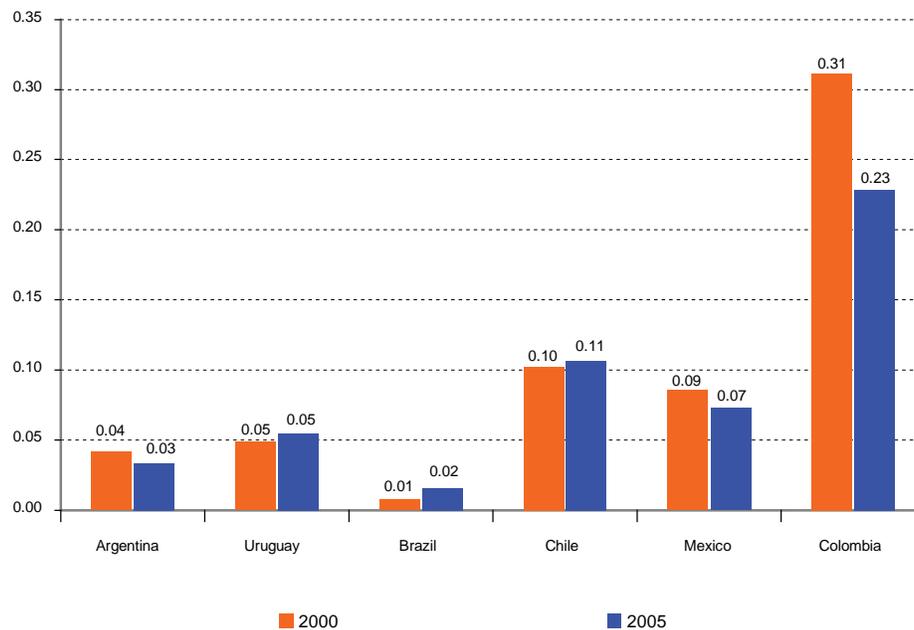
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of information provided by the Ministries or Secretariats of the Environment of the respective countries.

^a Preliminary figures.

³ According to data provided for this report by the National Environment Commission (CONAMA), the nominal budget of Chile in 2009 is double the 2005 figure.

As for the proportion of civil servants employed by ministries and departments of the environment, the figure is below 1% in the six countries analysed (see figure IV.1b).

Figure IV.1b
LATIN AMERICA (6 COUNTRIES): STAFF EMPLOYED IN MINISTRIES OR SECRETARIES OF THE ENVIRONMENT AS A PROPORTION OF TOTAL PUBLIC-SECTOR EMPLOYEES^a
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of information provided by the Ministries or Secretariats of the Environment of the respective countries.

^a Preliminary figures. Information on total wage workers and percentage of public-sector employees is from the International Labour Organization (ILO), QUIPUSTAT Database [online] <http://white.oit.org.pe/estad/laclispub/menu.php>.

(b) Public environmental spending

The indicator of public environmental spending is used to quantify progress in relation to the first part of target 7.A of the Millennium Development Goals, incorporating the budgetary execution of all government departments which engage in spending or investment related to environmental protection. This indirectly reflects the implementation of public policies for economic and social development that preserve environmental sustainability.

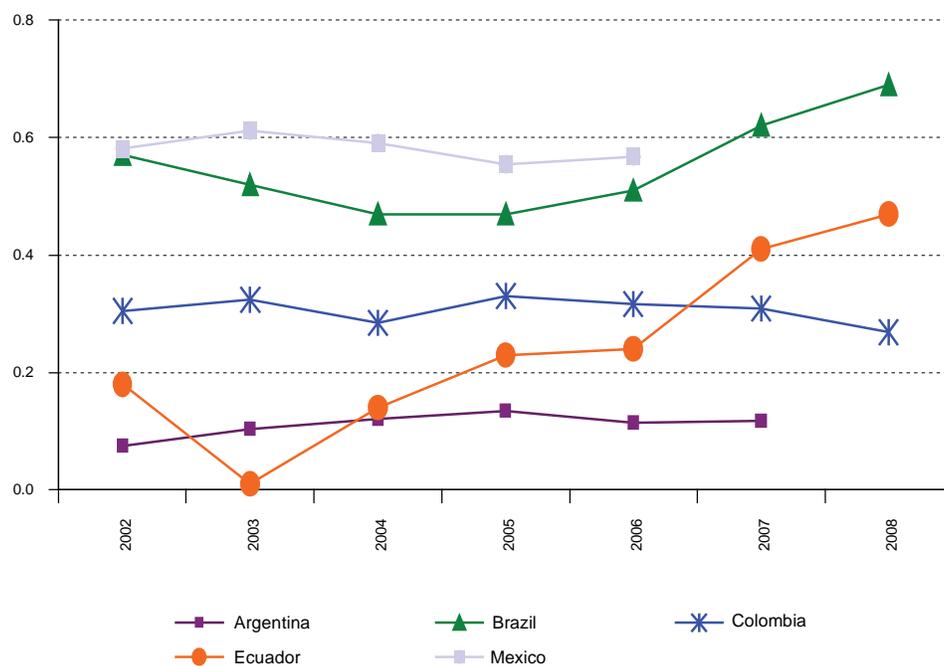
Since 1990, a number of countries and international organizations have attempted to measure spending on environmental management. For this purpose, environmental spending is defined as that whose main objective is to protect the environment; this includes disbursements for reducing and controlling pollution and protecting biodiversity. It excludes spending related to the provision of drinking water, natural resource management and the prevention of natural hazards.⁴

⁴ The items considered to be environmental protection spending are clearly defined in the international classification approved by the United Nations, the Classification of Environmental Protection Activities and

On the basis of these guidelines, some countries in Latin America and the Caribbean have measured environmental spending through joint efforts by international bodies such as ECLAC and UNDP⁵ or ECLAC and OECD.⁶ The studies conducted have revealed technical difficulties in measurement, however, including problems of double accounting between different levels of government and insufficient information owing to the lack of administrative records in some countries. Analysis of the findings must therefore take into account that the methodology had to be adapted to public spending dynamics in each country, characterized by different levels and geographical divisions —federal, national, provincial, regional and municipal— as well as differing definitions of “public” —central, fiscal, decentralized and others— and variations over time and differing monetary denominations.

As can be seen in figure IV.2 and table IV.4, the proportion of public environmental spending did not exceed 1% of GDP in any of the cases studied. By comparison, such spending makes up 1%-2% of GDP in the OECD countries.

Figure IV.2
**LATIN AMERICA (5 COUNTRIES): PUBLIC SPENDING ON THE ENVIRONMENT
 AS A PERCENTAGE OF GDP, 2002-2008**
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of updated information provided by the ECLAC/UNDP “Financing for environmentally sustainable development” project, and official country figures.

Expenditure (CEPA), which enables analysis of the countries’ priorities. These guidelines are intended to produce harmonized measurements in order to facilitate comparison.

⁵ The project “Financing for environmentally sustainable development”, begun in 2001 and executed by ECLAC in coordination with UNDP, has produced measurements of environmental spending in over 10 Latin American countries.

⁶ Environmental performance assessments conducted by the Organisation for Economic Co-operation and Development (OECD) in Mexico and jointly in Chile have promoted the collection of the data needed to measure spending on environmental protection.

Table IV.4
**LATIN AMERICA AND THE CARIBBEAN (9 COUNTRIES): PUBLIC ENVIRONMENTAL SPENDING
 AND INVESTMENT AS A PROPORTION OF GDP**
(Percentages)

Country	Period	Average for the period	Most recent data available	Trend
Argentina	1994-2007	0.14	0.12	Falling, with inflection in 2002
Brazil	1996-2008	0.39	0.69	Rising
Chile	1998-2001	0.50	0.40	Stable
Colombia	1995-2008	0.30	0.27	Stable
Costa Rica	1992-2000	0.50	0.64	Rising
Ecuador	1995-2008	0.29	0.47	Volatile, growing since 2003
Mexico	1991-2006	0.40	0.60	Since 2001, stable at its highest level
Peru	1999-2003	0.29	0.25	Stable
Trinidad and Tobago	1993-1999	0.18	0.20	Stable

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of updated information provided by the ECLAC/UNDP “Financing for environmentally sustainable development” project, and official country figures.

The goals of environmental spending depend on each country’s environmental issues. Water treatment and urban solid and liquid waste management, together with the protection of natural areas, are major items in the public environmental budget. When broader environmental spending, including water supply, is taken into account, the water resources component is the largest.

Lastly, box IV.1 describes the experience of Mexico in relation to integrated economic and environmental accounting. The National Institute of Statistics and Geography (INEGI) of Mexico has developed an indicator of Ecological Gross Domestic Product (EGDP) which makes it possible to attribute an economic value to environmental heritage loss. Mexico is currently the only country in the region to maintain systematic time series data in this regard. For illustration purposes, a sample of updated results in this area is provided below.

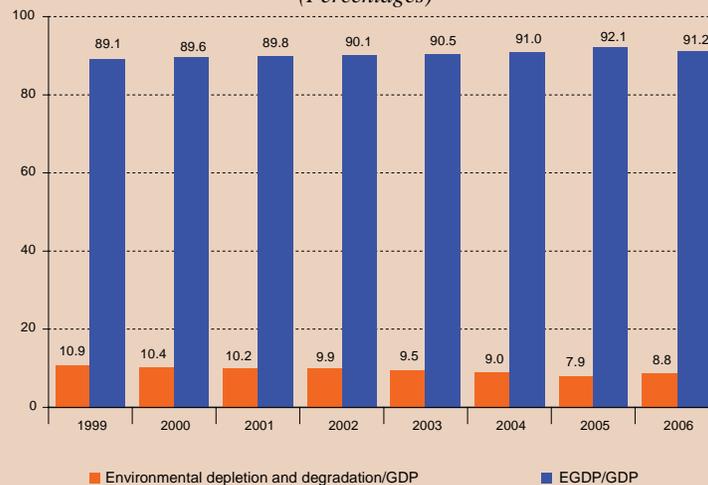
2. Target 7.A (ii): Reversing the loss of environmental resources

The second element of target 7.A covers many aspects, including those reflected in official indicators and others which are of particular significance for the Latin American and Caribbean region, including land degradation, the intensity and renewability of energy sources and air pollution in major cities, which will be discussed later.

Box IV.1
INFORMING SUSTAINABLE DEVELOPMENT: ECONOMIC VALUATION OF THE LOSS OF ENVIRONMENTAL HERITAGE IN MEXICO

As shown in the figure below, the cost of environmental depletion and degradation in Mexico has fallen slightly as a proportion of GDP, from 10.9% in 1999 to 8.8% in 2006. Ecological Gross Domestic Product (EGDP) thus represented between 89% and 91% of GDP during that period.

MEXICO: ECOLOGICAL GROSS DOMESTIC PRODUCT (EGDP) AND THE COST OF ENVIRONMENTAL DEPLETION AND DEGRADATION AS A PROPORTION OF GDP, 1999-2006
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of National Institute of Statistics and Geography (INEGI), *Sistemas y Cuentas Económicas y Ecológicas de México 1999-2004* and *Sistemas y Cuentas Económicas y Ecológicas de México 2003-2006. Base 2003*, Mexico City, 2009.

The table below summarizes the value of all the variables of Mexico's economic-environmental accounts system, published in 2009.

MEXICO: GDP AT MARKET PRICES, MINUS THE DEPRECIATION OF NATURAL RESOURCES, 1999-2006

Year	Millions of pesos						Percentages			
	GDP	FCC	NDP	TCEDD	EGDP	ENDP	ENDP/NDP	EGDP/GDP	FCC/GDP	TCEDD/GDP
1999	4 594 724	461 860	4 132 864	500 406	4 094 318	3 632 458	87.9	89.1	10.1	10.9
2000	5 491 708	525 596	4 966 112	573 158	4 918 550	4 392 954	88.5	89.6	9.6	10.4
2001	5 809 688	568 522	5 241 166	591 412	5 218 276	4 649 754	88.7	89.8	9.8	10.2
2002	6 263 137	614 186	5 648 951	620 778	5 642 359	5 028 173	89.0	90.1	9.8	9.9
2003	7 555 803	683 354	6 872 449	719 595	6 836 208	6 152 854	89.5	90.5	9.0	9.5
2004	8 557 291	759 221	7 798 070	771 511	7 785 780	7 026 559	90.1	91.0	8.9	9.0
2005	9 159 316	804 005	8 355 311	727 199	8 432 117	7 628 112	91.3	92.1	8.8	7.9
2006	10 306 639	882 688	9 423 951	903 724	9 402 915	8 520 227	90.4	91.2	8.6	8.8
Average for the period							89.4	90.4	9.3	9.6

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of National Institute of Statistics and Geography (INEGI), *Sistemas y Cuentas Económicas y Ecológicas de México 1999-2004* and *Sistemas y Cuentas Económicas y Ecológicas de México 2003-2006. Base 2003*, Mexico City, 2009.

Note: GDP = Gross Domestic Product; FCC = Fixed capital consumption; NDP = Net Domestic Product; TCEDD = Total cost of environmental depletion and degradation; EGDP = Ecological Gross Domestic Product; ENDP = Ecological Net Domestic Product.

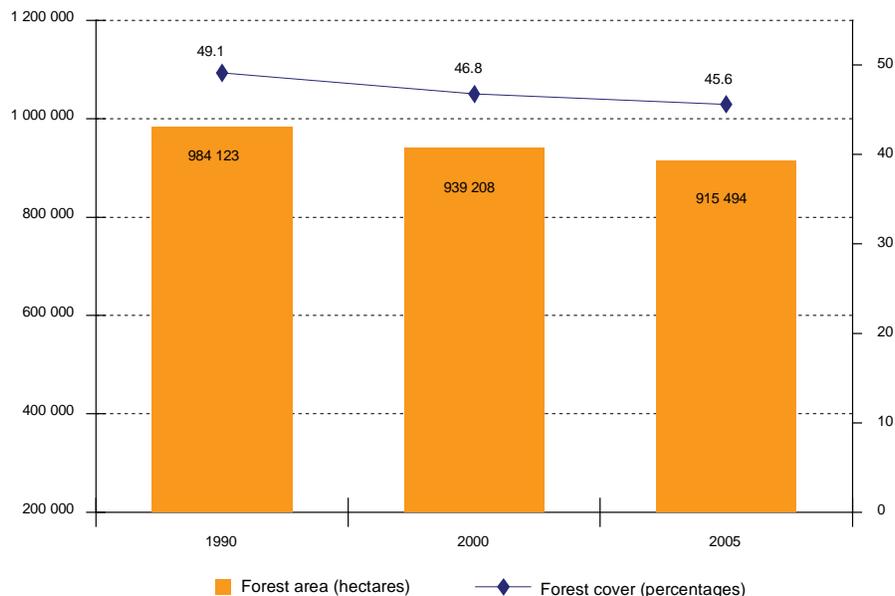
(a) **Indicator 7.1: proportion of land area covered by forest**

Forest cover is being increasingly lost, particularly in Meso-America and South America, owing to the growth of economic activities which offer greater profits than those compatible with forest preservation. Deforestation has a considerable impact on the region's environment and economies.

In 2005, the latest year for which data are available, Latin America and the Caribbean accounted for 22% of the world's forest areas, equivalent to some 915 million hectares (FAO, 2009a). The region has both the largest unfragmented tropical forests (Amazon region) and some of the most fragmented and endangered ones, in the Mata Atlantica (UNEP, 2003b). Six countries contain 85% of the region's forests, of which 52% are in Brazil and the remaining 33% in the Bolivarian Republic of Venezuela, Colombia, Mexico, Peru and the Plurinational State of Bolivia.

As for indicator 7.1, from 1990 to 2005 Latin America and the Caribbean lost close to 69 million hectares of forest, equivalent to 7% of the region's forest cover (see figure IV.3). That cover decreased from 49.1% of the region's territory in 1990 to 45.6% in 2005 (FAO, 2009a).

Figure IV.3
LATIN AMERICA AND THE CARIBBEAN: FOREST AREA AND FOREST COVER, 1990, 2000 AND 2005^a
(Thousands of hectares and percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Environmental Statistics and Indicators Databases (BADEIMA), on the basis of a calculation carried out using the national forest areas from *Global Forest Resources Assessment 2005* (FRA 2005) and the national land areas from the FAO Statistical Databases (FAOSTAT).

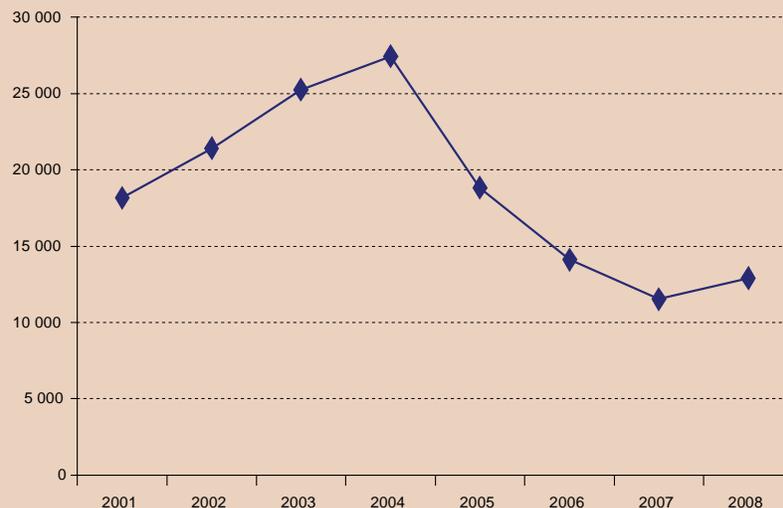
^a These figures may not coincide with the regional total for Latin America and the Caribbean in the FAO *Global Forest Resources Assessment 2005* (FRA), due to adjustments relating to the forest cover in the countries. In the above figure, the total for Latin America and the Caribbean includes data for 33 countries, whereas FRA 2005 includes 47 countries. This figure does not include information from Anguilla, Aruba, British Virgin Islands, Cayman Islands, Falkland Islands, French Guiana, Guadeloupe, Martinique, Montserrat, Netherlands Antilles, Puerto Rico and the South Georgia Islands. Another discrepancy is that the 2005 FRA report does not include Mexico in the total for Latin America and the Caribbean (as it is included under North America).

Of the total loss of forest suffered by the region in 1990-2005, 86%, or 59 million hectares, took place in South America, with a particularly strong impact on the Amazon region, although in recent years the pace of deforestation has slowed (see box IV.2).

Box IV.2
**CHANGES IN THE STRUCTURE OF ECONOMIC INCENTIVES IN BRAZIL:
 FIRST STEPS IN THE AMAZON REGION**

The Amazon Region of Brazil is home to much of the region's forested areas, and has also been the main site of deforestation over the last few decades, thereby making a significant contribution to the regional trend observed up to 2005 and illustrated in figure IV.3. Since then, however, the rate of deforestation in the area has dropped (see the figure below), as shown by the satellite monitoring system introduced by the Institute for Space Research (INPE) (see chapter V).

BRAZIL: DEFORESTATION IN THE LEGAL AMAZON^a
 (Km²)



Source: Institute for Space Research (INPE), "INPE divulga dados consolidados do PRODES 2007-2008", Press release, 4 August 2009.

^a Includes the States of Acre, Amazonas, Amapá, Maranhão, Mato Grosso, Pará, Rondônia, Roraima and Tocantins.

The fall in the rate of deforestation is the result of a series of factors. The Action Plan for Deforestation Prevention and Control in the Amazon was rolled out in 2003, in recognition of the complexity of the problem and the contradictions within public policy, and has ensured that ministries and other relevant public institutions are acting in unison. The fact that the Ministry for Civilian Affairs was responsible for coordinating the Plan made it a top priority at the federal level. Initiatives adopted included a strengthening of the monitoring actions of the Brazilian Environment and Renewable Resources Institute (IBAMA) and the enforcement of relevant legislation by the federal police. These measures have included increased vigilance on key road links between affected regions and markets in the south of the country to eradicate the rearing and sale of livestock in illegally occupied and deforested areas, and the signing of agreements with the soybean and timber sectors to stamp out the purchase of products obtained from deforested areas. These actions have had a significant visible effect: a single operation in which 3,000 illegal head of cattle were seized led to the capture of an additional 40,000 head of cattle in one region of the State of Pará.

Box IV.2 (concluded)

The occupation and fraudulent regularization of public land has also been curbed with the support of the National Institute for Colonization and Agrarian Reform (INCRA). Another key factor has been the entry into force of a decree of the National Monetary Council that prohibits lending to businesses or individuals that have been involved in illegal conduct relating to landownership and the environment in the Amazon Region. In other words, the cost of deforestation has been successfully raised and the profitability of activities driving it has been reduced. Combined with this is the creation of conservation units in an area of more than 50 million hectares, and the recognition of the territorial rights of indigenous peoples over more than 10 million hectares. Lastly, the 2006 National Forest Management Act established a system of regulations to promote sustainable economic activities in the forests, managed by a new agency—the Brazilian Forestry Service— set up for that purpose. The creation of the Amazon Fund, described in chapter V, comes under this set of initiatives.

The many major challenges that remain outstanding include the consolidation of State presence in the Amazon Region through command and control activities, as well as greater investment in social issues, citizen participation and more effective development of sustainable productive activities on a larger scale.

Source: Institute for Space Research (INPE), “INPE divulga dados consolidados do PRODES 2007-2008”, Press release, 4 August 2009; Grupo Permanente de Trabalho Interministerial Para a Redução dos Índices de Desmatamento da Amazônia Legal, “Plano de Ação para a Prevenção e Controle do Desmatamento na Amazônia Legal”, March 2004; Agência Brasil, “Minc quer chegar à menor taxa de desmatamento dos últimos 20 anos”, 2 June 2009 [online] <http://www.agenciabrasil.gov.br/noticias/2009/06/02/materia.2009-06-02.2998650511/view>; O Estado de São Paulo, “Para conter desmatamento, novas regras dificultam crédito rural” [online] <http://www.estado.com.br/editorias/2008/02/29/ger-1.93.7.20080229.1.1.xml>; and information provided by the Brazilian Ministry of the Environment.

Table IV.5
LATIN AMERICA AND THE CARIBBEAN: EXTENT OF AND VARIATION IN FOREST COVER^a

Subregion	Forest area (thousands of ha)			Variation				
				Annual average (thousands of ha)		Annual average (percentage)		Cumulative 1990-2005 (percentage)
	1990	2000	2005	1990-2000	2000-2005	1990-2000	2000-2005	
A. The Caribbean	4 741	5 098	5 368	36	54	0.73	1.04	13.23
B. Meso-America	96 655	89 377	86 649	-728	-546	-0.78	-0.62	-10.35
B.1 Central America	27 639	23 837	22 411	-380	-285	-1.47	-1.23	-18.92
B.2 Mexico	69 016	65 540	64 238	-348	-260	-0.52	-0.40	-6.92
C. South America	882 727	844 733	823 477	-3 799	-4 251	-0.44	-0.51	-6.71
D. Latin America and the Caribbean	984 123	939 208	915 494	-4 492	-4 743	-0.47	-0.51	-6.97
E. The world	4 077 291	3 988 610	3 952 025	-8 868	-7 317	-0.22	-0.18	-3.07
Latin America and the Caribbean/world (percentage)	0.241	0.235	0.232					

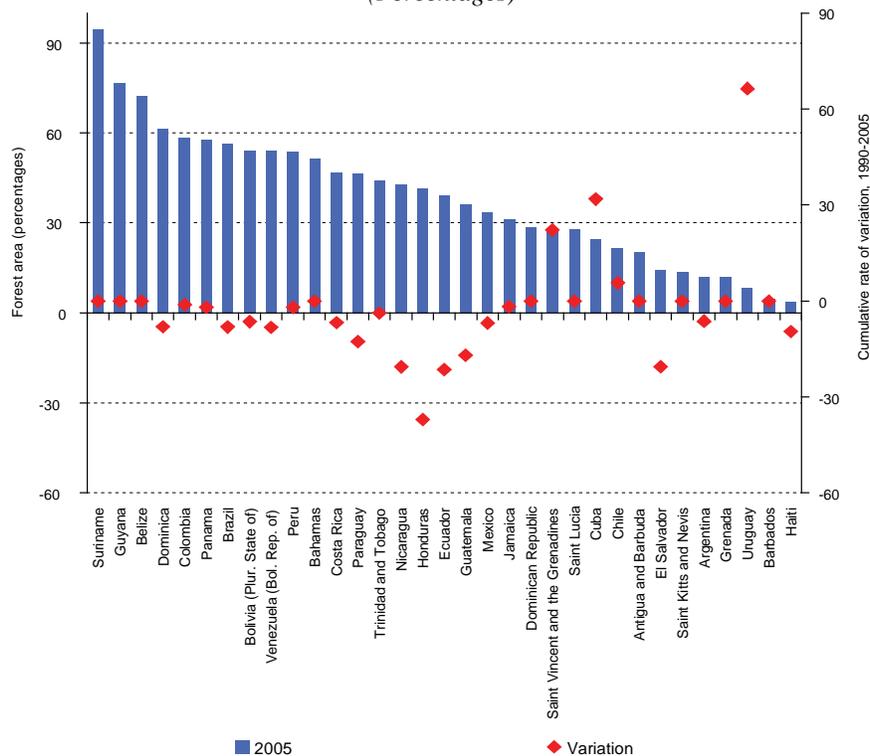
Source: Economic Commission for Latin America and the Caribbean (ECLAC), Environmental Statistics and Indicators Databases (BADEIMA), on the basis of calculations based on country-level forest cover from *Global Forest Resources Assessment 2005* (FRA 2005) and countries’ land areas from FAO Statistical Databases (FAOSTAT).

^a These figures may not match the total for Latin America and the Caribbean shown in the FAO publication *Global Forest Resources Assessment 2009*, because of adjustments relating to cover at the country level. In this figure, data for the region include 33 countries, whereas FAO includes 47 countries and territories. The figure does not include data on the following territories: Anguilla, Aruba, British Virgin Islands, Cayman Islands, Falkland Islands (Malvinas), French Guiana, Guadeloupe, Martinique, Montserrat, Puerto Rico, Netherlands Antilles, South Georgia and the South Sandwich Islands, Turks and Caicos Islands and United States Virgin Islands. Another discrepancy is due to the fact that the FAO report of 2009 includes Mexico in North America rather than in Latin America and the Caribbean.

From 2000 to 2005 all the South American countries recorded net losses in forest area except for Chile and Uruguay, which showed gains in forest area owing to large-scale industrial planting programmes for the timber, pulp and paper industry (see figure IV.4) (FAO, 2009a). In fact, while the region's total area of natural forests diminished, there was an increase in the area of forest plantations. This, however, is taking place much more slowly than deforestation and, while forest plantations do generate certain ecosystem services such as CO₂ capture, they cannot replace the ecological and biodiversity functions of natural forests.⁷ Furthermore, it is estimated that carbon storage in single-species plantations is 40%-60% below that in undisturbed natural forests (Mackey and others (2008), quoted in UNEP, 2009a).

As for the Caribbean, forest cover increased during the period examined. This was partly due to an increase in Cuba, resulting from a national programme to boost the country's forest cover, including the conversion of sugar-cane plantations to forest (see figure IV.4) (FAO, 2003). Furthermore, since on many Caribbean islands tourism has replaced agriculture as the main source of income, natural revegetation has been taking place on abandoned agricultural land. Owing to the lack of recent forest inventories, it is difficult to quantify the extent of this natural process, which is giving rise to the formation of secondary forests.

Figure IV.4
LATIN AMERICA AND THE CARIBBEAN: PROPORTION OF SURFACE AREA COVERED BY FORESTS, 1990-2005
 (Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Environmental Statistics and Indicators Databases (BADEIMA), on the basis of a calculation carried out using the national forest areas from the *Global Forest Resources Assessment 2005* (FRA 2005) and the national land areas from the FAO Statistical Databases (FAOSTAT).

⁷ The concept of ecosystem services is defined in chapter I.

The loss of forest cover is due to the expansion of large-scale industrial agriculture and livestock-rearing and forestry activities, resulting from growing global demand for food, fuels and wood products. These traditional activities are made even more profitable and attractive by the lack of mechanisms —appropriate legislation, economic instruments and the resources for their implementation— which might attach more value to the forests' ecosystem services. From 1990 to 2005 the area used for soybean cultivation rose by 22.3 million hectares, mostly at the expense of native forests, and livestock numbers increased from 326 million head in 1990 to 392.3 million head in 2007. In other words, livestock numbers climbed by 66.2 million head, mainly in South and Central America, though they declined by almost one million head in the Caribbean (UNEP, 2009a). Comparative analysis of these figures shows that in many countries —such as the Bolivarian Republic of Venezuela, Brazil, Colombia, Ecuador, Guatemala, Nicaragua, Paraguay, Peru and the Plurinational State of Bolivia— the growth of livestock coincides with decreases in forest areas. Logging is another cause of forest loss, although some parts of the region show signs of transition towards sustainable extraction. In 2002-2006 the area devoted to certified forest products in Latin America and the Caribbean soared from 4 million hectares to almost 10 million. However, between 2000 and 2004, about 3.3 million hectares of forest were lost to forest fires, especially in dry and semi-dry tropical forest ecosystems. Burning for fertilization purposes remains one of the main causes (UNEP, 2009a).

The consequences of deforestation, including biodiversity loss, soil destabilization, deterioration of the hydrological cycle and slowing of the CO₂ sink effect, are almost irreversible (FAO, 2009a). Beyond the environmental cost, it directly affects the economies of the region —for example, through the repercussions on agriculture of changes in hydrological cycles— and of the world, owing to its contribution to climate change. It is calculated that 48.3% of the world's CO₂ emissions are due to deforestation in the region driven by land-use change (UNEP, 2007, p.246). Since it is difficult to quantify these losses, some of the countries of the region have begun to develop integrated economic and environmental accounting systems to reflect them. Box IV.1 describes the experience of Mexico in this respect.

Deforestation also has a significant impact on the lives of local communities, especially indigenous peoples who depend directly or indirectly on the forests.

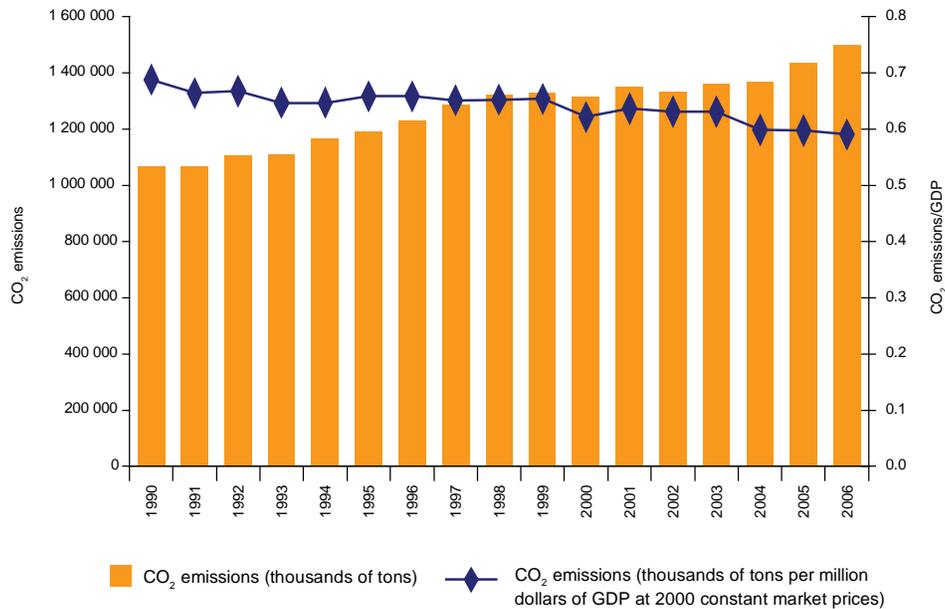
(b) Indicator 7.2: CO₂ emissions, total,⁸ per capita and per dollar of GDP

The region's CO₂ emissions have increased in absolute terms, although the ratio of emissions to GDP is declining slightly. Even with that increase, the region's total and per capita emissions represent a small fraction of those of the developed countries. Still, climate change and global measures for its mitigation make it all the more vital to progress towards greater efficiency in that respect. One of the major challenges for the region is to reduce CO₂ emissions generated by land-use change, particularly deforestation.

The total volume of CO₂ emissions in Latin America and the Caribbean has risen steadily since 1990. Taking into account emissions from the burning of fossil fuels and from cement production, but excluding those resulting from land-use change, the ratio of CO₂ emissions to GDP has fallen slightly (see figure IV.5).

⁸ Total emissions include CO₂ from the burning of solid, liquid and gaseous fuels and from cement production. The values for CO₂ emissions presented in figures IV.5 and IV.6 do not include those resulting from land-use change or those generated by fuel containers used in international transport.

Figure IV.5
LATIN AMERICA AND THE CARIBBEAN: CO₂ EMISSIONS, 1990-2006



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of the United Nations Millennium Development Goals indicators database [online] <http://mdgs.un.org/unsd/mdg/Default.aspx>, with CO₂ statistics compiled by the Carbon Dioxide Information Analysis Center (CDIAC); includes emissions from the burning of fossil fuels and cement production. GDP in constant 2000 prices obtained from ECLAC, Economic Indicators and Statistics Database (BADECON) [online] <http://websie.eclac.cl/sisgen/ConsultaIntegrada.asp?idAplicacion=6>.

Although it varies greatly from country to country (see figure IV.6), the level of per capita CO₂ emissions in the region, which in 1990-2006 averaged some 2.5 to 3.3 metric tons per capita, is well below that for the developed economies.⁹ Figure IV.6 shows this ratio in respect of CO₂ emissions from fossil-fuel use.

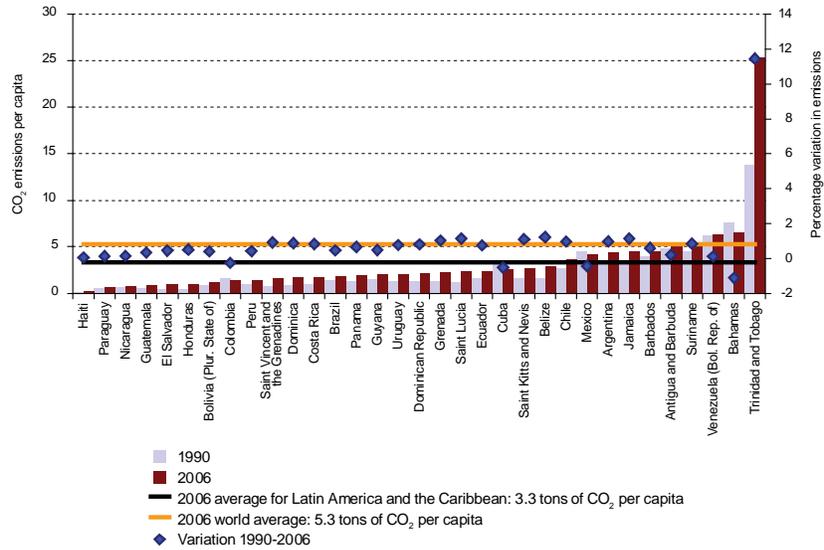
The case of Trinidad and Tobago is interesting. With an oil-based economy, the cost of energy is comparatively low. Although the country has supported some energy-efficiency initiatives, there are few economic incentives. This is reflected in high levels of CO₂ emissions per capita.

As mentioned above, the numbers shown in figures IV.5, IV.6 and IV.7 include emissions from fossil-fuel burning and cement production, but exclude those resulting from land-use change and deforestation. Accordingly, these figures understate the region's emissions.

Figure IV.8 reflects the scale of land-use change emissions in the region: almost four times more than those produced in other sectors. Although these emissions have diminished, there is plenty of room for further reductions.

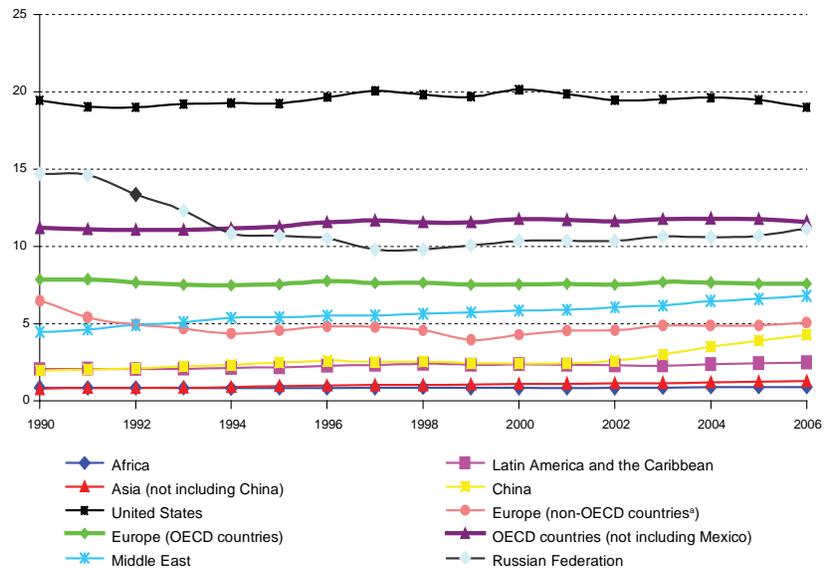
⁹ In 2006, for example, per capita CO₂ emissions in the Group of Eight (G8) countries, measured in metric tons, were as follows: Canada: 17.2; France: 6.7; Germany: 10.7; Italy: 8.3; Japan: 10; Russian Federation: 11; United Kingdom: 9.2; and United States: 19.7 (see Millennium Development Goals indicators database [online] <http://mdgs.un.org/unsd/mdg/Host.aspx?Content=Data/Trends.htm>).

Figure IV.6
LATIN AMERICA AND THE CARIBBEAN: CO₂ EMISSIONS PER CAPITA, 1990 AND 2006
 Official MDG Indicator 7.2.1
 (Metric tons of CO₂ and percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of the United Nations Millennium Development Goals indicators database [online] <http://mdgs.un.org/unsd/mdg/Default.aspx>, with CO₂ statistics compiled by the Carbon Dioxide Information Analysis Center (CDIAC).

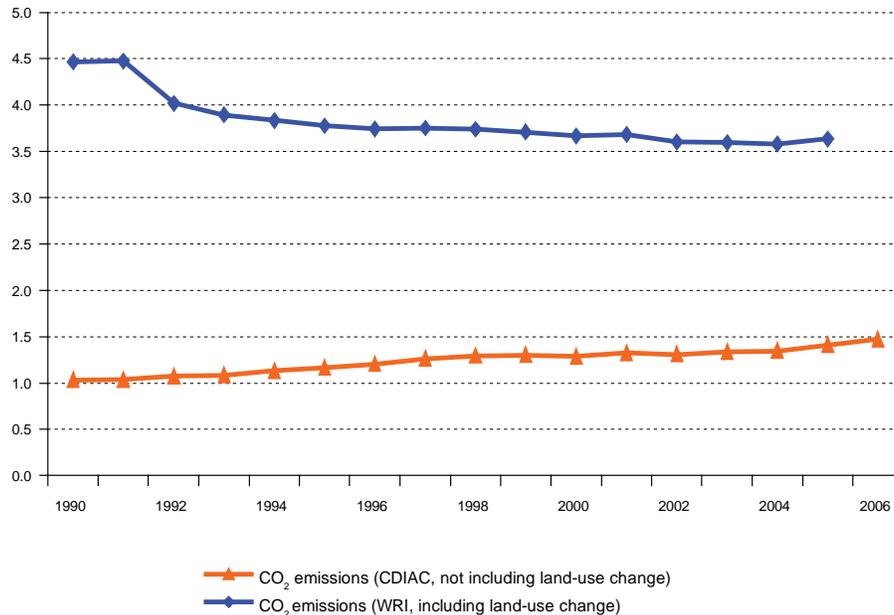
Figure IV.7
PER CAPITA CO₂ EMISSIONS FROM THE BURNING OF FOSSIL FUELS, BY REGION, 1990-2006
 (Metric tons of CO₂)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of information from the International Energy Agency (IEA) [online] <http://www.iea.org/>.

^a OECD = Organisation for Economic Co-operation and Development.

Figure IV.8
**LATIN AMERICA AND THE CARIBBEAN: CO₂ EMISSIONS WITH AND WITHOUT
 LAND-USE CHANGE EMISSIONS**
(Millions of metric tons)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of the United Nations Millennium Development Goals indicators database [online] <http://mdgs.un.org/unsd/mdg/Default.aspx>, with CO₂ statistics compiled by the Carbon Dioxide Information Analysis Center (CDIAC). The information on emissions, including emissions due to changes in land use, was obtained from the database of the World Resources Institute (WRI) [online] <http://www.wri.org/>, which also uses CDIAC data as a source.

One of the major challenges for the Latin American and Caribbean countries is to reduce the CO₂ emissions generated by land-use change, particularly deforestation. Latin America and the Caribbean, unlike the world's other regions, show positive net emissions from land-use change and forestry. In other regions, the carbon-sink effect exceeds that of emissions (UNFCCC, 2005).

The Amazon region is critical in this process. Aside from its contribution to emissions and its mitigation potential, the Amazon forest plays a vital part in the region's climate system. It helps to drive atmospheric circulation in the tropics, absorbing energy and recycling almost half the rainfall it receives. Also, the humidity added to the atmosphere by the Amazon ecosystem has a significant impact on precipitation patterns in the region. Any disruption in the volumes of humidity from the Amazon basin could set off a process of desertification in vast areas of Latin America and even North America, worsening the problems resulting from climate change (De la Torre, Fajnzylber and Nash, 2009).

The region holds one third of the forest biomass and two thirds of the tropical forest biomass in the world. Thus, it has great potential to contribute to global efforts to mitigate climate change through the carbon capture services of forests. The programme entitled Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD) supports projects and measures to reduce both problems in order to cut greenhouse gas emissions, also generating other environmental benefits such as biodiversity preservation. Beginning in 2005, REDD figured prominently in global negotiations under the United Nations Framework Convention on Climate Change (UNFCCC).

Concerning emissions generated by fossil-fuel use, the region faces two main challenges: (i) to efficiently meet the growing energy demand which will result from the region's development in the context of the economic and demographic growth of the coming decades (Acquatella, 2008; see box IV.3, which presents projections of the level of CO₂ emissions in the region under various scenarios); and (ii) to position itself competitively in a new low-carbon global economic paradigm.¹⁰

Box IV.3
**TRENDS AND PROJECTIONS FOR CO₂ EMISSIONS IN LATIN AMERICA
AND THE CARIBBEAN**

In the period 1990-2006, there was a gradual increase in greenhouse gas (GHG) emissions linked to the use of fossil fuels in the Latin American and Caribbean countries as a group.

**LATIN AMERICA AND THE CARIBBEAN: AVERAGE GROWTH RATES IN CO₂ EMISSIONS
IN RELATION TO ENERGY AND ITS COMPONENTS, 1990-2006**
(Percentages)

	Growth rate of CO ₂ emissions	Population growth rate	Growth rate of per capita GDP (GDP at constant 2000 dollars)	Growth rate of energy intensity	Growth rate of carbon intensity
Argentina	2.74	1.13	2.56	-0.30	-0.64
Barbados	1.38	0.48	0.94	-0.07	0.03
Bolivia (Plurinational State of)	4.66	2.32	1.27	0.10	0.90
Brazil	3.33	1.51	1.18	0.30	0.30
Chile	3.35	1.39	4.13	-1.03	-1.09
Colombia	0.63	1.68	1.64	-2.34	-0.29
Costa Rica	6.30	2.26	2.75	-0.96	2.15
Cuba	-0.73	0.37	0.98	-2.51	0.46
Ecuador	3.96	1.68	1.35	0.45	0.42
El Salvador	5.81	1.98	1.82	-0.38	2.29
Grenada	4.43	0.61	2.54	1.82	-0.58
Guatemala	5.38	2.40	1.41	-0.80	2.29
Guyana	1.76	0.07	3.43	-2.27	0.60
Haiti	3.82	1.79	-1.79	4.28	-0.41
Honduras	6.59	2.28	1.58	-1.43	4.07
Jamaica	2.68	0.82	0.25	2.87	-1.25
Mexico	0.79	1.42	1.61	-1.42	-0.78
Nicaragua	3.14	1.82	1.50	0.77	-0.97
Panama	4.59	1.95	3.03	0.84	-1.26
Paraguay	3.60	2.19	-0.01	-0.92	2.33
Peru	3.83	1.49	2.78	-2.48	2.08
Dominican Republic	4.83	1.74	3.75	-1.35	0.68
Suriname	1.88	0.78	1.55	-0.71	0.26
Trinidad and Tobago	4.37	0.52	5.63	2.92	-4.50
Uruguay	3.44	0.42	2.17	-1.54	2.40
Venezuela (Bolivarian Republic of)	2.15	1.98	0.74	0.91	-1.46

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of United Nations Millennium Development Goals indicators database [online] <http://mdgs.un.org/unsd/mdg/Default.aspx>, with CO₂ statistics compiled by the Carbon Dioxide Information Analysis Center (CDIAC); statistics for total energy consumption come from the Latin American Energy Organization (OLADE), Energy-Economic Information System; the data for per capita GDP at constant 2000 prices were obtained from the ECLAC Economic Indicators and Statistics Database (BADECON) [online] <http://websie.eclac.cl/sisgen/ConsultaIntegrada.asp?idAplicacion=6>; population data are from the ECLAC Social Indicators and Statistics Database (BADEINSO).

¹⁰ For a discussion of the challenges for the region's exports from the transition to and consolidation of a lower-carbon economy, see chapter III on climate change, chapter V on the relationship between trade and the environment in the context of global partnership for development, and chapter VI on recommendations.

Box IV.3 (continued)

As the table shows, the factors that tend to contribute to higher emissions are increases in the population and in per capita GDP. The IPAT identity (equation 1) shows that energy decoupling and decarbonization help to reduce emissions, although at varying rates and in different combinations from one country to another.

$$\Delta CO_{2t} = [\Delta POP]_t + \Delta \left[\frac{GDP}{POP} \right]_t + \Delta \left[\frac{ENERG}{GDP} \right]_t + \Delta \left[\frac{CO_2}{ENERG} \right]_t \quad (1)$$

Projections of the possible trajectories of GHG emissions linked to the use of fossil fuels were developed by applying the IPAT equation to different scenarios (Samaniego and Galindo, 2009).

- Population patterns are based on projections from the Latin American and Caribbean Demographic Centre (CELADE)-Population Division of ECLAC.
- The GDP growth rate was calculated using autoregressive integrated moving average (ARIMA) models^a from different countries, in order to capture the historical trajectory. The GDP projections of ECLAC for 2009 were included to reflect the current economic crisis.
- The historical average for 1990-2007 was used as the base scenario for the ratio of energy to output (energy intensity), and that for 1990-2006 was taken as the base scenario for the ratio of emissions to energy (carbon intensity).
- The construction of the four scenarios was based on the assumption that the series have a normal distribution and a confidence interval of 95%:
 - Scenario I was constructed using the lowest levels of energy and carbon intensity.
 - Scenario II used the lower level of energy intensity and average carbon intensity.
 - Scenario III corresponded to the lower level of energy intensity and the upper level of carbon intensity.
 - Scenario IV used average energy intensity and the lower level of carbon intensity.
 - Scenario V was based on average energy and carbon intensity.
 - Scenario VI used average energy intensity and the upper level of carbon intensity.
 - Scenario VII was built using the upper level of energy intensity and the lower level of carbon intensity.
 - Scenario VIII used the upper level of energy intensity and average carbon intensity.
 - Scenario IX used the upper levels of both energy and carbon intensity.

The table below shows a summary of emissions projections based on the IPAT identity (equation 1).

Box IV.3 (concluded)

LATIN AMERICA AND THE CARIBBEAN: CO₂ EMISSIONS GROWTH SCENARIOS, 2009-2015
(Percentages)

Assumption	Scenarios									
	Energy intensity	Min.	Min.	Min.	Average	Average	Average	Max.	Max.	Max.
	Carbon intensity	Min.	Average	Max.	Min.	Average	Max.	Min.	Average	Max.
Country	Projected GDP growth	I	II	III	IV	V	VI	VII	VIII	IX
Argentina	2.45	-3.18	-1.23	0.73	-0.77	1.18	3.14	1.64	3.59	5.55
Barbados	1.80	-10.39	-1.97	6.45	-6.85	1.57	9.99	-3.31	5.11	13.53
Bolivia (Plurinational State of)	3.40	-6.40	1.22	8.84	-3.46	4.16	11.78	-0.53	7.09	14.71
Brazil	4.77	2.19	4.24	6.28	3.27	5.32	7.37	4.36	6.40	8.45
Chile	3.08	-4.95	-1.00	2.95	-3.43	0.52	4.47	-1.90	2.04	5.99
Colombia	2.75	-7.15	-2.70	1.75	-4.66	-0.21	4.24	-2.17	2.28	6.72
Costa Rica	4.90	-1.09	3.38	7.85	1.74	6.21	10.69	4.57	9.05	13.52
Cuba	6.42	-2.55	2.35	7.25	-0.06	4.84	9.73	2.42	7.32	12.22
Ecuador	2.57	-11.14	1.34	13.82	-9.24	3.24	15.72	-7.35	5.14	17.62
El Salvador	3.40	-0.11	3.63	7.37	1.27	5.01	8.74	2.65	6.38	10.12
Grenada	1.69	-4.82	-0.95	2.92	-1.28	2.60	6.47	2.27	6.15	10.02
Guatemala	3.54	-0.68	3.42	7.52	0.76	4.86	8.96	2.21	6.31	10.41
Guyana	2.15	-4.52	-1.85	0.83	-2.39	0.29	2.96	-0.26	2.42	5.09
Haiti	1.80	-17.17	0.46	18.08	-12.48	5.15	22.77	-7.79	9.84	27.46
Honduras	3.60	0.33	4.47	8.61	2.23	6.37	10.51	4.13	8.27	12.41
Jamaica	5.96	-5.52	1.91	9.35	-0.15	7.28	14.71	5.21	12.64	20.07
Mexico	2.39	-3.51	-1.06	1.39	-2.03	0.42	2.87	-0.55	1.90	4.35
Nicaragua	3.40	-3.35	1.93	7.20	-2.07	3.20	8.48	-0.79	4.48	9.75
Panama	4.70	-9.53	0.04	9.60	-5.21	4.36	13.92	-0.89	8.67	18.24
Paraguay	2.41	-2.04	1.81	5.66	-0.15	3.70	7.54	1.73	5.58	9.43
Peru	2.51	-3.60	0.09	3.78	-1.75	1.95	5.64	0.11	3.80	7.49
Dominican Republic	6.15	-1.78	2.40	6.58	1.25	5.42	9.60	4.27	8.45	12.62
Suriname	4.26	-0.18	1.17	2.52	2.19	3.53	4.88	4.55	5.89	7.24
Trinidad and Tobago	4.70	-7.28	-1.82	3.63	-3.08	2.37	7.83	1.12	6.57	12.02
Uruguay	1.35	-5.28	0.45	6.17	-3.46	2.27	7.99	-1.64	4.09	9.81
Venezuela (Bolivarian Republic of)	0.85	-10.72	-4.47	1.79	-6.94	-0.69	5.56	-3.16	3.09	9.34
Region		-2.53	0.49	4.02	-0.78	2.37	6.03	1.06	4.33	8.12

Source: J. Samaniego and L.M. Galindo, "Escenarios de emisiones de gases de efecto invernadero asociados a combustibles fósiles en América Latina: una aproximación empírica", Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2009, unpublished.

Note: The growth rate for emissions in the region is the sum of the rates recorded in the countries considered.

The simulations carried out show that GHG emissions are highly likely to continue rising in Latin America. In other words, energy decoupling and decarbonization are still in the early stages in the Latin American economies, and as such are unable to offset factors driving energy demand and emissions growth.

Source: J. Samaniego and L.M. Galindo, "Escenarios de emisiones de gases de efecto invernadero asociados a combustibles fósiles en América Latina: una aproximación empírica", Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2009, unpublished.

^a The ARIMA models are available from the Sustainable Development and Human Settlements Division of ECLAC. The estimates for Argentina and Mexico include ECLAC projections for 2009.

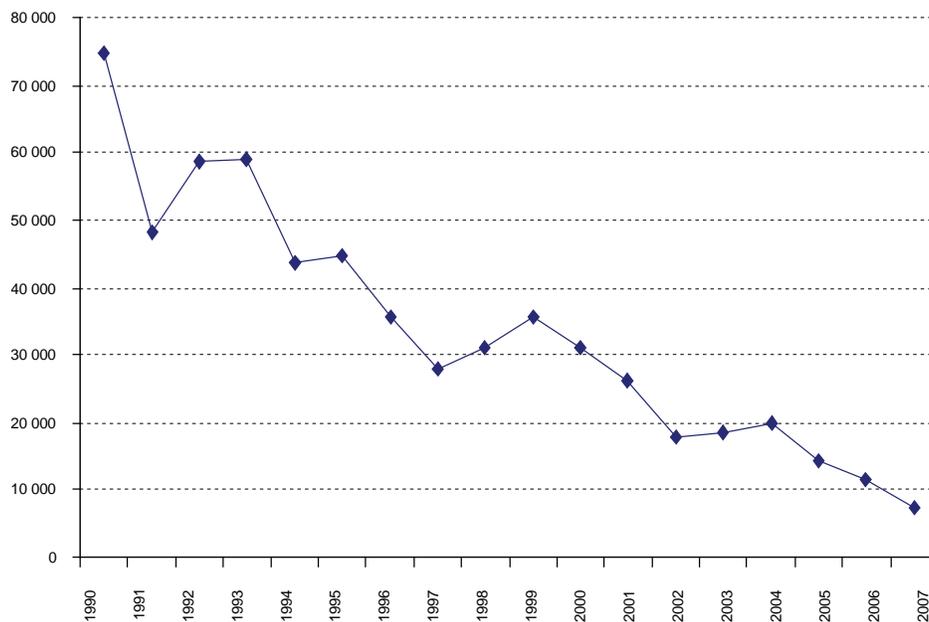
(c) **Indicator 7.3: consumption of ozone-depleting substances**

The region's emissions of ozone-depleting substances have fallen steadily, reflecting the efforts made in the framework of the Montreal Protocol, including international cooperation, technological progress and successful collaboration between the public and private sectors.

The region has shown strong commitment to protecting the ozone layer. From 1990 to 2007, the consumption of ozone-depleting substances fell by about 90%, from 74,652 tons to 7,445 tons (see figure IV.9). Figure IV.10 shows the variation by country over that period.

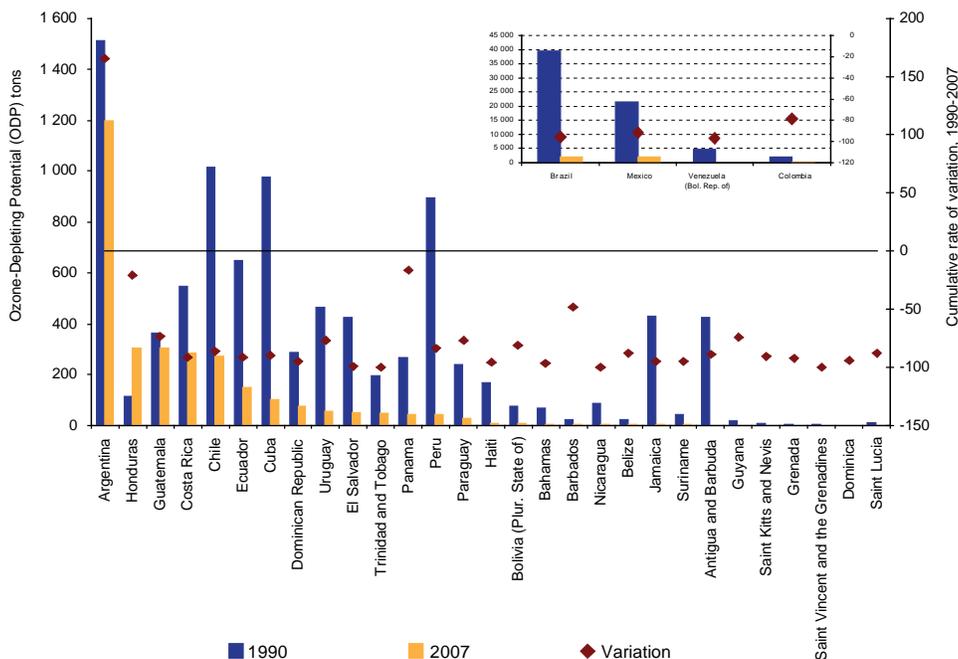
Solving the problem of the thinning of the ozone layer is especially important for Latin America, particularly in the region's southern latitudes; these areas are closest to the ozone hole which opens up over Antarctica in the southern-hemisphere spring and summer. Argentina, Brazil, Chile, Paraguay and Uruguay receive a great deal of ultraviolet-B rays owing to the most acute reduction of the ozone layer which occurs in that area.

Figure IV.9
**LATIN AMERICA AND THE CARIBBEAN: CONSUMPTION OF
 OZONE DEPLETING SUBSTANCES (ODS), 1990-2007**
(Ozone-Depleting Potential (ODP) tons)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of United Nations Millennium Development Goals indicators database based on figures from the Ozone Secretariat of the United Nations Environment Programme (UNEP) [online] http://ozone.unep.org/Data_Reporting/Data_Access/.

Figure IV.10
**LATIN AMERICA AND THE CARIBBEAN: CONSUMPTION OF OZONE DEPLETING
 SUBSTANCES (ODS) BY COUNTRY, 1990-2007**
(Ozone-Depleting Potential (ODP) tons and percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of United Nations Millennium Development Goals indicators database based on figures from the Ozone Secretariat of the United Nations Environment Programme (UNEP) [online] http://ozone.unep.org/Data_Reporting/Data_Access/.

(d) Indicator 7.4: proportion of fish stocks within safe biological limits

The growth of fishing and industrial aquaculture, habitat changes and increasing pollution are putting strong pressure on hydrobiological resources, which is reflected in falling stocks of some of the commercially important fish species. In response to this situation, the countries have adopted sustainable management practices for some species, although the results have so far been unclear.

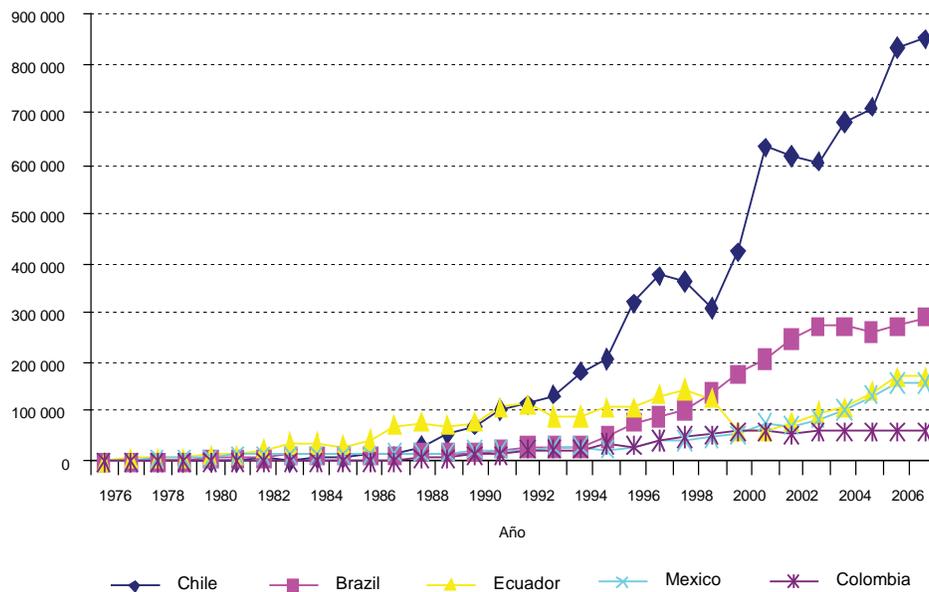
There are no statistics as yet to reflect indicator 7.4 properly. Research on the level of exploitation of fisheries can provide an approximate view of the situation, although such data depend more on isolated studies than on systematic collection of information.

The data available suggest that the fish stocks of Latin America and the Caribbean are not among the most seriously threatened, unlike those of the north-east Atlantic, the western Indian Ocean and the north-western Pacific. As for inland fisheries, the region has a high proportion of resources that are less exploited than the worldwide average (FAO, 2009b). Although the output of fisheries in the Brazilian Amazon region —17% of the country's annual fisheries production— increased by 37% from 1996 to 2006, 60% of the reserves are still underexploited. Another 30% is either overexploited or recovering. The data on production levels should be interpreted from a broader viewpoint, given the

numerous environmental factors which, in addition to fisheries, influence the situation of the stocks being exploited. The combination of intensive fishing with other environmental factors might hasten the depletion of some fisheries.

As for aquaculture, the growth rate in the region in 1970-2006 (22%) was the fastest in the world (FAO, 2009b). This represents a considerable contribution to the economies of a number of countries through the export of products which are highly valued on international markets, such as salmon, shrimp and tilapia (see figure IV.11). Nonetheless, both the output of the region's aquaculture and its growth rate will be affected by factors such as the global financial crisis and some epizootic problems such as those seen recently in Chile (see box IV.4).

Figure IV.11
**LATIN AMERICA: AQUACULTURE HARVESTS IN COUNTRIES
 WITH FISH PRODUCTION OF OVER 60,000 TONS PER YEAR**
(Tons)



Source: Food and Agriculture Organization of the United Nations (FAO), FishStat database, 2009.

Box IV.4
SALMON IN CHILE: BOOM AND STANDSTILL

Salmon farming in Chile has run up against the environmental, health and social consequences of intensive single-species rearing with little or no provision for environmental capacity. The figure below shows the sharp rise in the country's annual salmon production (landing).

CHILE: HARVEST VOLUMES OF FARMED ATLANTIC SALMON, 1998-2008
 (Tons)



In the past 10 years, exports of Atlantic salmon (which represents 60% of Chile's income from aquaculture) quadrupled, going from 100,000 tons in 1998 to almost 400,000 tons in 2008. According to figures from the Chilean General Directorate for International Economic Affairs (DIRECON), the value of total salmon exports rose from USD 816 million in 2002 to USD 2.625 billion in 2008. However, this growth was curtailed by the outbreak of the Infectious Salmon Anaemia Virus (ISAV).

The disease was detected in June 2007 and affected mainly Atlantic salmon, with high mortality rates among infected populations. The outbreak originated in the Region of Los Lagos, before spreading to the Region of Aysén and Magallanes, affecting over 200 farms and generating losses estimated at billions of dollars.

The country's National Fisheries Service (SERNAPESCA) rolled out a contingency plan that involved containing outbreaks, culling fish in infected pens, cordoning off the affected areas, biosecurity measures, special procedures and harvest conditions for centres in the areas under quarantine and surveillance, as well as the introduction of sanitary barriers in the regions affected.

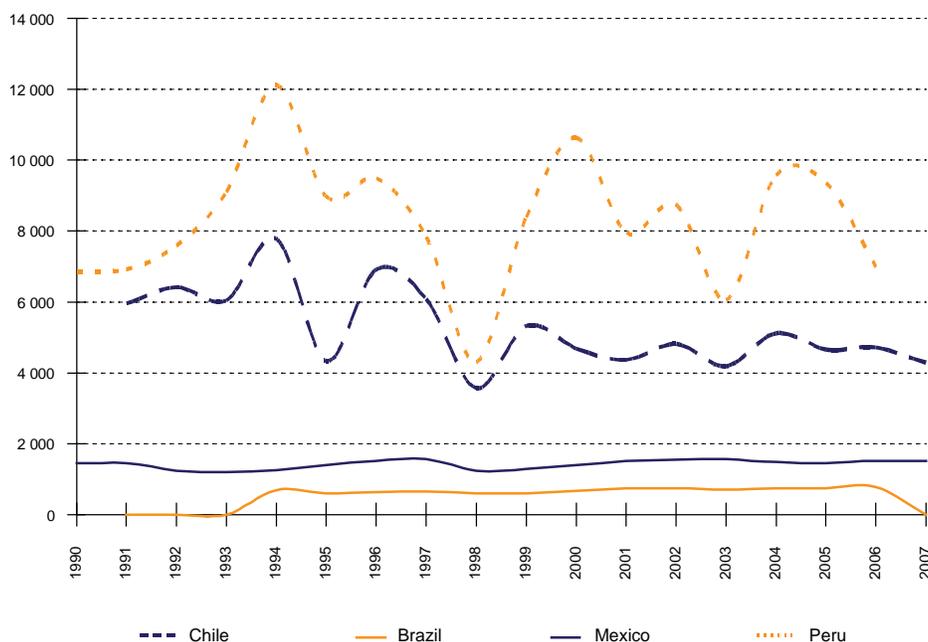
Despite these measures, the disease has had a social as well as an environmental impact on regions affected, as the level of unemployment has increased markedly in the areas most dependent on fisheries.

The spread of the disease is now thought to be under control, as no Atlantic salmon have been spawned in the sea, and the most significant production and social impacts are expected to be felt in 2010. By September 2009, over 16,000 workers had been made redundant and production of Atlantic salmon was down by 60%.

Source: National Fisheries Service of Chile (SERNAPESCA), "Balance de la situación sanitaria de la anemia infecciosa del salmón en Chile", Santiago, Chile, Unidad de Acuicultura, July 2008; General Directorate for International Economic Affairs (DIRECON), Relaciones económicas internacionales de Chile. Cifras 2005, Santiago, Chile, Ministry of Foreign Affairs, 2005.

Climate phenomena such as El Niño have affected the catch volumes of the principal fisheries, with particular impacts on the anchoveta, horse mackerel and sardine in Pacific waters. The catch of these species fell significantly in 1998 and 2003. The increase and unpredictability of climate phenomena will undoubtedly have considerable effects on the region's fisheries, including the possible displacement of fish stocks to lower-temperature areas, with the resulting increase in availability in those areas in comparison with the fall which would occur in the traditional fishing grounds. Anthropogenic pressure also helps to explain the volatility of catch volumes. Figure IV.12 shows the situation in the region's four major fishing countries, showing the great variability that exists in the cases of Chile and Peru.

Figure IV.12
LATIN AMERICA (4 COUNTRIES): ANNUAL EXTRACTION VOLUMES FROM MAIN FISHERIES
(Thousands of tons)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Environmental Statistics and Indicators Databases (BADEIMA) [online] <http://websie.eclac.cl/sisgen/cosultatitegrada.asp>.

A growing number of countries recognize the need to bring more order to the fisheries sector and regulate the use of certain types of fishing gear which do little to contribute to resource sustainability. This has led to the creation of regulatory measures and training schemes designed to introduce methods which have had positive effects in some regions and catchment basins. In some other areas, such as the Caribbean, economic needs —despite institutional mechanisms to supervise fishery activities— have led to overfishing through practices such as the use of fine-meshed nets, intensification of fishing efforts (longer fishing days) and fishing in areas further from the coast.

As discussed in chapter III, climate change has generated new challenges for the region's fisheries and its fishery resources.

(e) Indicator 7.5: Proportion of total water resources used

Latin America and the Caribbean is one of the most water-abundant regions in the world. The distribution of water resources is highly unequal, however, and they have come under many forms of pressure, including excessive extraction in activities such as agriculture and mining, depletion of aquifers, growing water contamination, deforestation and the destruction of catchment basins and recharge areas. Effective water resource management has become increasingly important owing to the probable effects of climate change on the distribution and intensity of precipitation.

In aggregate terms, the region is well endowed with water resources. Although it has only 15% of the world's land mass and 8.4% of its population, it receives 29% of its precipitation and has a third of its renewable water resources (WWAP, 2009). Despite this relative abundance, there are considerable problems concerning the availability of water over time and space and its quality. These difficulties will be exacerbated in the current climate-change scenario (see chapter III).

Trends in the region show considerable growth in demand for water. From 1990 to 2004, that demand rose by 76% from 150 to 264.5 km³ per year (UNEP, 2009a). This was due to the expansion of irrigated agriculture and of water use for industry and mining and for human supply, particularly in cities. Since all this took place without a parallel development of waste-water treatment services, it led to widespread contamination of many sources of water resources, especially near and beneath major cities.

Indicator 7.5 reflects the ratio of water extraction to water availability, seeking to establish the volume of water available in each country in relation to its level of use. Use-factor estimates (freshwater extraction) show that South and Central America taken as a whole consume around 1% of the water resources available to them. In the Caribbean, the use factor stands at about 14%, reflecting mainly water consumption in Cuba and the Dominican Republic. The world average is 9% (see table IV.6).

In Latin America and the Caribbean, as in the rest of the world, water is used mainly for agriculture, followed by household and industrial consumption. Figure IV.13 shows the situation in selected countries in the region.

The main factors which put pressure on water availability include excessive extraction, aquifer depletion, growing water contamination —resulting from the dumping of untreated wastewater from manufacturing and mining as well as domestic sewage— and the destruction of catchment basins and recharge areas. Deforestation and logging also have negative effects on the production and regulation of water cycles, while soil erosion reduces storage capacity and causes sedimentation of watercourses, resulting in higher treatment costs.

Despite the advantage of their low carbon intensity, large-scale hydroelectric developments tend to bring a variety of environmental and social impacts —and to interfere with other water uses. The region has 22% of the world's hydroelectric potential, equivalent to 582,033 MW per year, of which only 139,688 MW (around 24%) is being used (OLADE (2005), quoted in UNEP, 2009a).

Table IV.6
FRESHWATER EXTRACTION BY REGION AND ECONOMIC SECTOR,
FROM 1998 TO AROUND 2002
(Cubic kilometres and percentages)

Continent/region	IRWR ^a Km ³	Volume used Km ³	Extraction by sector						Extraction (percentage of IRWR)
			Households Km ³	Percentage	Industry Km ³	Percentage	Agriculture Km ³	Percentage	
World	43 659	3 813	380	10	781	20	2652	70	9
Africa	3 936	213	21	10	9	4	182	86	5
Asia	11 594	2 357	172	7	249	11	1936	82	20
Latin America ^b	13 477	165	32	19	21	13	112	68	1
The Caribbean ^c	93	13	3	23	1	9	9	68	14
North America	6 253	526	70	13	253	48	203	39	8
Oceania	1 703	26	5	18	3	10	19	72	2
Europe	6 603	340	59	17	177	52	104	30	5

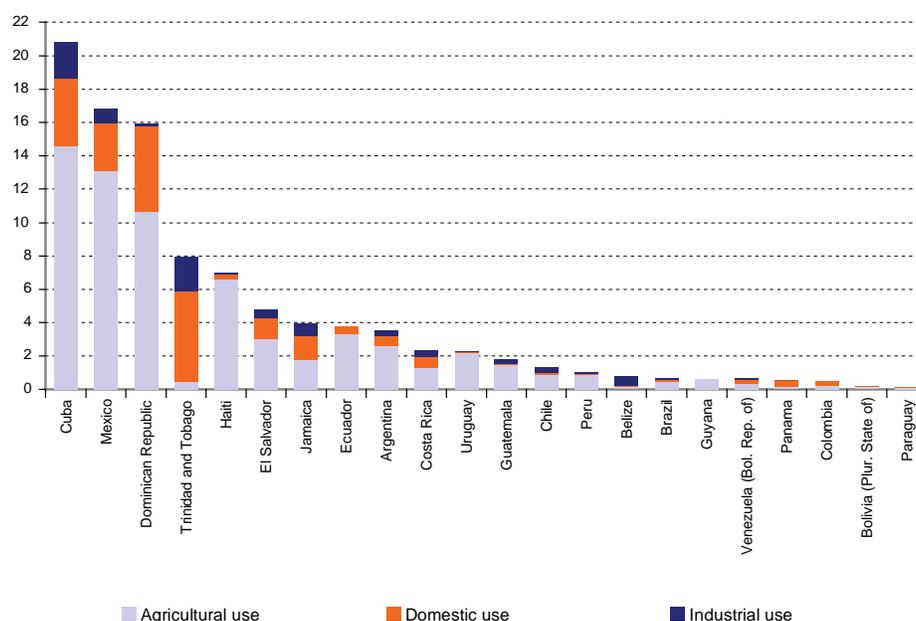
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Food and Agriculture Organization of the United Nations (FAO), Global Information System on Water and Agriculture (AQUASTAT) [online] <http://www.fao.org/landwater/aglw/aquastat/dbases/inde.stm>.

^a IRWR: Internal renewable water resources.

^b Includes the following countries and territories: Argentina, Belize, Bolivarian Republic of Venezuela, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Falkland Islands (Malvinas), French Guiana, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Plurinational State of Bolivia, Suriname and Uruguay.

^c Includes the following countries and territories: Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, British Virgin Islands, Cayman Islands, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Montserrat, Netherlands Antilles, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos Islands and United States Virgin Islands.

Figure IV.13
LATIN AMERICA AND THE CARIBBEAN (SELECTED COUNTRIES): SECTORAL WATER WITHDRAWAL AS A PROPORTION OF RENEWABLE WATER, MOST RECENT YEAR FOR WHICH INFORMATION IS AVAILABLE, 1998-2002
(Percentages)



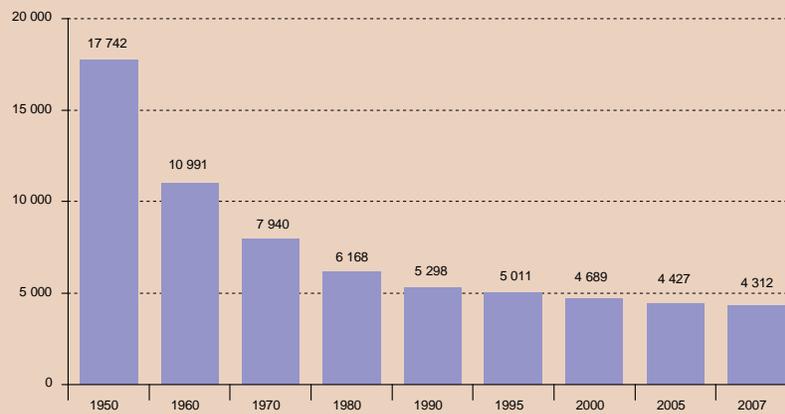
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Food and Agriculture Organization of the United Nations (FAO), Global information system of water and agriculture (AQUASTAT) [online] <http://www.fao.org/landwater/aglw/aquastat/dbases/inde.stm>.

Highly water-intensive productive sectors, such as mining, agriculture and aquaculture, have continued to expand in the region, further increasing yet more the pressure on water resources. Mexico illustrates this situation (see box IV.5).

Box IV.5
WATER AVAILABILITY: THE CASE OF MEXICO

Since 1999, Mexico has been promoting the dissemination of detailed statistical information on the availability of water resources, in the form of the Basic Compendium of Water in Mexico, which was updated in 2008 in “Water Statistics in Mexico”, developed as part of the National Information System on Water Quantity, Quality, Uses, and Conservation (SINA). One of the indicators analysed is the average natural water availability per capita, which includes total renewable fresh water available to the population at the end of the hydrological cycle. This is calculated on the basis of precipitation minus the water returned to the atmosphere through evapotranspiration. The value of this indicator has fallen from 17,742 m³ a year per inhabitant in 1950 to just 4,312 m³ a year per inhabitant in 2007, which gives a cumulative rate of variation of -75.7%. The decline was due mainly to growth of the population, which increased five-fold during the period.

MEXICO: VARIATION IN AVERAGE NATURAL WATER AVAILABILITY PER CAPITA, 1950-2007
(M³ per inhabitant per year)



There is a wide geographical variation in per capita water availability between the southern and northern regions of the country. In the Baja California peninsula, Río Bravo and Lerma-Santiago-Pacífico, availability is less than 1,700 m³ per inhabitant per year, and these regions are therefore considered to be suffering from water stress. In contrast, the Central Gulf and Southern Border regions have availability of over 9,000 m³ per inhabitant per year, which makes them water-abundant regions. The situation in the Aguas del Valle de México region is the most worrying, as the availability is less than 500 m³ per inhabitant per year (143 m³), and it is therefore experiencing serious water scarcity. As shown in the maps comparing 2007 and 2030, produced by the National Water Commission (CONAGUA), average natural water availability will continue to fall to below 1,000 m³ per inhabitant per year. The Baja California peninsula and the Río Bravo region are at particular risk of water scarcity.

Shrinking glaciers and the reduction in available water resources are among the main concerns for Andean countries. The Andes mountain range is home to 90% of the world's glaciers, which produce 10% of the planet's water from high Andean ecosystems, most of which drain into the extensive Amazon region. Naturally, any change to water levels would have major impacts in the region, both in terms of access to water sources, hydroelectric energy and agriculture, and with regard to the conservation of natural ecosystems, particularly in the Amazon region. For example, in the past 30 to 35 years, the total area of the glaciers in the Peruvian Andes has fallen by 22% and the area of smaller glaciers by as much as 80%, leading to a 12% decrease in the availability of freshwater in the coastal area, where 60% of the population lives. Given the glut of water which some glacier basins may experience in the coming years as a result of deglaciation, and the shortage of water during periods of drought or low water levels after that high has passed, planned action is needed now (Andean Community, 2008).

(f) Complementary information relating to Target 7.A (reverse the loss of environmental resources)

(i) Degradation of land and soils in Latin America and the Caribbean

Although land degradation is not one of the official indicators corresponding to Millennium Development Goal 7, it is a significant environmental issue in the region. Land degradation relates to the loss of soil productive capacity, which affects human activities and relevant ecological functions, endangering ecosystems' future potential to produce goods and services.

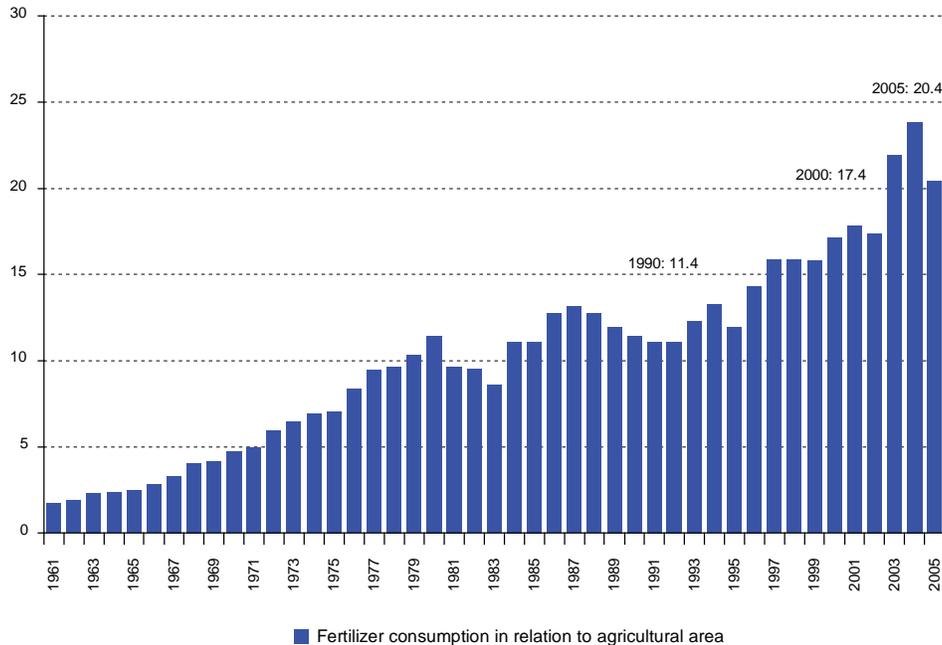
The report *Global Land Degradation* (UNEP, 2007) states that 15.7% of the area of Latin America and the Caribbean shows some level of degradation. The problem is most serious in Meso-America, affecting 26% of the land, while in South America the proportion is lower, at 14%. Data from the Global Land Degradation Assessment and Improvement (GLADA) project of the Global Environment Facility (GEF), UNEP and FAO show that Guatemala has the highest proportion of degraded land in Latin America and the Caribbean as a proportion of national territory (51.3%), followed by Uruguay (49.6%), Guyana (43.4%) and Haiti (42.6%) (Bai and others, 2008).

The process of land degradation in arid, semi-arid and dry sub-humid areas results from erosion brought about by deforestation and overgrazing, over-exploitation of the soil, failure to rotate crops or monocropping and inappropriate intensive irrigation practices. One fourth of the region contains desert or arid land (UNEP, 2009a). Recently, these pressures have intensified owing to the impact of climate change (see chapter III).

An extreme form of land degradation is desertification, a process affecting the land in arid, semi-arid and dry sub-humid areas as a result of climate factors and human activities. In the work conducted by the Global Mechanism of the United Nations Convention to Combat Desertification in respect of Chile and Mexico, it was concluded that the costs of desertification vary between 3% and 7% of gross agricultural product (ECLAC, 2008e).

The intensive use of fertilizers and pesticides contributes to the degradation and contamination of land, air and water, causing a number of environmental problems in all those mediums, in ecosystems and in human health. This is particularly true of agricultural activities where large quantities of fertilizers or pesticides are used, such as horticulture (see figure IV.14).

Figure IV.14
**LATIN AMERICA AND THE CARIBBEAN: INTENSITY OF FERTILIZER
 CONSUMPTION, 1961-2005**
(Tons per 1,000 hectares)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Environmental Statistics and Indicators Database (BADEIMA) and Food and Agriculture Organization of the United Nations (FAO), FAO Statistical Databases [online] <http://faostat.fao.org/default.aspx>.

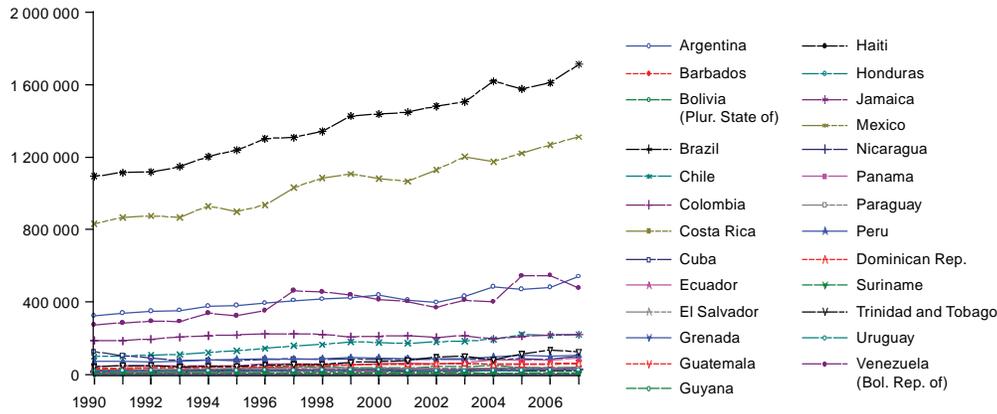
Among the countries for which statistics on herbicide and insecticide use are available, Belize, Costa Rica and the Dominican Republic were the most intensive users of both types of substance in 2001.¹² Nicaragua and Uruguay also use large volumes of insecticides, while herbicide use is high in Ecuador and Paraguay.

(ii) *Energy supply, intensity and renewability in the region*

Energy production and consumption in Latin America and the Caribbean as a whole show an upward trend, although the rates of increase differ between countries (see figures IV.15 and IV.16). This reflects energy requirements determined by current production, distribution and consumption patterns and demographic trends. If these forces continue unaltered in future, they will lead to a gradual but steady increase in energy output and demand.

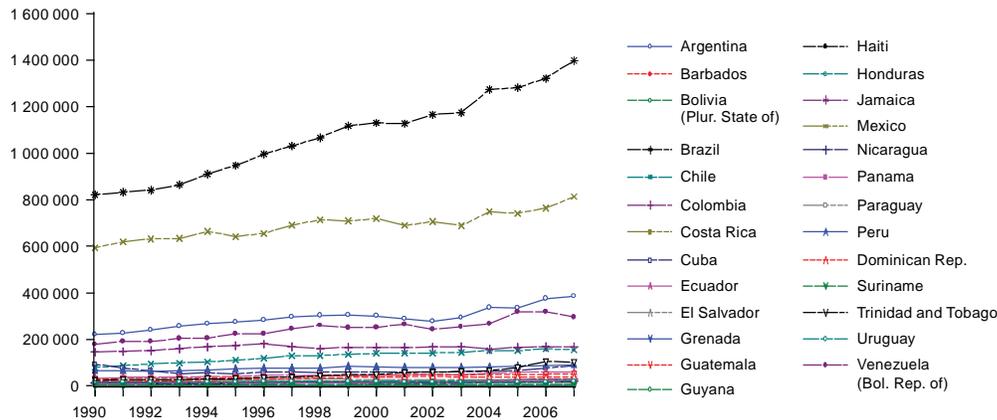
¹² There is also a lack of aggregate statistical series on pesticide use at the regional level. The instrument used by FAO for collecting agricultural statistics was changed in 2006 and is still at the stage of data compilation on the global scale.

Figure IV.15
LATIN AMERICA AND THE CARIBBEAN (SELECTED COUNTRIES): TOTAL ENERGY SUPPLY, 1990-2006
(Thousands of barrels of oil equivalent)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Latin American Energy Organization (OLADE), Energy-Economic Information System (SIEE), October 2009.

Figure IV.16
LATIN AMERICA AND THE CARIBBEAN (SELECTED COUNTRIES): TOTAL ENERGY CONSUMPTION, 1990-2006
(Thousands of barrels of oil equivalent)

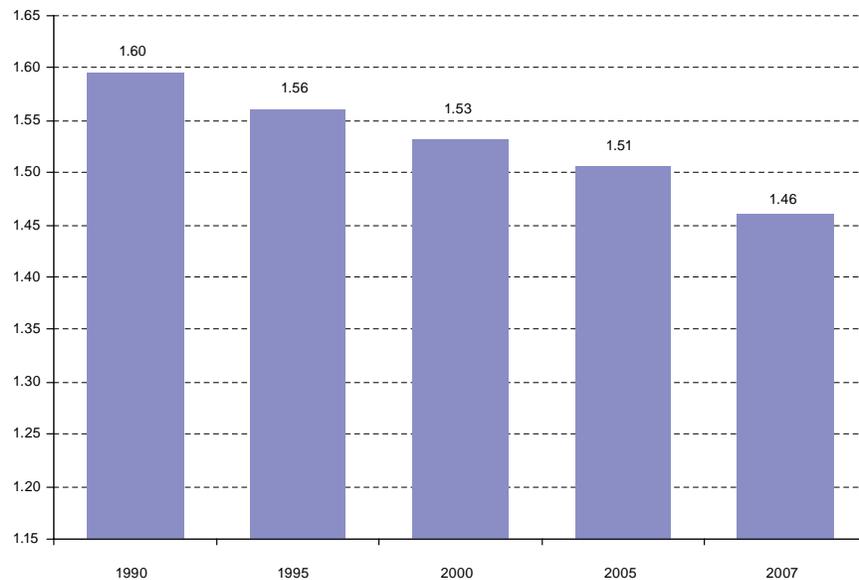


Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Latin American Energy Organization (OLADE), Energy-Economic Information System (SIEE), October 2009.

As shown in figure IV.17, in the region as a whole the energy intensity of GDP eased down slightly in the period from 1990 to 2007, meaning that GDP grew faster than energy consumption.

Two advances in the energy sector may help to reduce the region’s CO₂ emissions and contribute to the sustainability of energy production: increases in renewable sources and energy efficiency measures. Currently, some 23% of the region’s energy comes from renewables (see figure IV.18).

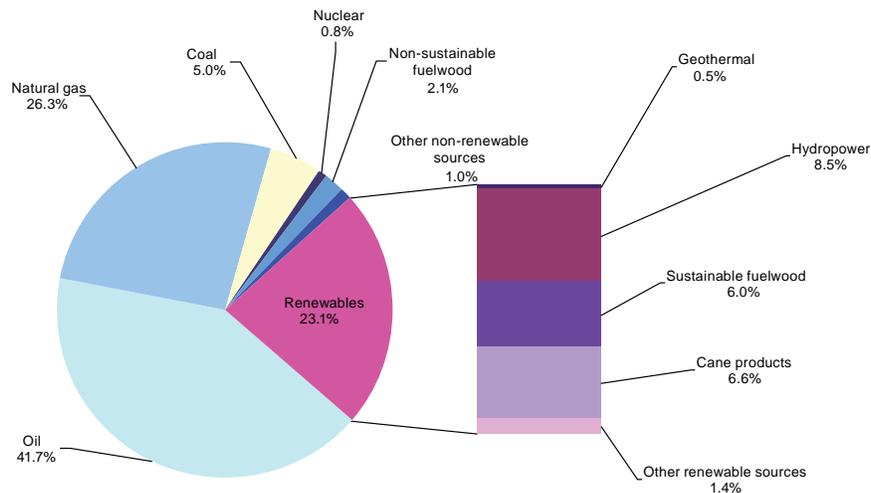
Figure IV.17
LATIN AMERICA AND THE CARIBBEAN: ENERGY INTENSITY OF GDP, 1990-2007^a
(Thousands of barrels of oil equivalent per million dollars of GDP, at constant 2000 prices)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Economic Indicators and Statistics Database (BADECON) and Latin American Energy Organization (OLADE), October 2009.

^a Energy consumption in relation to GDP.

Figure IV.18
LATIN AMERICA AND THE CARIBBEAN: ENERGY SUPPLY, 2007



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of the Latin American Energy Organization (OLADE), Energy-Economic Information System (SIEE) [online] <http://www.olade.org.ec/siee.html>.

The region has seen progress both in legal frameworks and in the implementation of energy-related projects. A number of countries have set up programmes to develop the renewable energy industry, in a market which has the potential to expand. Brazil has been particularly active, with the

deployment of subsidized schemes, particularly through the Alternative Sources of Energy Incentive Programme (PROINFA), which has led to appreciable growth in renewable energies (ECLAC, 2009g).

Nonetheless, progress in the area of renewable energies has not yet been reflected in a significant variation in the sources of energy supply (Coviello, 2006). The obstacles to developing these sources include: (i) economic obstacles, such as the higher cost of renewable sources in comparison with conventional ones; (ii) lack of institutional structure in the area of renewable energies; (iii) limited technical capacity to design and develop projects; (iv) financial barriers, including scarce availability of development credit and high transaction costs; and (v) social barriers, such as little ability to pay in the lowest-income sectors (Granizo and Zuñiga, 2007).

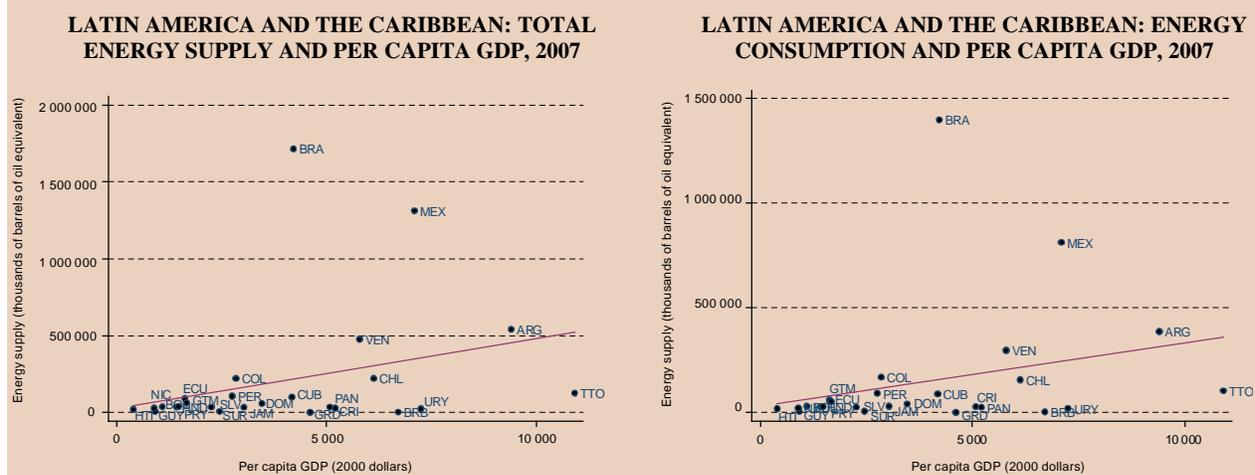
In the Caribbean, there are knowledge barriers owing to lack of awareness of energy efficiency measures and renewable energy sources.

There are considerable energy efficiency opportunities for the region. According to the Inter-American Development Bank (IDB, 2008), the Latin American and Caribbean region has rich energy efficiency reserves it has barely begun to exploit. Though some countries—notably Mexico and Brazil—are already reaping substantial savings from energy efficiency programmes begun in the 1980s and 1990s, most of their neighbours still need to undertake major efforts to conserve energy sources. Opportunities abound, because the region’s energy productivity is generally low. The region is still overwhelmingly reliant on incandescent light bulbs, even though these consume 70% more power than newer “compact fluorescent” or LED alternatives. The region’s factories and water supply systems use millions of old, energy-wasting electric motors and pumps. In many countries the transportation infrastructure—which consumes more than 30% of the region’s energy—is inefficient. Commercial and residential buildings are full of outdated air conditioning systems, refrigerators, washing machines and water heaters (ECLAC, 2009g).

Box IV.6

CORRELATION BETWEEN ENERGY INTENSITY AND PER CAPITA GDP

Regional data shows a positive correlation between energy supply and energy consumption on the one hand, and per capita GDP on the other, such that countries with higher per capita incomes also showing a higher level of energy supply and consumption.

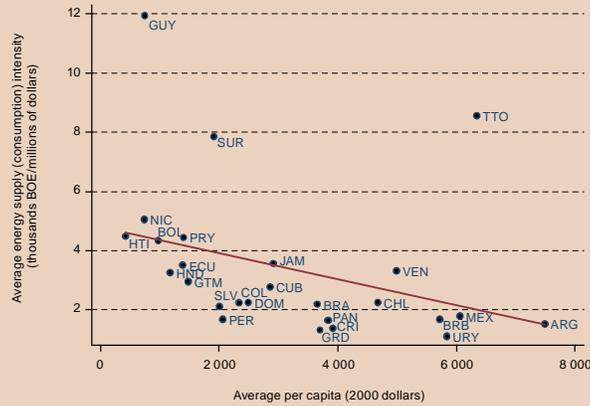


Source: Economic Commission for Latin America and the Caribbean (ECLAC), Economic Indicators and Statistics Database (BADECON) and Latin American Energy Organization (OLADE), October 2009.

Box IV.6 (concluded)

Furthermore, energy consumption and production are gradually decoupling from per capita GDP. This is owed mainly to changes in the production structure, technological innovation, the development of more energy-efficient economies and the implementation of stricter regulations. However, the energy decoupling that is occurring is insufficient to flatten the upward trend of energy consumption and production in the region.

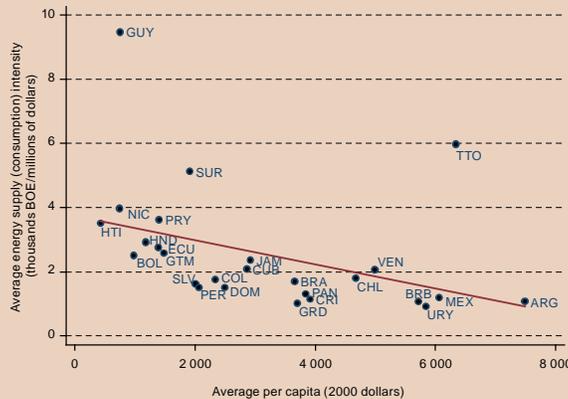
LATIN AMERICA AND THE CARIBBEAN: AVERAGE ENERGY SUPPLY INTENSITY AND PER CAPITA GDP, 1990-2007



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Economic Indicators and Statistics Database (BADECON) and Latin American Energy Organization (OLADE), October 2009.

Note: Average energy supply intensity corresponds to the average ratio of total energy supply (measured in thousands of barrels of oil equivalent) to GDP (in 2000 dollars) during the period.

LATIN AMERICA AND THE CARIBBEAN: AVERAGE ENERGY CONSUMPTION INTENSITY AND PER CAPITA GDP, 1990-2007



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Economic Indicators and Statistics Database (BADECON) and Latin American Energy Organization (OLADE), October 2009.

Note: Average energy consumption intensity corresponds to the average ratio of total energy consumption (measured in thousands of barrels of oil equivalent) to GDP (in 2000 dollars) during the period.

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

(iii) *Atmospheric pollution*

Biomass consumption and the burning of fossil fuels have been identified as the main sources of atmospheric pollutants, although there are others which arise from natural processes in the environment (PAHO, 2007). In addition to the effects of CO₂ emissions on the world climate, as described in chapter III of this document, those combustion processes also generate pollutants which harm the local environment.

Air pollution in the region causes an estimated annual total of 2.3 million cases of chronic respiratory illnesses in children, some 105,000 cases of chronic bronchitis in older persons and the loss of about 65 million working days. Exposure to the types and concentrations of pollutants commonly found in urban areas is connected to increased risk of mortality and morbidity from conditions such as respiratory and cardiovascular diseases. Furthermore, exposure to air pollutants during pregnancy also has negative effects on embryonic development (UNEP, 2003b).

Implementation of the available measures and technologies to reduce air pollution levels would reduce the occurrence of diseases and premature deaths. On the basis of information related to certain metropolitan areas in the Americas —Mexico City, Santiago, Sao Paulo and New York— it is calculated that merely reducing the emissions from solid-fuel burning in the coming 20 years would help to avoid around 64,000 premature deaths, including among children (95% confidence interval [CI] 18,000-116,000), 65,000 cases of chronic bronchitis (95% confidence interval [CI] 22,000-108,000) and the loss or curtailment of 37 million working days (Cifuentes and others, 2001).

Most of the pollutants present in the air in the form of gases, dust or particulate matter come from human activities such as transport, power generation, industrial processes, food preparation and the heating of dwellings.

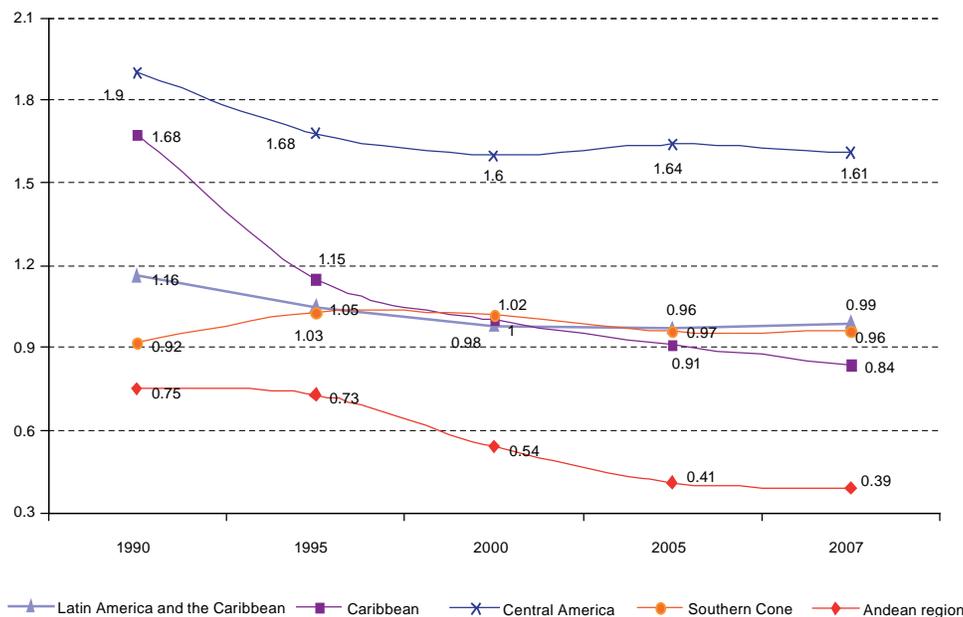
In rural areas, pollutant generation is mostly due to indoor biomass combustion (PAHO, 2007), generally from the use of solid fuels —wood, charcoal, crop residue, animal dung and coal— for cooking and heating. Biomass use increases the risk of contracting respiratory disease, especially among women and children. Per capita biomass use in the region is relatively stable, with a slight downward trend in the Caribbean, Central America and the Andean subregion, and an upward trend in the Southern Cone (see figure IV.19).

In urban areas, atmospheric pollution is linked to the use of fossil fuels¹³ in transport, energy generation and industrial activities (PAHO, 2007). The greatest source of atmospheric pollution in the cities of the region is transport, particularly private transport. In addition to the number of motor vehicles (see the motorization rate in section F), the age of the vehicle fleet is also important, as are the level of maintenance (generally poor), emission control technology and fuel quality. The most widely used fuel in the transport sector is diesel. With its high sulphur levels, it produces gaseous and particulate pollutants which increase morbidity and mortality rates among those suffering from chronic heart and respiratory conditions.¹⁴

¹³ The main pollutants produced by the burning of fossil fuels are particulate matter and gases. The latter include nitrous oxide, sulphur dioxide, carbon monoxide and ozone.

¹⁴ An initiative which could help to prevent and mitigate the problems associated with fossil fuel use in the region is the Inter-Governmental Network on Air Pollution in Latin America and the Caribbean, established in March 2009. Its main objective is to conduct technical exchanges, promote capacity-building and assess the best options for reducing air pollution, such as improving the quality of fuels by cutting their sulphur content.

Figure IV.19
**LATIN AMERICA AND THE CARIBBEAN: PER CAPITA BIOMASS ENERGY CONSUMPTION,
 BY REGION, 1990-2007**
(Thousands of barrels of oil equivalent)



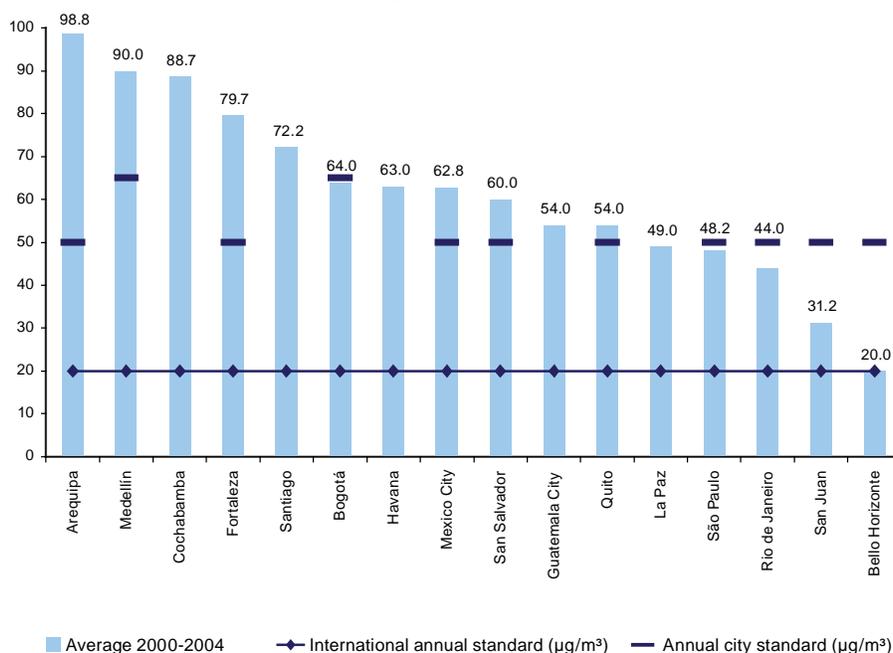
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Latin American Energy Organization (OLADE), Energy-Economic Information System (SIEE) [online] <http://www.olade.org.ec/siee.html>.

The expansion of urban areas and the resulting increase in energy consumption and motorization have increased concentrations of coarse particulate matter (PM10) beyond air quality standards in many of the region's cities (see figure IV.20).¹⁵

Some 85 studies published in scientific journals from 1994 to August 2004 on the links between air pollution and various health problems in the major cities of the Bolivarian Republic of Venezuela, Brazil, Chile, Cuba, Mexico and Peru found that an increase of 10 μg per m^3 in the concentration of particulate matter in the air leads to an increase in the daily number of deaths from respiratory and cardiovascular disease. It also increases hospital admissions due to respiratory problems. Among vulnerable groups such as older persons, that increase was calculated to represent as much as 0.86% of deaths per day (95% CI: 0.49; 1.24) (PAHO, 2005a).

¹⁵ PM10 includes solid and liquid particles such as dust, ash, soot, metal fragments, cement and pollen which are scattered in the atmosphere and whose diameter does not exceed 10 microns (a micron is a thousandth of a millimetre).

Figure IV.20
LATIN AMERICA AND THE CARIBBEAN (SELECTED CITIES): AVERAGE ANNUAL CONCENTRATION OF MP10 IN RELATION TO NATIONAL AND INTERNATIONAL STANDARDS, 2000-2004
(Micrograms per cubic metre ($\mu\text{g}/\text{m}^3$))



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Pan American Health Organization (PAHO), *Evaluación de los efectos de la contaminación del aire en la salud de América Latina y el Caribe*, Washington, D.C., 2005.

C. REDUCING BIODIVERSITY LOSS

Target 7.B

Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss.

The Latin American and Caribbean region is home to 40% of the world's animal and plant species and shows a high level of endemism.¹⁶ It contains around 40% of tropical forest species and 36% of the world's industrial forests and those cultivated for food. The eastern slope of the Andes has the world's greatest biological variety (FAO, 2009a). Also within the region are six of the world's 17 megadiverse countries; that is, countries having numerous plant or animal land-based species: the Bolivarian Republic of Venezuela, Brazil, Colombia, Ecuador, Mexico and Peru (UNEP, 2009a). The region's flora and fauna, in addition to being highly diversified, offer considerable opportunities for economic development, whose legacy in terms of medical, industrial and food potential could provide sustained benefits for the current and future population.¹⁷

¹⁶ Species which are unique to a particular geographic location.

¹⁷ Despite their huge health benefits, plants are becoming extinct at a considerable rate and will continue to do so unless urgent measures are taken. According to the Red List of Threatened Species of the International Union for

Although the Latin American and Caribbean countries have adopted policies and strategies for biodiversity conservation (IUCN, 2007) (see box IV.7), their biological heritage is threatened by the loss of natural habitats. This is occurring mostly in high mountain areas, tropical drylands, desert ecosystems, cloud forests and tropical moist forests.

Box IV.7

CONSOLIDATING MANAGEMENT TO REDUCE THE RISK OF BIODIVERSITY LOSS

The region undoubtedly faces many hurdles to halting biodiversity loss. Nevertheless, in recent years significant efforts have been made to stem that loss by means of policies and strategies that have not only improved levels of representativeness and the number of recognized areas, but have also reduced the uncertainty surrounding the most appropriate way to manage and learn about wild heritage.

Given the conceptual advances made in conceptualizing biodiversity over the past decade, countries have begun to pay particular attention to the criteria used for recognizing and managing conservation areas. Some have established the first functional analysis procedures and have begun to assess the capacity of ecosystems to maintain themselves and withstand natural and manmade disturbances. These approaches are vital, in the light of the uncertainty surrounding global climate change. Elements such as the minimum functional area of landscape fragments, the ecological health or integrity of ecosystems and the concept of species, landscape, climate variability and climate change are fundamental for identifying factors that support the resilience of ecosystems and those that contribute to their degradation.

In Meso-America, the Andean Community^a and the Amazon region, strategies are afoot aimed at conserving biodiversity, a heritage that is increasingly threatened by the serious disturbances caused by the expansion of the agricultural frontier, the introduction of foreign species, globalization of the economy and changing weather patterns.

In 2002, the Council of Foreign Ministers of the Andean Community approved the Regional Biodiversity Strategy for the Tropical Andean Countries (ERBPTA) (decision 523). The aim of the Strategy is to “help to produce viable alternatives for sustainable regional development based on our natural resources and to orchestrate joint positions in the various fora for international negotiations”. As a vision for 2010, the decision proposes integrated biodiversity management as a strategic element and competitive advantage for the development of the Andean Community, based on the criteria of equity, interculturalism and sustainability. The strategic themes and action lines of the Strategy are conservation, knowledge, sustainable use and distribution of benefits.

Amongst member countries of the Amazon Cooperation Treaty Organization (ACTO), the Regional Action Plan for Amazonian Biodiversity seeks to strengthen coordination and cooperation activities related to the knowledge, conservation and sustainable use of biodiversity in this region, as well as the fair and equitable distribution of the benefits of use, thereby helping to improve the living conditions of the population. The intention is also to deepen knowledge of Amazon biodiversity and to continue working on programmes to conserve traditional knowledge and gain access to genetic resources and intellectual property rights, to name a few of the most relevant examples.

Source: Andean Community, “Estrategia Regional de Biodiversidad para los Países del Trópico Andino” [online] http://www.comunidadandina.org/public/ERB_final.pdf, 2005.

^a The Andean Community is made up of Colombia, Ecuador, Peru and the Plurinational State of Bolivia.

The region has one of the world’s highest rates of habitat loss, having recorded around 66% of global forest loss between 2000 and 2005 (UNEP, 2009a). It has also been affected by the decline of mangrove swamps as a result of tourism and aquaculture development. Since 1980, some 20% of the world’s wetlands have disappeared; this is also a considerable loss for the region. Land-use change has had considerable negative effects on fisheries and the related ecosystem services. Almost two thirds of the coral reefs of the Caribbean are threatened by coastal urbanization, the dumping of sediments and toxic

the Conservation of Nature and Natural Resources (IUCN), the last decade saw a significant increase in the numbers of threatened species; it is calculated that 70% of the world’s plant species are endangered (IUCN, 2008).

substances, marine pollution (CO₂) and overfishing (UNEP, 2009a), as well as ocean warming, the development of marine tourism, hurricanes and the removal of vegetation. The region also has a continued problem with beach erosion, which entails the risk of habitat loss for flora and fauna and damage to coastal infrastructure. In addition, biodiversity has been affected by habitat fragmentation, mostly owing to infrastructure works.

Associated with this habitat loss in the region is the presence of many deforestation “hot spots”—forest areas that have great biodiversity and high endemism indices and suffer from strong anthropogenic pressure (see map IV.1).

Target 7.B aims to reduce biodiversity loss by 2010. This deadline is related to the 2010 Biodiversity Target adopted by the States parties to the Convention on Biological Diversity.¹⁸ The target includes two official indicators: 7.6, proportion of terrestrial and marine areas protected and 7.7, proportion of species threatened with extinction.

1. Indicator 7.6: proportion of terrestrial and marine areas protected¹⁹

While it is true that protected terrestrial and marine areas have increased in the region, a number of challenges relating to representativeness, management and resource availability must be overcome for these safeguards to be really effective. Even in conjunction with other strategies to contain biodiversity losses, such as afforestation and community forest management, payment for environmental services and land management and certification, it has not been possible to bring it to a halt. Biodiversity is endangered by strong pressure exerted on natural habitats by certain economic activities, such as large-scale agriculture. Another disruptive factor is the impact of global climate change. The countries of the region are making progress in the identification of these issues.

There is growing commitment in the region to biodiversity conservation; between 1990 and 2008, the designation of terrestrial and marine protected areas more than doubled (see figures IV.21 and IV.22; the latter shows the situation country by country). The rate of increase has, however, been lower in the last five years than in the 1990s: the annual average growth rate was 7.32% in 1990-2000, but only 3.85% in 2000-2007.

Map IV.2 shows the location of protected areas throughout Latin America and the Caribbean in 2009; as can be seen, they are situated mostly in Meso-America and the northern part of South America. The region also has 102 biosphere reservations, distributed among 19 countries.²⁰

¹⁸ The Countdown 2010 Initiative, supported by IUCN and the European Commission, has launched a programme of support for the governments of the region aimed at meeting the 2010 target.

¹⁹ Protected areas in Latin America and the Caribbean, with a variety of names, show different levels of effective biodiversity conservation and varying degrees of representativeness of biomass and species, depending on the countries where they are located. This is due to differences in the countries' legislation and in their capacity to ensure appropriate protection for the legally protected areas.

²⁰ Biosphere reserves are areas of terrestrial and coastal/marine ecosystems or a combination thereof which are internationally recognized within the framework of the UNESCO programme on Man and the Biosphere (MAB). They fulfil three functions, according to the following zoning system: (i) a legally constituted core area or areas devoted to long-term protection, according to the conservation objectives of the biosphere reserve, and of sufficient size to meet these objectives; (ii) a buffer zone or zones clearly identified and surrounding or contiguous to the core area or areas, where only activities compatible with the conservation objectives can take place; (iii) an outer transition area where sustainable resource management practices are promoted and

Map IV.1
LATIN AMERICA AND THE CARIBBEAN: HOT SPOTS BY TYPE OF DETERIORATION, 2005

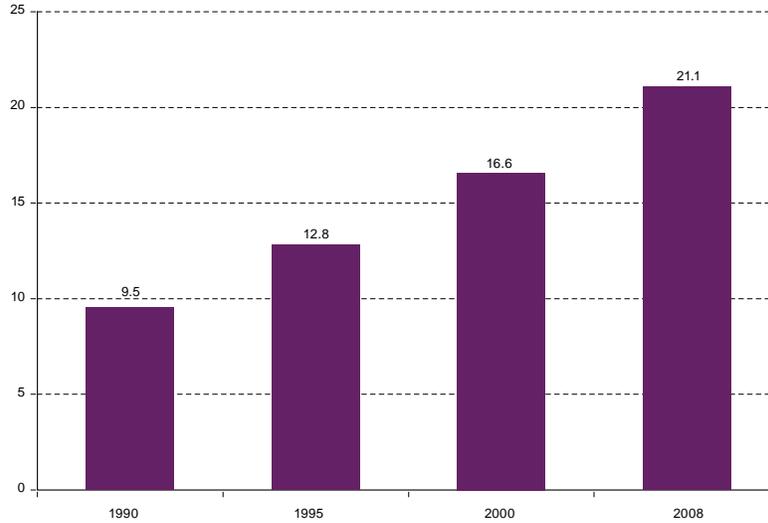


Source: F. Achard and others, "Identification of deforestation hot spot areas in the humid tropics", *Research Report*, No. 4, Brussels, European Commission, 1998; Food and Agriculture Organization of the United Nations (FAO), *Global Forest Resources Assessment 2005*, Rome, 2005; and information from GlobCover project.

Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

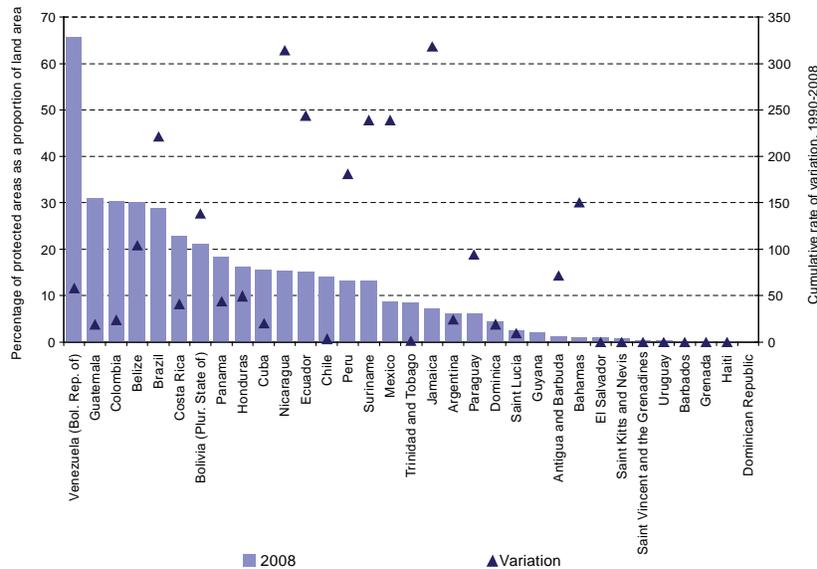
developed. The geographic distribution of biosphere reserves can be seen [online] at <http://www.unesco.org/uy/mab/images/mapaRB-2006-A4.jpg>.

Figure IV.21
LATIN AMERICA AND THE CARIBBEAN: TERRESTRIAL AND MARINE PROTECTED AREAS AS A PROPORTION OF THE TERRITORY, 1990, 1995, 2000 AND 2008
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of United Nations Millennium Development Goals indicators database [online] <http://mdgs.un.org/unsd/mdg/Default.aspx>, and World Database on Protected Areas, October 2009.

Figure IV.22
LATIN AMERICA AND THE CARIBBEAN: PROPORTION OF TERRESTRIAL AND MARINE PROTECTED AREAS, BY COUNTRY, 1990-2008
(Percentages and rate of variation)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of United Nations Millennium Development Goals indicators database [online] <http://mdgs.un.org/unsd/mdg/Default.aspx>, and World Database on Protected Areas, October 2009.

Map IV.2
LATIN AMERICA AND THE CARIBBEAN: PROTECTED AREAS, 2009



Source: United Nations Environment Programme (UNEP) and World Conservation Monitoring Centre (WCMC), *Data Structure of the World Database on Protected Areas (WDPA) Annual Release 2009*.

Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Although over 20% of the region's territory is now under protection, this does not mean that all ecosystems are properly represented in the areas concerned. For example, only 2.7% of the Mata Atlantica, only 7.5% of whose original area still remains, is protected (UNEP, 2009a).

Thus, the existence of a protected area is not enough to ensure that the species and habitats it contains are really safeguarded. Neither can it be said that those areas contain the species, communities and habitats which constitute each country's ecological diversity.

For example, marine reserves are estimated to make up less than 0.1% of the exclusive economic zone (EEZ) of the countries of Latin America and the Caribbean. Furthermore, despite progress in the region in the creation of marine protected areas, many of them lack effective management.²¹ In the case of Small Island Developing States (SIDS) in the Caribbean, only a fraction of the marine protected areas have some sort of management plan (UNEP, 2009a).

Pressures linked to production, together with the expansion of cities and of agricultural frontiers, are obstacles to the designation and maintenance of protected areas. Permanent or temporary settlements often exist within such areas as a result of economic problems and inadequate legal arrangements in the countries. Thus, not only the expansion of protected areas but also their management are key challenges for the region. The proper administration of these areas calls for strategic planning which takes into account their multiple characteristics and potential. In this regard, the Republic of Panama has pioneered a scheme for the effective management of protected areas (see box IV.8).

The management of protected areas also requires financial resources. In this context, the United Nations Development Programme (UNDP) and The Nature Conservancy (TNC) are conducting a regional initiative which has implemented the Financial Sustainability Scorecard for National Systems of Protected Areas in 18 Latin American and Caribbean countries. This initiative directly engaged government representatives and experts in the field to help determine the financial status of those systems. On the basis of that analysis, the funds available each year for protected area systems are calculated at US\$ 300 million, excluding Brazil.²² The financial gap in the 16 countries where funding needs for basic management implementation have been analysed is estimated at approximately US\$ 150 million per year.²³ This gap—the difference between existing funding and what is needed for proper management of the protected areas—prevents those areas from functioning fully to ensure the production of ecosystem services such as biodiversity conservation, water regulation and supply, carbon capture and adaptation and resilience to climate change. Economic valuation of biodiversity and ecosystem services provided by protected areas for sustainable growth and equity in the region is an objective of another UNDP initiative, which will give a clearer picture of the risks from the aforementioned gap in regional development.²⁴

²¹ A marine protected area is an area of intertidal or subtidal terrain which has been designated as such in order to safeguard its biodiversity and includes certain biological, physical and cultural attributes (IUCN (1990), quoted in UNEP, 2009a).

²² For further details on these data and the critical elements which need to be strengthened in order to narrow the financial gap, see UNDP/TNC (2009).

²³ This information includes the following countries: Argentina, Bolivarian Republic of Venezuela, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru and Plurinational State of Bolivia.

²⁴ Biodiversity and Ecosystems: why these are important for sustained growth and equity in Latin America and the Caribbean Initiative.

Box IV.8

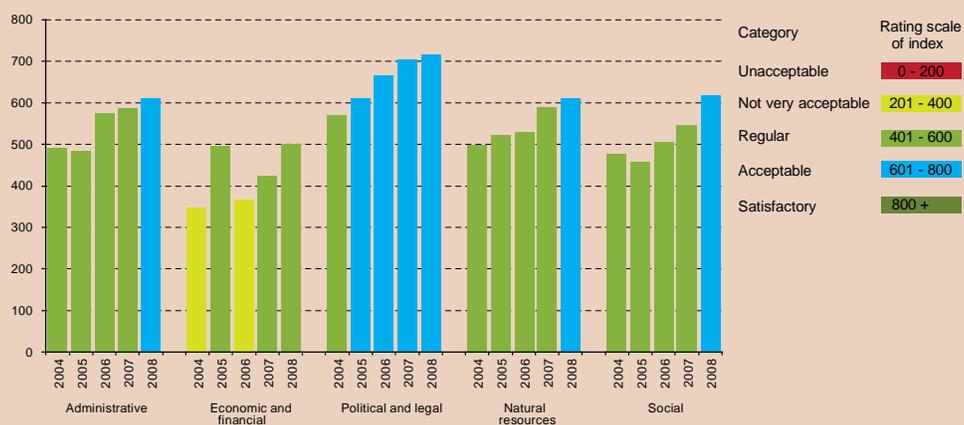
EFFECTIVE MANAGEMENT OF PROTECTED AREAS IN PANAMA

Panama has developed a management effectiveness index for protected areas, to provide qualitative and quantitative information to support planning and guide decision-making. Between 2001 and 2008, the index revealed the effectiveness of management in 36 out of 95 protected areas. The index is based on a methodology of structured assessment of local stakeholders, incorporating five spheres of action (social, administrative, economic and financial, political and legal, and natural and cultural resources), as well as many other relevant variables. The management of protected areas in Panama has been improving, although it remained “regular” in the period 2001-2007 and became “acceptable” in 2008 (see figure 1).

Figure 1
PANAMA: MANAGEMENT EFFECTIVENESS INDEX OF THE NATIONAL SYSTEM OF PROTECTED AREAS, 2001-2008



Figure 2
PANAMA: MANAGEMENT EFFECTIVENESS INDEX OF PROTECTED AREAS, BY SPHERE OF ACTION, 2004-2008



Box IV.8 (concluded)

More specifically, the protected area conservation management effectiveness index shows the same pattern (regular to acceptable) with respect to administrative, social and natural resource matters. The sphere showing most progress is that of political and legal issues, while performance in the economic and financial sphere has been uneven (although the last two years evaluated have seen an improvement thanks to the allocation of new resources).

Thanks to this index, the environmental authorities can identify opportunities, weaknesses or both. The index also strengthens and supplements the production of annual operational and management plans, and helps to justify projects and investments in protected areas. In addition, it contributes to the short-, medium- and long-term planning of new strategies and the implementation of measures aimed at improving environmental management within protected areas and advancing towards their successful conservation and development.

Source: National Environment Authority of Panama. *Indicadores Ambientales de Panamá 2009*; National System of Protected Areas in Panama (SINAP), Department of Protected Areas and Wildlife, National Environment Authority (2008): “Programa de Monitoreo de la Efectividad de Manejo de las Áreas Protegidas del SINAP”, Panama City, 2008.

2. Indicator 7.7: proportion of species threatened with extinction

The information is still unreliable, and no historical trend can be established on the basis of available estimates. Recent assessments suggest that the huge biodiversity of Latin America and the Caribbean is being lost or is seriously threatened by human activities at all levels and almost throughout the region’s territory. The region includes 5 of the 20 countries with the highest numbers of species of fauna threatened with extinction, and 7 of the 20 countries whose plant varieties are the most threatened.

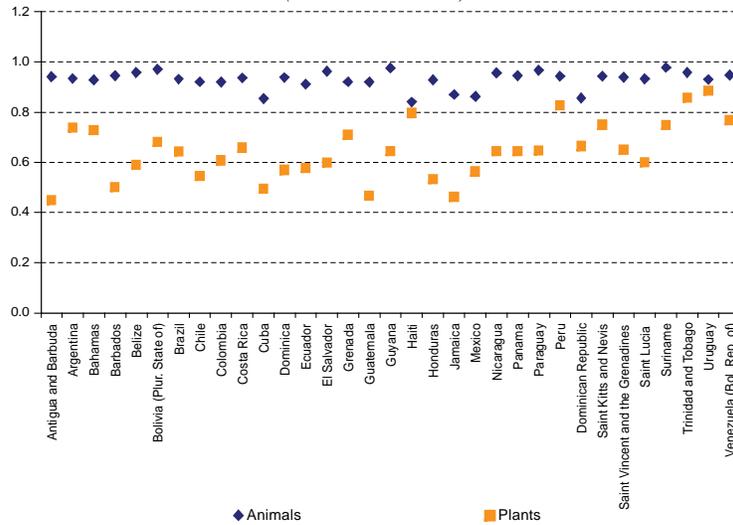
Information on species threatened with extinction is still unreliable. The inclusion of this issue as an indicator for target 7.B is recent and no historical trend can be established owing to the lack of comparable and harmonized statistics. Nonetheless, many assessments and studies conducted in recent years suggest that the huge biodiversity of Latin America and the Caribbean is being lost or is seriously threatened by human activities at all levels and throughout almost all the region’s territory. The region is home to a high proportion of threatened species; it includes five of the 20 countries with the highest numbers of species of fauna threatened with extinction, and seven of the 20 countries whose plant varieties are the most threatened (UNEP, 2009a).

The region is among those with the greatest numbers of tree species in danger of extinction, threatened or vulnerable. Amphibians are suffering the ravages of the chytrid fungus owing to changes in macro- and microclimatic conditions, and similar situations obtain in a variety of groups of organisms. Over the past 100 years Latin America and the Caribbean has lost an estimated 75% of the genetic diversity of its agricultural crops (UNEP, 2004).

The proportion of animal and plant species threatened with extinction in the countries of Latin America and the Caribbean and their numbers by region are shown in figures IV.23 and IV.24, respectively.²⁵

²⁵ Indicator 7.7 is based on the work of the International Union for Conservation of Nature and Natural Resources (IUCN), which established the Red List of Threatened Species to assess the conservation status of vegetal and animal species. An expert group has calculated a Red List Index showing the proportion of species which are likely to survive (not to be extinct) in the near future in the absence of any conservation measures. The “near future” cannot be quantified exactly because it depends on the duration of the reproductive generation for each of the species included in the index; in most cases, however, it is in the range of 10-50 years for short-lived species and 10-100 for long-lived ones. The value of the index varies between 1 (when all species are classified as “least

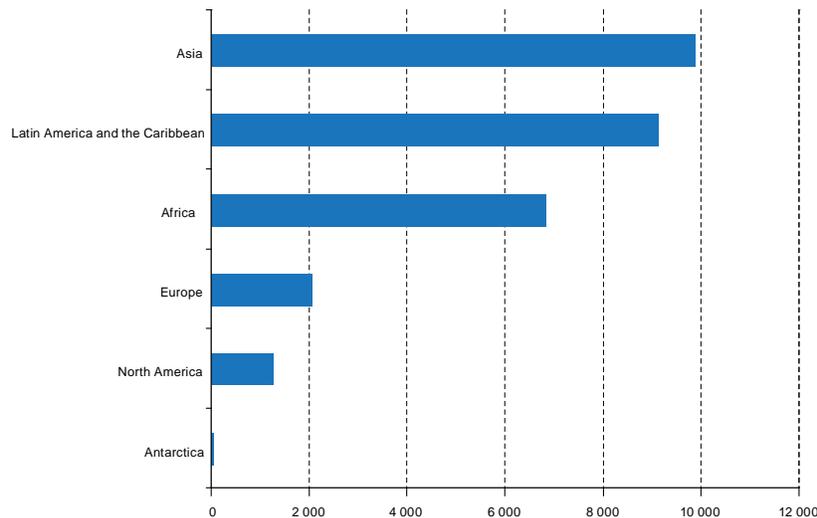
Figure IV.23
LATIN AMERICA AND THE CARIBBEAN: PROPORTION OF SPECIES IN DANGER OF EXTINCTION, 2008
(Red List Index^a)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of International Union for Conservation of Nature and Natural Resources (IUCN), “Red List of Threatened Species” [online] <http://www.iucnredlist.org/static/stats>.

^a Red List of Threatened Species of the International Union for Conservation of Nature and Natural Resources (IUCN), with values of between 1 (when the danger of extinction of all species is classified as “least concern”) and 0 (when all species are classified as “extinct”).

Figure IV.24
NUMBER OF SPECIES IN DANGER OF EXTINCTION, BY REGION, 2008



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of International Union for Conservation of Nature and Natural Resources (IUCN), “Red List of Threatened Species” [online] <http://www.iucnredlist.org/static/stats>.

concern” and 0 (when all species are classified as extinct). Figure IV.23 shows the Red List Index for 2008 in 33 countries in Latin America and the Caribbean.

D. REDUCE THE PROPORTION OF PEOPLE WITHOUT SUSTAINABLE ACCESS TO SAFE DRINKING WATER AND BASIC SANITATION

Target 7.C

Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.

While the situation remains quite uneven, the region has made significant progress in terms of the coverage of drinking-water and sanitation systems. Pre-2006 figures show that, for urban areas, almost all the countries have fulfilled the target of access to drinking water. Within that group, however, there are substantial differences between rural and urban areas and between different cities, provinces, states, regions and municipalities and, above all, between income groups. It is estimated that 70% of persons without access to drinking water and 84% of those lacking sanitation services are in the bottom two income quintiles.

The region as a whole is better off in terms of the drinking-water situation than with regard to sanitation, and urban areas are better served than rural areas. Much remains to be done in terms of quality for both services —especially for drinking water, its effective disinfection, reducing the problems of leakage and intermittent service— and the treatment of urban sewage, as well as the sustainability of services amid growing competition for water, destruction of catchment basins, contamination and climate change.

Access to drinking water and sanitation services corresponds to target 7.C, which is quantifiable and states that the proportion of people who were without them in 1990 is to be halved by 2015. The analysis contained in this section is therefore based on comparison of advances and achievements recorded up to the last year for which data are available (2006). The harmonized international data of the World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF) are used in order to include all the countries of the region.

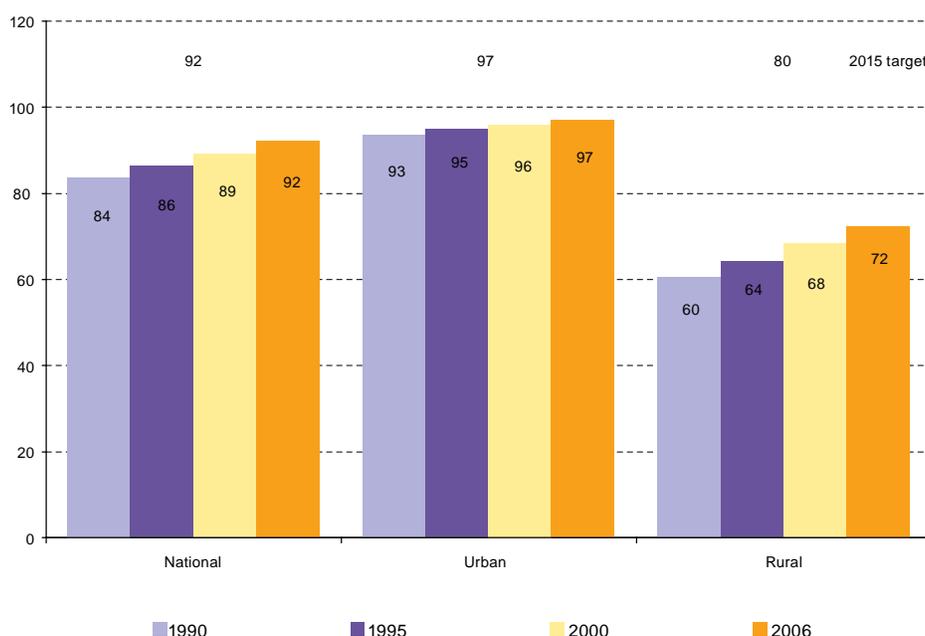
1. Indicator 7.8: Proportion of population using an improved drinking water source²⁶

While the situation remains quite uneven, the region has made significant progress in terms of the coverage of drinking-water systems.

²⁶ Improved drinking water sources are considered to be: water piped into dwelling, plot or yard; public taps or standpipes; tube wells or boreholes; protected dug wells; rainwater collections, provided that there is a secondary source which is also improved; bottled water, provided that the secondary source is also improved; and protected springs. Improved water sources do not include: unprotected dug wells and springs; carts small tanks or drums; tanker trucks; bottled water if the secondary source is not improved; rainwater collections if the secondary source is not improved; surface water from rivers, lakes, ponds, streams, dams or irrigation channels. This indicator is calculated using the ratio of the population with access to improved sources of drinking water to the total population (See the Official United Nations site for the MDG Indicators [online] <http://unstats.un.org/unsd/mdg/Default.aspx>).

Between 1990 and 2006, there was gradual progress in the level of coverage of drinking water services in the region (see figure IV.25). In 2006, some 468 million persons —92% of the population— had access to drinking water. Thus, in aggregate terms, the target of 91.8% corresponding to 2015 was achieved. In the case of the urban population the target was also attained in 2006, with a coverage of 97% (see table IV.7).²⁷

Figure IV.25
LATIN AMERICA AND THE CARIBBEAN (SELECTED COUNTRIES): POPULATION WITH SUSTAINABLE ACCESS TO AN IMPROVED DRINKING WATER SOURCE, 1990-2006^a
(Percentages of the total population)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of United Nations, Millennium Development Goals Indicators Database [online] <http://unstats.un.org/unsd/mdg/Default.aspx>; national, urban and rural population figures provided by the Latin American and Caribbean Demographic Centre (CELADE) - Population Division of ECLAC; figures for the Caribbean provided by the United Nations Population Division [online] www.unpopulation.org.

^a Includes statistics from the following countries: Argentina, Barbados, Brazil, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Paraguay, Peru, Plurinational State of Bolivia, Saint Kitts and Nevis, Saint Lucia, Trinidad and Tobago and Uruguay. Countries were selected on the basis of availability of information for all years studied.

²⁷ Analysis of the level of drinking-water access in 30 of the main urban areas in six of the countries of the region, based on population and housing censuses (1990 and 2000 rounds) shows that very few cities show a coverage below 80%; the majority of these are in Brazil (Cecchini, Rodríguez and Simioni, 2006).

Table IV.7
LATIN AMERICA AND THE CARIBBEAN (SELECTED COUNTRIES): ACCESS TO DRINKING WATER, PROGRESS AND THE ACHIEVEMENT GAP AS OF 2006^a
(Percentages)

Latin America and the Caribbean	1990	2000	2006	Target for 2015	Achievement	Gap as of 2006
Total	84	89	92	91.8	102	-2% (target exceeded)
Urban	93	96	97	96.7	105	-5% (target exceeded)
Rural	60	68	72	80.2	61	39

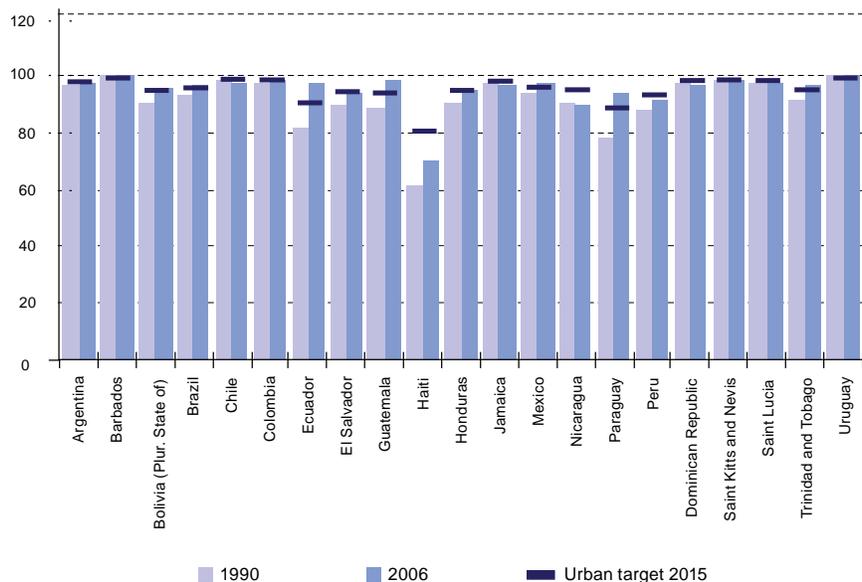
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of United Nations, Millennium Development Goals Indicators Database [online] <http://unstats.un.org/unsd/mdg/Default.aspx>; national, urban and rural population figures provided by the Latin American and Caribbean Demographic Centre (CELADE) - Population Division of ECLAC; figures for the Caribbean provided by the United Nations Population Division [online] www.unpopulation.org.

^a Includes statistics on the following countries: Argentina, Barbados, Brazil, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Paraguay, Peru, Plurinational State of Bolivia, Saint Kitts and Nevis, Saint Lucia, Trinidad and Tobago and Uruguay. The selection of countries related to the availability of information for all the years included in the study.

Nonetheless, the data presented do not reveal any quality issues with the services provided. The improved sources of drinking water do include water piped into a dwelling, a plot of land or a yard, for example. The water available to a large proportion of people is not true drinking water, however, and the supply is irregular.

Some countries have much farther to go than others (see figures IV.26 and IV.27). Box IV.9 describes the subnational inequalities present in many of the countries of the region.

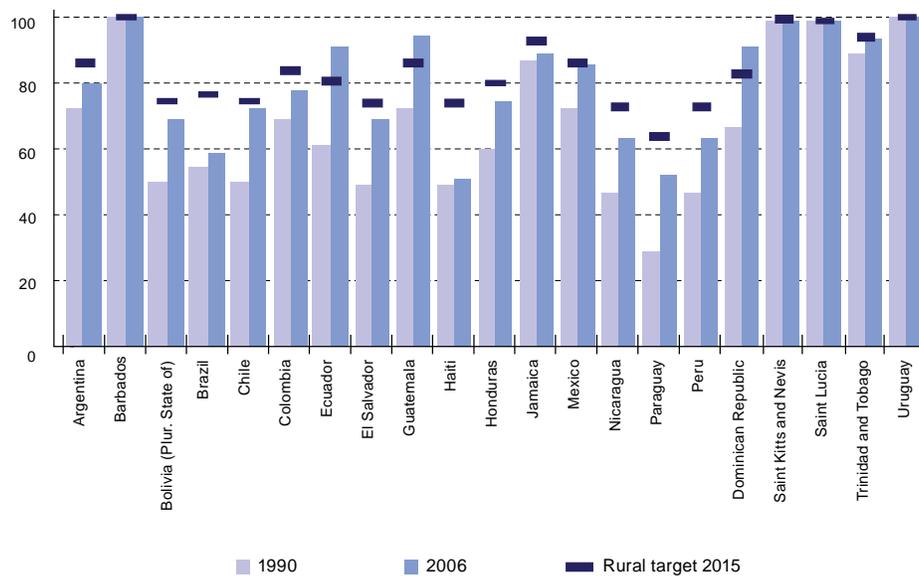
Figure IV.26
LATIN AMERICA AND THE CARIBBEAN (SELECTED COUNTRIES): URBAN POPULATION WITH ACCESS TO AN IMPROVED DRINKING WATER SOURCE
(Percentages of the total population)



Source: United Nations, Millennium Development Goals Indicators Database [online] <http://unstats.un.org/unsd/mdg/Default.aspx>, on the basis of figures provided by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF).

Note: Owing to a lack of data from 1990 for Costa Rica and Guyana, and from 2006 for the Bolivarian Republic of Venezuela, it was not possible to calculate the gaps for these countries.

Figure IV.27
**LATIN AMERICA AND THE CARIBBEAN (SELECTED COUNTRIES): RURAL POPULATION
 WITH ACCESS TO AN IMPROVED DRINKING WATER SOURCE**
(Percentages of the total population)



Source: United Nations, Millennium Development Goals Indicators Database [online] <http://unstats.un.org/unsd/mdg/Default.aspx>, on the basis of figures provided by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF).

Note: Owing to a lack of data from 1990 for Cuba, Dominica, Grenada, Guyana and Panama, and from 2006 for the Bolivarian Republic of Venezuela, it was not possible to calculate the gaps for these countries.

Box IV.9

TERRITORIAL INEQUALITIES IN SUSTAINABLE ACCESS TO DRINKING WATER AND BASIC SANITATION FACILITIES

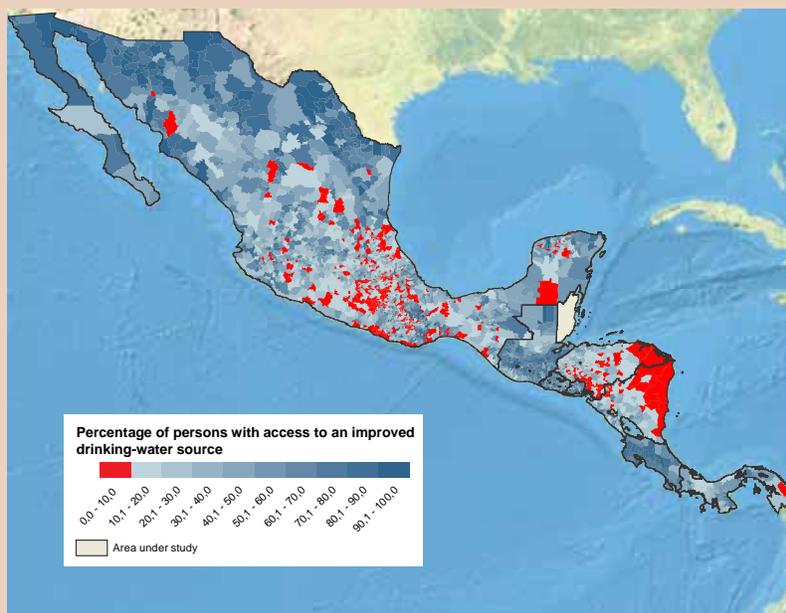
Territorial gaps are one of the most abiding hallmarks of social inequality in Latin America and the Caribbean, and this is clearly seen in the MDG indicators. Although the region is on track to reach many targets at the aggregate level, the figures conceal major inequalities at the national and especially the subnational level. This is particularly true in the case of indicators formulated to assess fulfilment of target 7.C: the proportion of population using an improved drinking water source and the proportion of the population using an improved sanitation facility. However, subnational differences are often inadequately quantified, owing to a lack of statistical information representing smaller territorial areas such as municipalities.

Nevertheless, there are population and housing censuses carried out every 10 years, which facilitate the calculation of indicators at various territorial levels. Having said that, censuses lack detail and frequency. Conversely, household surveys, which are conducted more frequently and contain questions on drinking water and sanitation, are representative only at an aggregate territorial level. Accordingly, drinking water and sanitation indicators were calculated using population and housing censuses, on the basis of the "basic unmet needs" methodology, which has long been used in ECLAC and in particular in the Population Division of ECLAC-Latin American and Caribbean Demographic Centre (CELADE). This approach measures the deprivation of individuals in a given dwelling in relation to (i) access to piped drinking water within the dwelling and (ii) access to a system of sanitary waste disposal via an internal sewerage system.

Box IV.9 (concluded)

The following map shows an example of the territorial distribution of these disaggregated indicators. In Mexico and the Central American countries (3,649 territorial units in total), the smallest administrative divisions show significant variation in the percentage of the population living in dwellings with access to an improved drinking water source. Only municipalities in the north of Mexico (on the border with the United States), most of the territory of Costa Rica and some parts of Guatemala (shown in dark blue on the map) have high levels of coverage for drinking water services. The municipalities with the worst conditions (indicated in red) are those in the central and southern regions of Mexico, the Caribbean coast of Honduras and Nicaragua and the Emberá indigenous area in Panama, where only 10% or less of the population live in dwellings with access to an improved drinking water source. Interestingly, many of the areas where dwellings lack piped drinking water services are located in places with an abundant natural water supply.

MEXICO AND CENTRAL AMERICA: PERCENTAGE OF PERSONS LIVING IN DWELLINGS WITH AN IMPROVED DRINKING WATER SOURCE, BY SMALLER ADMINISTRATIVE DIVISIONS, AROUND 2000



These territorial inequalities underline the importance of generating sociodemographic data that is more disaggregated at the territorial level, so as to facilitate the identification and formulation of planning priorities for improving drinking water and sanitation services, beyond a simple distinction between rural and urban areas.

Although Latin America and the Caribbean as a region is on track to achieve target 7.C, territorial gaps in access to improved drinking water sources and sanitation services remain a worrying challenge and could even impede future progress towards the target.

Source: Latin American and Caribbean Demographic Centre (CELADE) - Population Division of ECLAC, on the basis of census data.

Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

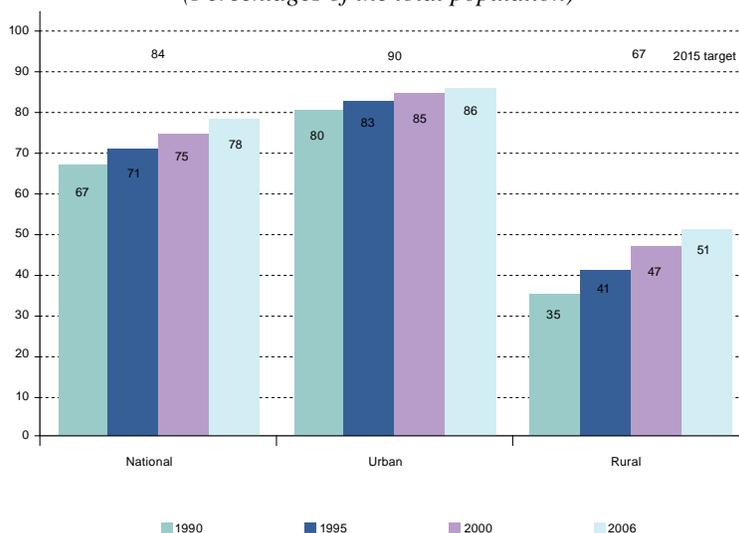
2. Indicator 7.9: Proportion of population using an improved sanitation facility²⁸

Much remains to be done in terms of service quality, the treatment of urban sewage and the sustainability of services in a scenario of pollution and climate change.

From a coverage of 67% in the region in 1990, the proportion of the population having access to sanitation facilities had reached 78% by 2006. In other words, some 113 million persons achieved connection to sanitation systems during that period (see figure IV.28). The coverage target for 2015 is 84%. As with drinking water, the distribution of services is very unequal both between and within countries. The most significant improvements have taken place in urban areas (see table IV.8). In 2006, nine years before the deadline for achieving this target, the region as a whole and its urban areas had progressed to 78% and 86% of the population with access to improved sanitation, respectively. In rural areas the gap is wider, with only 51% of the population having access to those services in 2006, compared with the target of 68%. A major effort is therefore needed to move towards the achievement of the goals set for 2015, particularly in the region's rural areas. Nonetheless, the number of people in rural areas who need to obtain access to sanitation services in order for the target to be reached is very close to—and slightly below—that for urban areas (see figures IV.29 and IV.30).

Figure IV.28

LATIN AMERICA AND THE CARIBBEAN (SELECTED COUNTRIES): POPULATION WITH ACCESS TO AN IMPROVED SANITATION FACILITY, 1990, 1995, 2000 AND 2006^a (Percentages of the total population)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of United Nations, Millennium Development Goals Indicators Database [online] <http://unstats.un.org/unsd/mdg/Default.aspx>; national, urban and rural population figures provided by the Latin American and Caribbean Demographic Centre (CELADE) - Population Division of ECLAC; figures for the Caribbean provided by the United Nations Population Division [online] www.unpopulation.org.

^a Includes the following countries: Argentina, Bahamas, Barbados, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Paraguay, Peru, Plurinational State of Bolivia, Saint Kitts and Nevis, Trinidad and Tobago and Uruguay.

²⁸ The following are considered improved sanitation services: toilet or latrine connected to a sewer, septic tank or pit with a cover and ventilation. The following are not among the improved services: public or shared facilities, toilets which discharge into an open sewer or ditch, uncovered latrines, bucket latrines, hanging toilets or latrines which directly discharge in water bodies, or use of the bush or fields. This indicator is calculated using the ratio of the population with access to improved sanitation services to the total population.

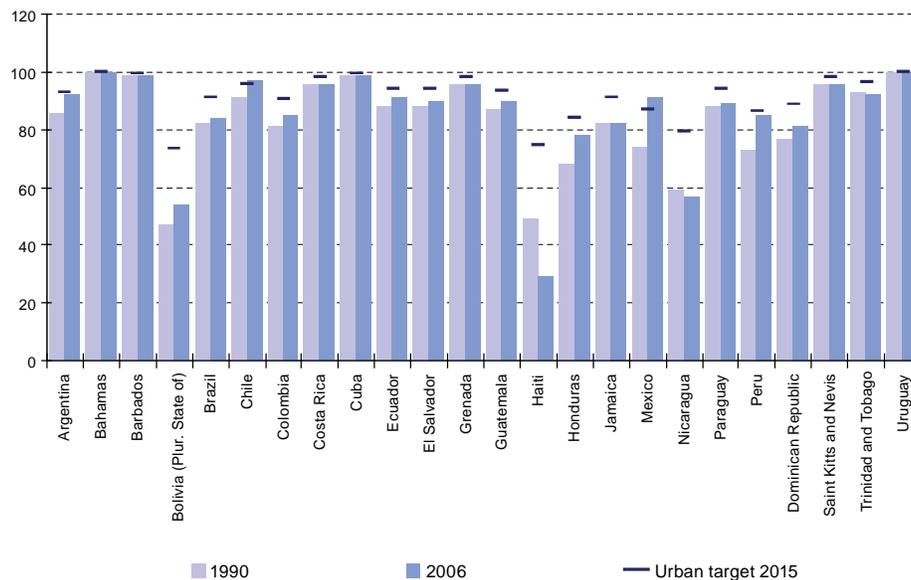
Table IV.8
LATIN AMERICA AND THE CARIBBEAN (SELECTED COUNTRIES): ACCESS TO SANITATION SERVICES, PROGRESS AND THE ACHIEVEMENT GAP AS OF 2006^a
(Percentages)

Latin America and the Caribbean	1990	2000	2006	Target for 2015	Achievement	Gap as of 2006
National	67.2	75.0	78.4	83.6	68	32
Urban	80.5	84.8	86.3	90.2	59	41
Rural	34.9	47.1	50.8	67.5	49	51

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of United Nations, Millennium Development Goals Indicators Database [online] <http://unstats.un.org/unsd/mdg/Default.aspx>; national, urban and rural population figures provided by the Latin American and Caribbean Demographic Centre (CELADE) - Population Division of ECLAC; figures for the Caribbean provided by the United Nations Population Division [online] www.unpopulation.org.

^a Includes the following countries: Argentina, Bahamas, Barbados, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Paraguay, Peru, Plurinational State of Bolivia, Saint Kitts and Nevis, Trinidad and Tobago and Uruguay.

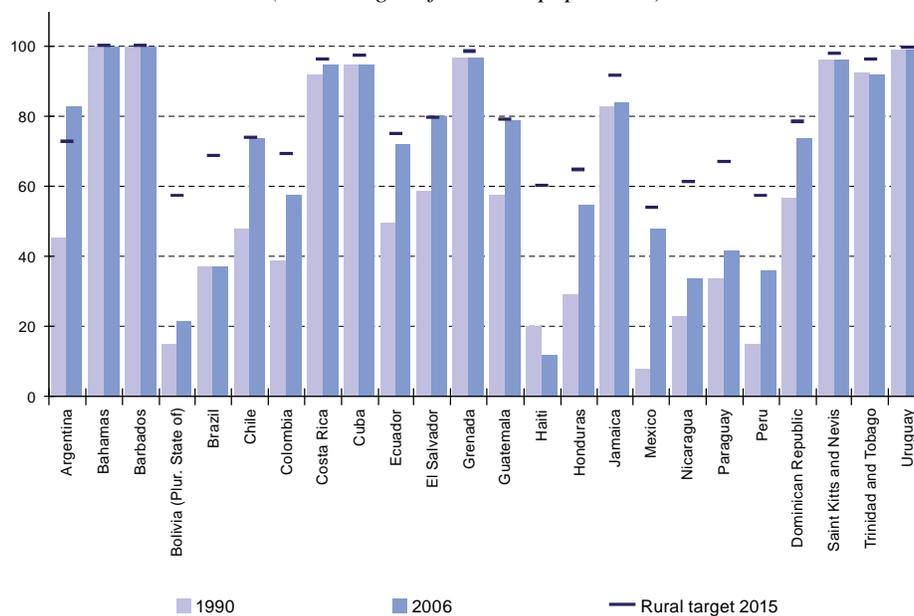
Figure IV.29
LATIN AMERICA AND THE CARIBBEAN (SELECTED COUNTRIES): URBAN POPULATION WITH ACCESS TO AN IMPROVED SANITATION FACILITY
(Percentages of the total population)



Source: United Nations, Millennium Development Goals Indicators Database [online] <http://unstats.un.org/unsd/mdg/Default.aspx>, on the basis of figures provided by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF).

Note: It was not possible to calculate the gaps for Belize, the Bolivarian Republic of Venezuela, Dominica, Guyana, Panama, Saint Lucia and Saint Vincent and the Grenadines, owing to lack of data.

Figure IV.30
LATIN AMERICA AND THE CARIBBEAN (SELECTED COUNTRIES): RURAL POPULATION WITH ACCESS TO SANITATION SERVICES
(Percentages of the total population)



Source: United Nations, Millennium Development Goals Indicators Database [online] <http://unstats.un.org/unsd/mdg/Default.aspx>, on the basis of figures provided by the World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF).

Note: It was not possible to calculate the gaps for Antigua and Barbuda, Belize, the Bolivarian Republic of Venezuela, Dominica, Guyana, Panama, Saint Lucia and Suriname, owing to lack of data.

The definition of “access to sanitation services” for statistical purposes varies widely. Also, although not taken into account explicitly in the indicators of target 7.C, there are issues such as sewage treatment, service quality and access to financing which are inextricably linked to improvements in sanitation services and the related environmental benefits.

An increasingly pressing problem in the region is the pollution of surface and groundwaters and of the seas and coastal areas owing to emissions of organic, industrial and mining waste. In most cities, which are home to a large proportion of the population, sewage is dumped into rivers and the sea with various degrees of treatment, and sometimes untreated, which represents a heavy organic burden and can lead to the eutrophication of lakes and pools. Furthermore, depending on the effectiveness of each country’s regulatory framework, industries and mining activities may dump their liquid waste into surface watercourses—and even into sewers—with only partial treatment or untreated, so that pollutants ultimately reach rivers, lakes and the coastline. Owing to the use of agrochemicals and pesticides, agricultural activities also contribute to the contamination of soils, surface watercourses, groundwater tables and, through rivers, to the coastline and the oceans. The situation of beaches in Brazil—and the recreational opportunities that involve direct contact with the water—is an example of what is occurring in the region (see box IV.10).

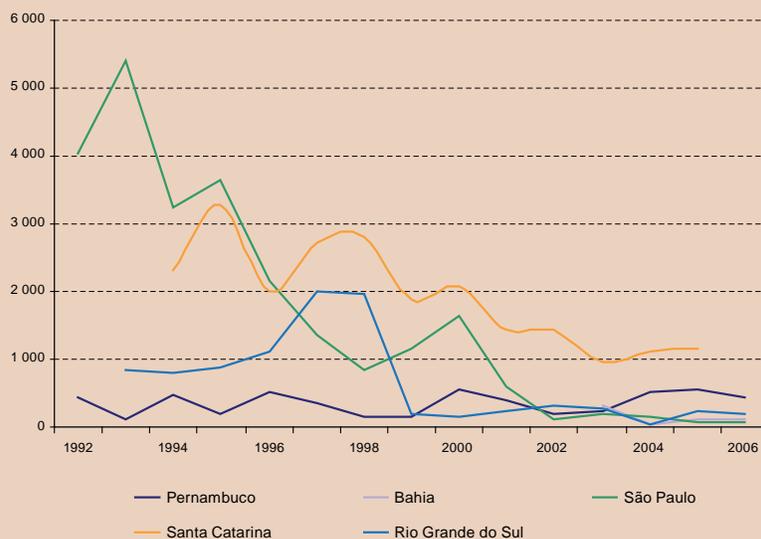
Box IV.10

HYGIENE CONDITIONS ON BRAZIL'S BEACHES

Brazil is one of the few countries in the region to have developed an official indicator for beach “swimmability”. This indicator is used to test the quality of the water with which people come into direct contact for recreational purposes in certain beaches on the Brazilian coast, but it is also important for measuring the impacts of tourist activities on sea pollution levels and threats to ecosystems that could harm sea fishing. The indicator provides a status assessment over time and supplies valuable information for socio-environmental decision-making at both the local and national levels.

One aspect revealed by the indicator is that water hygiene is poorest at the beaches closest to ports and urban areas. This is mainly the result of economic activity and the physical characteristics of bays, where water is refreshed less. In certain Brazilian cities, swimmability indicators for 1992-2006 show an improvement in water quality (see figure), thanks to enhancements made to sewage collection and treatment systems.

BRAZIL (SELECTED STATES): ANNUAL AVERAGE OCCURRENCE OF FAECAL COLIFORMS, ESCHERICHIA COLI OR ENTEROCOCCUS, 1992-2006
(MPN^a or CFU^b per 100ml of water)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of information from the Brazilian Geographical and Statistical Institute (IBGE).

^a Most probable number of coliforms.

^b Colony-forming units.

For Rio de Janeiro, one of the cities with the highest visitor numbers, swimmability is improving (see table). For instance, the index shows that hygiene conditions at Grumari beach have been favourable since 1995 and Flamengo beach, although still unsuitable for swimming, shows improving water quality from 2000 on. Conditions in Copacabana are more variable, and the indicator improved substantially from 2,200 in 1995 to 300 in 2005 (for 80% of samples in both cases).

Box IV.10 (concluded)

RIO DE JANEIRO: “SWIMMABILITY” OF BEACHES, 1995-2005
(Swimmability index^a)

Beach	1995	1997	2000	2005
Grumari	198	80	230	50
Copacabana	2 200	1 300	350	300
Flamengo	13 000	23 000	7 600	7 000

■ Suitable for swimming
■ Unsuitable for swimming

Source: Brazilian Geographical and Statistical Institute (IBGE), *Indicadores de desenvolvimento sustentável 2008*.

^a This indicator measures the number of bacteria in the beach water, based on the most probable number of faecal coliforms in 100ml of water (MPN/100ml) or the number of colony-forming units of *Escherichia Coli* or *Enterococcus* per 100ml of water (CFU/100ml). Beaches where 80% or more of the water samples collected at the same site, in each of the previous five weeks, have fewer than 1,000 faecal coliforms, 800 *Escherichia coli* or 100 *Enterococcus*, are considered suitable for swimming.

In the late 1990s, only 14% of sewage from households connected to sewerage networks received some degree of treatment. Taking into account the fact that in 1962, only about 10% of sewerage systems in the region's countries that were most advanced in this respect had facilities for sewage treatment, it is clear that the situation did not improve significantly in the space of almost 40 years. In recent years, however, considerable progress has been made. By the mid-2000s, an estimated 28% of sewage was being treated at the regional level (Lentini, 2008). Figures vary widely across the region, but Chile and Uruguay are noteworthy with treatment figures close to 70%.²⁹ The situation in the region is significantly better than in earlier decades, but this is mostly due to improvements in Chile and, to a lesser extent, in Brazil, Colombia and Mexico (Lentini, 2008).

Box IV.11 describes an innovative experience in waste-water management and treatment in Ecuador, using local resources and at the same time generating income for local communities.

Box IV.12 describes activities conducted by a number of stakeholders in the Panama City and Bay Sanitation Project.

In sum, the main challenges for the attainment of the targets relating to drinking water and sanitation are as follows: (i) to increase the supply of drinking water and sanitation services to rural areas and low-income groups; (ii) to improve service quality in respect of issues such as continuity and drinking-water quality control; (iii) to expand the treatment of urban sewage; and (iv) ensure the sustainability of services in light of the growing competition for water, the destruction of catchment basins, water contamination and the effects of climate change. Future advances in this respect largely depend on governments' capacity to deal with two critical issues: (i) to improve the financial situation of the sector, which would entail moving towards self-financing rates, increased budgetary allocations and the creation of an effective subsidy system for the poor; and (ii) improving regulatory, contractual and institutional frameworks, including the industrial organization of the sector (see chapter VI).

²⁹ In Chile, the coverage of urban sewage treatment rose from 8% in 1989 to 21% in 2000 and 82% in 2007. It is expected to approach 100% in the near future.

Box IV.11

**MANAGEMENT AND TREATMENT OF SEWAGE WITH AQUATIC LENTIL,
WATER LETTUCE AND REEDS IN ECUADOR**

This project conducted in Ecuador was a finalist in the 2006-2007 Contest: Experiences in social innovation in Latin America and the Caribbean, organized by the W.K. Kellogg Foundation and ECLAC. The initiative originated in San Rafael de la Laguna parish, Imbabur province, and aimed to improve the treatment of wastewater being emptied into the San Pablo lake, also known as Lake Imbakucha.

Pollution in Lake Imbakucha had worsened considerably since 1999, as a result of solid and liquid waste discharge from the sewers of surrounding residential areas, tourist resorts and flower industries. Septic tanks had collapsed owing to lack of maintenance. Ninety per cent of wastewater was being emptied untreated into the lake, affecting the production of reeds (which are essential for income generation) and the health of the people living by the lake.

The aim of the project was to introduce a wastewater management system and create community businesses to help strengthen income generation using the area's resources. The initiative was driven by the municipality of Otavalo, the Center for Pluricultural Studies (CEPCU) and the Project for the Development of the Indigenous and Afro-Ecuadorian people of Ecuador (PRODEPINE), which attests to the interest of the local authorities in solving this problem.

The sustainable development not only of the natural area around the lake but also of economic activities carried out by the region's inhabitants (including agriculture, livestock and reeds-based crafts and tourism) had been damaged by the pollution.

The project stakeholders opted for a system of wastewater management using aquatic plants and reeds. This type of vegetation has properties that helped to clean the wastewater without using electric power. The conservation gains resulted in new resources that could be channelled into community enterprise for boosting the income of local people, such as the production of humus, animal feed and the reuse of water.

Source: Economic Commission for Latin America and the Caribbean (ECLAC), Network for Interchanging and Disseminating Successful Experiences for Achieving the MDG (IDEEA-MDGs) [online] <http://ideea.cepal.org/ideea/ideea.htm>.

Box IV.12

**CLEANING UP THE BAY OF PANAMA AND PANAMA CITY:
THE EFFORTS OF VARIOUS STAKEHOLDERS**

The increasingly intensive shipping traffic on the Panama Canal, the rise in the urban population, the construction boom over the past two decades and other factors have pushed up water consumption and the generation of wastewater. This has obliged the Panamanian authorities to make strenuous efforts to clean up the city's water and sewerage system and prevent further pollution of the water of the bay. The sanitary conditions of the sea have been worsening, with an estimated 40 million tons of untreated wastewater being emptied into natural waterways every year, which is the equivalent of 30 million gallons per day (MGD) or 1,300 litres per second.

In order to tackle water pollution, new provisions were introduced under which developers of new projects must build their own sewerage networks and systems to treat wastewater before it is emptied into bodies of water (usually the sea). To remedy the major pre-existing problem, the large-scale Master Plan for Cleaning Up the Bay of Panama was devised, covering around 350 km² and five rivers and 65 sub-basins. The project also offers other environmental advantages, such as the construction of a methane collection plant that generates some of the electricity used to power the wastewater collection plant.

The project's feasibility study was carried out in 1998, and implementation began in the early 2000s. By mid-2009, 30% of the work had been completed, and the rest is expected to be finished in about five years. The largest part of the project is the wastewater treatment plant.

Box IV.12 (concluded)

Many national and international institutions have contributed to the project. In 2007, for instance, the Government of Panama concluded the PA-P1 loan agreement with the Government of Japan (through the Japan Bank for International Cooperation (JBIC)), to partially finance the project to clean up the Bay of Panama and Panama City. This agreement concerns the second phase of the first stage and the works for the conveyance of wastewater from Panama City (interceptor system).

Source: Inter-American Development Bank (IDB)/World Tourism Organization (UNWTO)/United Nations Development Programme (UNDP), Trade and Leisure; Panama Institute of Tourism, “Análisis diagnóstico general del turismo en Panamá; Plan maestro de turismo sostenible de Panamá 2007-2020 [online] http://www.atp.gob.pa/documentos/Analisis_Diagnostico_General_del_Turismo_en_Panamá.pdf, May 2008; Ministry of Health of Panama, “Proyecto para el saneamiento de la ciudad y bahía de Panamá” [online] <http://www.minsa.gob.pa/minsa2004/saneamiento/proyecto.htm>; “Saneamiento de bahía de Panamá tiene 30% de avance y estará listo en 5 años” [online] http://www.soitu.es/soitu/2009/06/03/info/1243993750_347844.html, 3 June 2009.

E. IMPROVING THE LIVES OF AT LEAST 100 MILLION SLUM DWELLERS

Target 7.D

By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers.

1. Indicator 7.10: proportion of urban population living in slums³⁰

Although the period from 1990 to 2005 saw decreases in the numbers of slum dwellers and in the percentage they make up of the region’s urban population, over 100 million people in Latin America and the Caribbean are still living in unacceptable conditions.

Estimates by the United Nations Human Settlements Programme (UN-Habitat), which makes such calculations for all Member States of the United Nations, the proportion of the urban population of Latin America and the Caribbean living in slums fell from 37% in 1990 to 25% in 2005, while the total numbers declined from 110 million to 106 million during the same period (see table IV.9). Figure IV.31 shows the situation country by country.

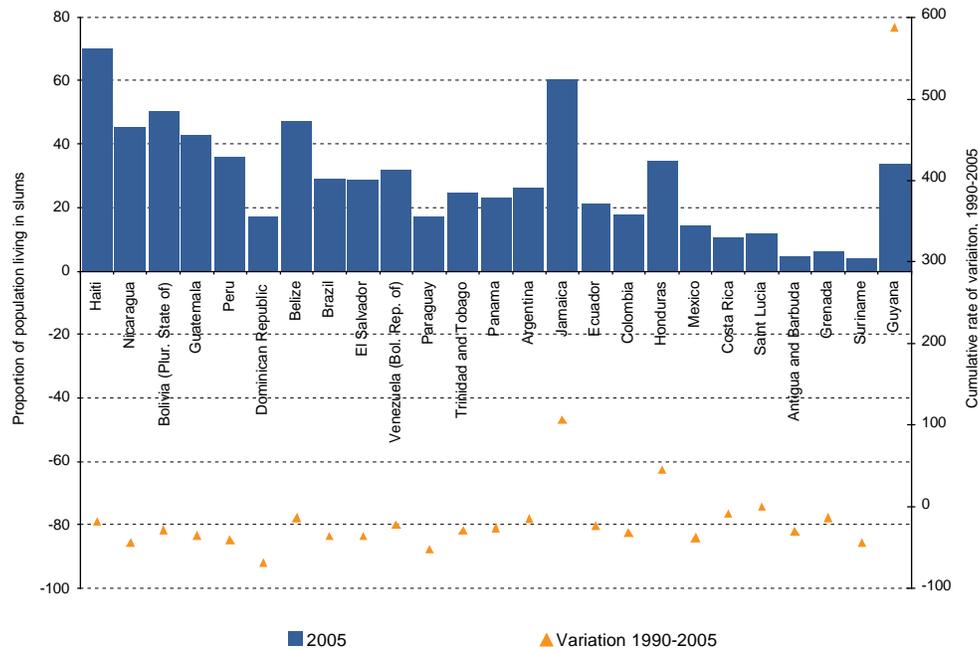
Table IV.9
LATIN AMERICA AND THE CARIBBEAN: URBAN POPULATION LIVING IN SLUMS

Urban population living in slums	1990	2005	Variation 1990-2005 (percentages)
Proportion of the population living in slums (percentages)	37.09	25.49	-31.27
Slum dwellers (millions)	110	106	-3.81

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of United Nations, Millennium Development Goals Indicators Database [online] <http://unstats.un.org/unsd/mdg/Default.aspx>; figures for Latin America provided by the Latin American and Caribbean Demographic Centre (CELADE) - Population Division of ECLAC; figures for the Caribbean countries provided by the United Nations Population Division [online] <http://www.un.org/esa/population/publications/pdewallchart/popenvdev.pdf>.

³⁰ According to United Nations metadata, a deprived slum-dwelling household is defined as a group of persons living under the same roof and lacking one of the following: access to improved sources of drinking water, access to improved sanitation, sufficient living area, durability of the housing occupied by the household and security of tenure. This indicator is calculated using the ratio of the urban population living in deprived slum housing to the total urban population.

Figure IV.31
**LATIN AMERICA AND THE CARIBBEAN (SELECTED COUNTRIES): PROPORTION OF URBAN
 POPULATION LIVING IN SLUMS, 1990-2005^a**
(Percentages)



Source: United Nations, Millennium Development Goals Indicators Database [online] <http://unstats.un.org/unsd/mdg/Default.aspx>, on the basis of figures provided by the United Nations Human Settlements Programme (UN-Habitat).

^a No data available for Bahamas, Barbados, Chile, Cuba, Dominica, Saint Kitts and Nevis, Saint Vincent and the Grenadines or Uruguay.

The economic growth of the period 2000-2005, together with redistributive social policies and urban and housing programmes specifically targeting slums, such as Chile-Barrio, Favela-Barrio, and Hábitat-México, did much to bring about that reduction, which contrasts with the growth in the numbers of slum dwellers during the 1990s. The current economic crisis, however, could set the region back in relation to target 7.D. Accordingly, the efforts needed from the Latin America and the Caribbean governments in order to attain that target within the next 10 years represent more than triple the progress achieved in the first half of the designated period.

That said, the deadline for achieving the target is longer than for the other indicators of Goal 7, since it extends to 2020. Furthermore, the target was set globally: to reduce the number of slum dwellers by 100 million in the world as a whole. Since there is no regional target, only a worldwide one, and the indicators do not state what part of the target relates to which geographical area, the target for Latin America and the Caribbean has been set in terms of its population as a proportion of the planet-wide total. Taking that proportion and applying it to the numbers provided for in the target, it follows that the reduction in the region's slum dwellers should be some 13.8 million (Quiroga, 2007).³¹

³¹ Statistics from United Nations-Habitat show that in 2001 there were about 940 million slum dwellers worldwide, 128 million of whom were in Latin America and the Caribbean, making up 13.8% of the world's urban slum-

Caution must therefore be exercised in interpreting the results of this indicator in the region. Although there has been progress towards fulfilment of the target, that target is still modest, since it represents fewer than 11% of the region's slum dwellers. Thus, the target appears to be insufficient, particularly in relation to the human right to which it is most closely linked, which is the right to housing (see chapter I). A target which excludes around 90% of slum dwellers and encompasses the housing needs of only a limited group of people would seem to be contrary to States' obligation to provide a minimum level of security of tenure and housing for all (OHCHR, 2008).

Socio-economic disparities and asymmetries in the region are reflected in the structures of cities, where large urban areas offering access to all types of goods and services coexist with others racked by deprivation, informality and poverty, often because of inadequate urban land management systems. A central issue in this regard is lack of resources. In the region as a whole and in each of the countries, social spending on the "housing and other" item³² is the smallest in the health, education and social security budget.³³ In per capita terms, social public spending on "housing and other" represents less than 10% of total public spending.

The growth of the urban population has created peripheral areas of informal settlements, usually in inappropriate locations such as flood lands or high slopes, putting pressure on the physical and natural environment. Furthermore, owing to the inappropriate disposal of solid and liquid waste and industrial pollution, the urban population living in informal settlements is particularly vulnerable to environmental problems such as air and water pollution (UNEP, 2003b).

Experience shows that improving the quality of life of slum dwellers requires the application of a combined anti-poverty and anti-deprivation strategy which takes an integrated approach to slum dwellers' needs in terms of housing, employment and income, essential services and infrastructure, public spaces and secure tenure. Concerning tenure, the region's poor have historically faced major challenges in accessing urban land, since few legal mechanisms exist to afford them access in a "regular" manner. The strict requirements established in some countries in relation to the minimum size of plots of land and provision of infrastructure and equipment have pushed up land values, further restricting access to the formal or legal land market for the region's poor. This makes it hard for them to buy plots of land to build housing unless financing mechanisms exist for that purpose. For decades, this has resulted in people squatting on the land in order to settle in the cities (see box IV.13).

dwelling population. Given that relative proportion, the region should reduce its slum dwellers by 13.8 million as its contribution to the attainment of the worldwide target.

³² "Other" items include urban development, drinking water, street lighting and community services.

³³ For example, in the bienniums 1990-1991 and 2005-2006 social public spending on housing varied between 1.2% and 1.4% of GDP, respectively (ECLAC, 2009a).

Box IV.13

LIVING CONDITIONS IN THE METROPOLITAN AREA OF PORT-AU-PRINCE

Cité Soleil, in the centre of Haiti's capital Port-au-Prince, is considered to be the largest slum in the Caribbean and has grown out of a process of rapid, unchecked urbanization. It is also the direct consequence of a lack of urban policies for promoting a better distribution of the Haitian population throughout the territory, rather than only in the few major cities (and the capital in particular). The proportion of urban population in Haiti has thus grown from 25% in 1982 to 40% in 2003. The unplanned rapid growth in low-income population in urban areas has contributed to the formation of high-density settlements, generating huge pressure on scarce utilities and limited city infrastructure. Cité Simone, which was named after the wife of François Duvalier (President of Haiti from 1957 to 1971), was established in 1960 to house workers from rural areas. According to the Haitian Institute of Statistics and Information Sciences, its population numbered 48,321 in 1982. Six years later, the population had increased by over 286%, according to a census conducted by the United Nations Development Programme (UNDP), which estimated the population at 186,620. Cité Simone was renamed Cité Soleil in 1986.

In the 1980s, the economic crisis prompted thousands of people from rural areas to head for the capital in the hope of a better future. Moving to Port-au-Prince was perceived as a way of escaping poverty. Most rural households in Haiti make a living from small-scale farming or livestock activities. However, severe environmental degradation and deforestation have reduced the already limited area of arable land. Furthermore, the frequent weather disasters reduce productivity and often leave rural workers unemployed or with an extremely low income.

Over the years, the country has developed in such a way as to leave a marked imbalance between urban and rural areas. Indeed, 90% of Haiti's industries are located in the capital, which explains why 60% of the urban population live there too.

The establishment of export processing zones (EPZ) in the metropolitan area has also played a major role in the rural exodus. At the beginning of the 1970s, the assembly industry directly generated 2,000 jobs, rising to 43,000 in 1986 and 55,000 in 1988. More recently, in July 2009, former United States President Bill Clinton expressed optimism concerning an export processing zone project in the area of Cité Soleil, which he presented during his first visit to Haiti as Special Envoy of the United Nations.

Rural exodus to the metropolitan area of Port-au-Prince has caused the urban population to expand rapidly, further worsening the living conditions of the thousands of Haitians who live in Cité Soleil. Two elements have contributed to this situation: the limited space available and the poor quality of construction. Besides this, the area's original infrastructure was very weak, and the availability of basic social services very limited. Over time, these slums grew up unauthorized, in unsafe sites, coastal areas and industrial zones. This extremely rapid urbanization process has exacerbated the situation, since it lacked adequate development and improvement of utilities (particularly systems for water supply, refuse collection and sewerage).

Cité Soleil, which covers a mere two squared kilometres, is estimated to be home to between 200,000 and 350,000 people. In 2003, average population density in Haiti was 206 inhabitants per km², but Port-au-Prince has the highest in the country: 4,000 inhabitants per km².

In Cité Soleil, thousands of people live in extremely unsanitary and crowded conditions. Access to drinking water, sewerage and sanitation and public safety are the main causes of concern. All imply serious public health problems and help to spread diseases such as malaria, tuberculosis, infections and diarrhoea. One of the most vulnerable groups are children aged under five and, of all children, 90% are too poor to attend school.

In the metropolitan area of Port-au-Prince, 92% of households lack access to electricity, compared with the national average of 31.6%. Drinking and running water is a serious concern, as only one third of the country's households and a fifth of those living in slum areas have access to this resource.

Source: "Analyse de la situation de l'habitat en Haïti" [online] <http://www.cepis.ops-oms.org/bvsasv/e/diagnostico/Haiti.pdf>, June 2000; International Committee of the Red Cross, "Dossier presse" [online] [http://www.icrc.org/Web/fre/sitefre0.nsf/htmlall/haiti-dossier-011105/\\$File/haiti_dossier_presse.pdf](http://www.icrc.org/Web/fre/sitefre0.nsf/htmlall/haiti-dossier-011105/$File/haiti_dossier_presse.pdf), 2005; Irma Tirada de Alonso, *Trade issues in the Caribbean*, 1992; Haitian Institute of Statistics and Information Sciences [online] http://www.ihsi.ht/haiti_en_chiffre.htm; Haitian Institute of Statistics and Information Sciences, "Housing and Infrastructure" [online] <http://www.ihsi.ht/pdf/ecvh/ECVHVOLUMEI/logement.pdf>, 2003.

F. CROSS-CUTTING COMPLEMENTARY ISSUES

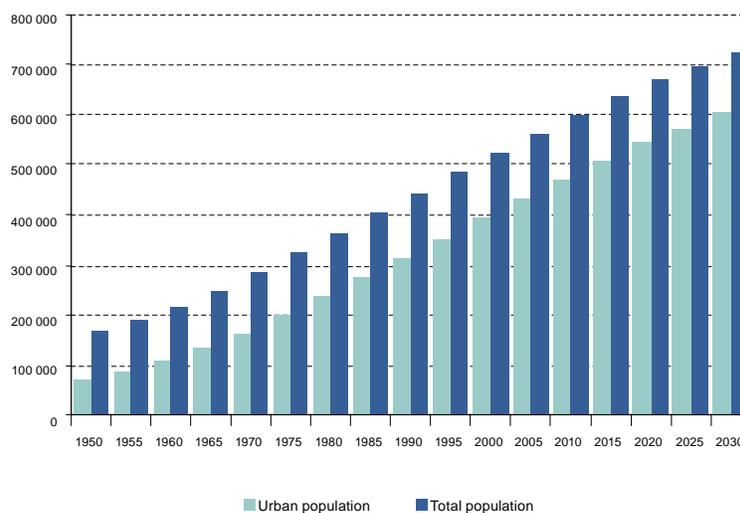
1. Sustainability and eco-efficiency of cities

The slum problem to which target 7.D relates is part of the broader challenge of ensuring the sustainability of cities in Latin America and the Caribbean. Also, some of the problems discussed in relation to advances towards the indicators of Goal 7 are linked to urban behaviour patterns.

Urban sustainability is that set of conditions of habitability and functionality which makes it possible to disconnect urban growth from environmental pollution, providing urban dwellers with an acceptable quality of life without endangering the ability of future generations to satisfy their own needs. In terms of concrete measures, this means controlling urban expansion, ensuring appropriate land use, and upgrading the city, as well as promoting access to energy and to sources of safe water, sustainable management of resources and waste, protection of the natural and cultural heritage, and improved transport accessibility and efficiency, all as part of an integrated approach. Urban sustainability is closely linked to the eco-efficiency of cities, which is about reducing ecological impact per spatial unit in the life cycles of urban processes. In practice this means rehabilitating urban areas and adopting infrastructure and housing construction techniques to make more efficient use of natural resources and energy.

Around 75% of the people of Latin America and the Caribbean live in urban areas, which is the legacy of a powerful and largely unplanned process of migration towards the development poles in urban areas. In recent years, this process has been expanded by intra-urban migration and the organic expansion of informal human settlements (Baeza, 2007) (see chapter II). In South America, the level of urbanization is 79.8%, in Meso-America 67.3% and in the Caribbean 63%. It is expected that by 2020 the region's urban population will have risen to 526 million, or 80.4% of the projected population (see figure IV.32).

Figure IV.32
LATIN AMERICA AND THE CARIBBEAN: URBAN POPULATION BY FIVE-YEAR PERIOD, 1950-2030
(Thousands of persons)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), ECLAC Social Indicators and Statistics Database (BADEINSO) [online] <http://websie.eclac.cl/sisgen/cosultatitegrada.asp>, on the basis of the Latin American and Caribbean Demographic Centre (CELADE) - Population Division of ECLAC.

The areas that come under urban development policy include the aforementioned problems of pollution, slums, drinking water and sanitation, but also urban transport, solid waste and green spaces, which are discussed below.

(a) Urban transport

Both large and medium-sized towns in the region face serious challenges regarding eco-efficient transport systems and mass transit services. To a great extent, urban public transport remains ineffective in many cities, where the large and growing numbers of private vehicles causes traffic problems. The social dimension is particularly pertinent here, since the poorest population groups suffer the most from the lack of investment in public transport.

In addition to the pollution issue, rising motorization rates in cities have caused another significant environmental problem: high and rising levels of traffic congestion, with its negative impact on travel times and quality of life in urban areas. Between 1990 and 2007, motor vehicle ownership in the region, in terms of vehicles per person, rose from 0.08 to 0.17 (see figure IV.33); in other words, one vehicle for every five people.³⁴

Figure IV.33
**LATIN AMERICA AND THE CARIBBEAN (SELECTED COUNTRIES):
 MOTORIZATION RATE, 1990-2007^a**
(Number of automobiles per person)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), statistical database of social, economic and environmental indicators for Latin America and the Caribbean (CEPALSTAT) [online] <http://websie.eclac.cl/sisgen/ConsultaIntegrada.asp>.

Note: Annual rate of variation 1990-2007: 6.59%.

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

³⁴ In the European countries the proportion is one for every two people. See Statistical Office of the European Communities (EUROSTAT) [online] <http://epp.eurostat.ec.europa.eu/portal/page/portal/transport/data/database#>.

Soaring numbers of motorcycles, a private response to ineffective public transport policies in most of the cities of the region, are also a cause for concern. As well as worsening traffic congestion, owing to the lack of proper infrastructure and education in their proper use, they have led to an increase in the numbers of road accidents, and motorcycle riders have the highest rates of accidental death in Latin America and the Caribbean.

Promoting eco-efficiency in the design and construction of urban areas and their public-transport infrastructure is part of the response to the challenge of environmental sustainability and development in the region, especially in the current context of climate change (see chapter III). The challenge is to improve air quality and ensure transport for passengers and freight. One notable scheme in this context is the Transmilenio programme in the city of Bogota, whose rapid bus transit system has helped to reduce travel times and operating costs. It has also cut back on emissions of atmospheric pollutants thanks to the replacement of the public-transport fleet. The programme has led to improved efficiency in the city's transport system (UNEP, 2009a).

Internal transport —mostly urban but also rural— is a vitally important to improve social inclusion and environmental sustainability. Public policies, right from the formulation stage, should therefore take into account the negative externalities generated by each form of transport. These may be environmental, social or both, such as pollution, time lost owing to congestion or badly designed public transport and road transport systems. This is in addition to the connectivity and mobility needed to provide all inhabitants, especially the poorest population groups and the rural population, with access to basic education and health services. This is vitally important for the attainment of this particular Millennium Development Goal as well as the other Goals.

As for freight transport, cost overruns resulting from the lack of adequate infrastructure in terms of quality and quantity, failures of logistics and intrasectoral coordination, in both the private and the public sectors, as well as the lack of intelligent transportation systems in support of extractive and productive processes, have not only environmental implications owing to increased levels of emissions produced by transport systems, but also economic and social repercussions, particularly for the poorest population groups, who pay higher prices for products because of inefficient transport. Solving this problem requires States to take action to create the necessary conditions to reduce transport and logistical costs, in terms of both infrastructure and regulation, ensuring that the resulting savings are passed on to end users in order to improve their purchasing power and standard of living.

(b) Solid waste

Latin American and Caribbean cities are producing growing quantities of solid waste, whose improper disposal is leading to increasingly complex problems. Unlike in the developed countries, domestic and hospital waste and industrial solid waste, far from decreasing, are growing in volume year by year and are being disposed of in ways which are inappropriate and generally risky in most of the region's countries and territories. The production and incorrect management of such waste carry significant social and environmental costs, direct and indirect, especially for urban communities. At the regional level, it is estimated that 45% of all waste ends up in open dumps or in navigable waterways such as rivers, lakes or seas (PAHO, 2005b). There is also little awareness of the potential of solid waste to generate employment and energy. The situation of the Bolivarian Republic of Venezuela serves to illustrate this situation (see box IV.14).

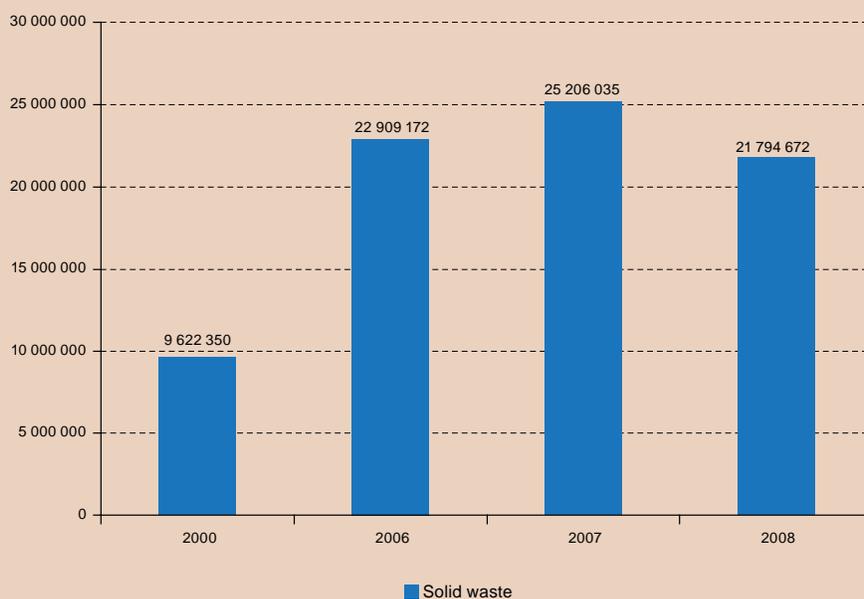
Box IV.14

SOLID WASTE IN THE BOLIVARIAN REPUBLIC OF VENEZUELA

Solid waste is one of the world's most enduring environmental problems, even in industrialized countries. In Latin America and the Caribbean, a lack of administrative records on the destination of such waste makes it difficult to monitor the situation over time.

The National Statistical Institute of the Bolivarian Republic of Venezuela periodically produces statistical information on solid waste, on the basis of surveys disaggregated by federal entity. As shown in the figure below, between 2000 and 2008 the amount of solid waste increased from just under 10 million kg per day to 25 million kg per day. The country has an infrastructure of 198 sanitary landfills, 204 waste-disposal sites and 1,888 open dumps for the waste collected nationwide.

BOLIVARIAN REPUBLIC OF VENEZUELA: SOLID WASTE RECORDED IN 2000-2008
(Kilogrammes per day)



Source: National Statistical Institute of the Bolivarian Republic of Venezuela.

The levels of coverage of both collection and recycling are key aspects of waste management. In 2006, 69% of the urban population was connected to a direct waste collection service and 10% had access to indirect facilities. In other words, almost 80% of the population had access to waste disposal services of some sort. In the Bolivarian Republic of Venezuela, the largest volumes of recycled solid waste correspond to aluminium and iron (311,305 kg per day), plastic (231,966 kg per day), paper and cardboard (165,048 kg per day) and glass (86,591 kg per day).

As far as solid waste management is concerned, one of the policy priorities of the Ministry of the Environment is to close open dumps and build sanitary landfills. Accordingly, integrated solid waste management projects are strategically important for setting up new territorial structures and properly managing waste-disposal sites and sanitary landfills. The Bolivarian Republic of Venezuela therefore established physical targets for 2007, such as the cleaning and closure of seven waste-disposal sites, cleaning and conversion to sanitary landfill of another 29 sites, related studies and projects and supplementary works to help achieve the targets, based on appropriate and timely provision of information that meets the needs of the population.

Source: National Statistical Institute of the Bolivarian Republic of Venezuela, "Registro administrativo de las Alcaldías a nivel nacional", Caracas, Gerencia de Estadísticas Ambientales, 2008.

In some places, poor solid waste management has gone hand in hand with situations of extreme poverty, and as a result entire communities are dependent on open-air dumps. Box IV.15 describes an experiment which succeeded in changing that situation.

Box IV.15
**SOCIAL DEVELOPMENT PROGRAMME FOR THE SAMBAIATUBA
 ENVIRONMENTAL PARK IN BRAZIL**

In 2002, a solid-waste disposal site known as the Sambaibatuba dump was closed after more than 30 years of receiving waste from various areas, which affected the ecosystem of the surrounding area and contaminated the groundwater. Many families lived in unhealthy and degrading conditions from collecting the refuse deposited in the dump. Closing the site raised a series of social and environmental challenges for the municipality of São Vicente (State of São Paulo). One of the most significant challenges was to reintegrate children into family life, school and community centres.

With regard to the environment, since 1997 the municipal prefecture of São Vicente and the São Vicente Development Company (CODESAVI) have been working on a variety of actions that culminated on 1 April 2002 with the closure of the dump and the opening of the Sambaibatuba environmental park. All of the necessary safety measures were taken to recover this lost and desolate area, which gradually became a leisure site offering gardens, nurseries for plants being brought on for landscaping town squares, recovery of endangered species, sports facilities, an environmental education school, a community vegetable garden and a project think-tank to help the collectors who used to make a living from the recyclable waste of the former dump.

CODESAVI has carried out a number of schemes directly related to waste treatment and recyclable materials, and has also managed the creation of small-scale projects to educate people on environmental issues, such as the environmental education school, the urban landscaping project, composting tree and plant prunings and clippings for fertilizer, an educational market garden and a hydroponic garden.

Source: Economic Commission for Latin America and the Caribbean (ECLAC), Network for Interchanging and Disseminating Excellent Experiences for Achieving the MDG (IDEEA-MDGs) [online] <http://ideea.cepal.org/ideea/ideea.htm>.

(c) Urban greening

The vast majority of the cities of Latin America and the Caribbean do not comply with the minimum area of green spaces per capita recommended by the World Health Organization (UNEP, 2004). WHO recommends nine square metres of green spaces per inhabitant and urban design which ensures that those spaces are no more than 15 minutes' walk from housing.

Furthermore, green spaces are not distributed equitably within the cities. Higher-income urban districts usually have a greater area of green spaces, which are also of higher quality. This is an obvious distributive problem, since green spaces not only serve as places for leisure and recreation, but also perform essential environmental and ecological functions such as improving climatic conditions, reducing air contamination and noise pollution and helping to reduce surface runoff of rainwater. Metropolitan Santiago (Chile) exemplifies this situation (see box IV.16).

Box IV.16
GREEN AREAS IN SANTIAGO, CHILE

Santiago has an average of just 3.4 m² of green areas per inhabitant today —just 38% of the amount recommended by the World Health Organization (WHO). Furthermore, the distribution of green spaces is very unequal among rich and poor areas. While high-income sectors have green areas of up to 40 m² per inhabitant, sectors with the highest percentage of low-income persons have just 2 m² per inhabitant.

METROPOLITAN AREA OF SANTIAGO

Percentage of population in quintiles I and II according to the district census

M² of maintained green areas per inhabitant (2006)



Source: Ministry of Housing and Urban Affairs, Chile.

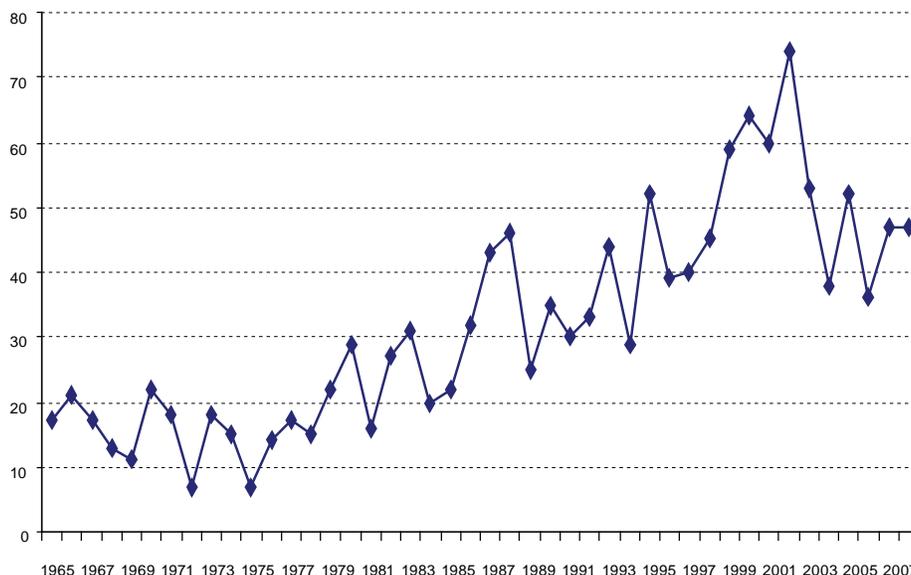
Increasing the availability of green spaces has been made one of the three pillars for updating the Metropolitan Master Plan for Santiago, whereby there are proposals to reserve 3,900 hectares for parks and gardens, both on the outskirts and in low-income inner-city areas. Accordingly, property developers will be required to create green spaces in order to gain permits to build projects in the 5,663 hectares that are scheduled to be incorporated into the urban area and the 873 hectares of urban industrial areas that will be converted to mixed residential use.

Source: Ministry of Housing and Urban Affairs, Chile, *Memoria Plan Regulador Metropolitano de Santiago*, Chile, 2008.

2. Extreme weather events and natural disasters

As a result of climate change, Latin America and the Caribbean has seen an increase in the frequency and intensity of extreme weather events and natural disasters. Proactive disaster response measures should therefore include risk management and reduction: prevention rather than reaction and response. Financial considerations, risk insurance and investment instruments should play a major role in reducing the risks which, judging by available evidence, will become more numerous, global and severe (see figure IV.34). Such events also show up the vulnerability of human systems.

Figure IV.34
LATIN AMERICA AND THE CARIBBEAN: OCCURRENCE OF EXTREME WEATHER EVENTS AND DISASTERS
(Number of events)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Environmental Statistics and Indicators Databases (BADEIMA), on the basis of Centre for Research on the Epidemiology of Disasters (CRED), Emergency Events Database (EM-DATA) [online] <http://www.emdat.be/Database/terms.html>.

Changes regarding extreme weather events are of particular concern in the Caribbean; between 1950 and 2007, more people in that subregion were affected by natural disasters such as floods, droughts and tropical cyclones than anywhere else in the world.³⁵ In 2008, for example, a tropical storm and three hurricanes cost the lives of 350 people and caused losses to 2.8 million (UNEP). In the past three decades, the Caribbean has recorded direct and indirect losses of the order of US\$ 700 million and US\$ 3.3 billion, respectively, owing to disasters caused by natural phenomena (IDB, 2000).

³⁵ See Centre for Research on the Epidemiology of Disasters (CRED), Emergency Events Database (EM-DATA) [online] <http://www.emdat.be/Database/terms.html>.

The evidence from 36 years of disaster assessment by ECLAC show that these events have had high costs in terms of their human impact and their effects on economic conditions in Latin America and the Caribbean. They have cost over 114,000 lives and afflicted some 46 million people, mostly in social groups whose living conditions were already insecure in terms of housing, income, education and other services. The negative socio-economic effects are caused not only by physical destruction of property, assets, infrastructure and inventory, but also by the losses and unplanned expenditures resulting from damage (see table IV.10 and figure IV.35).

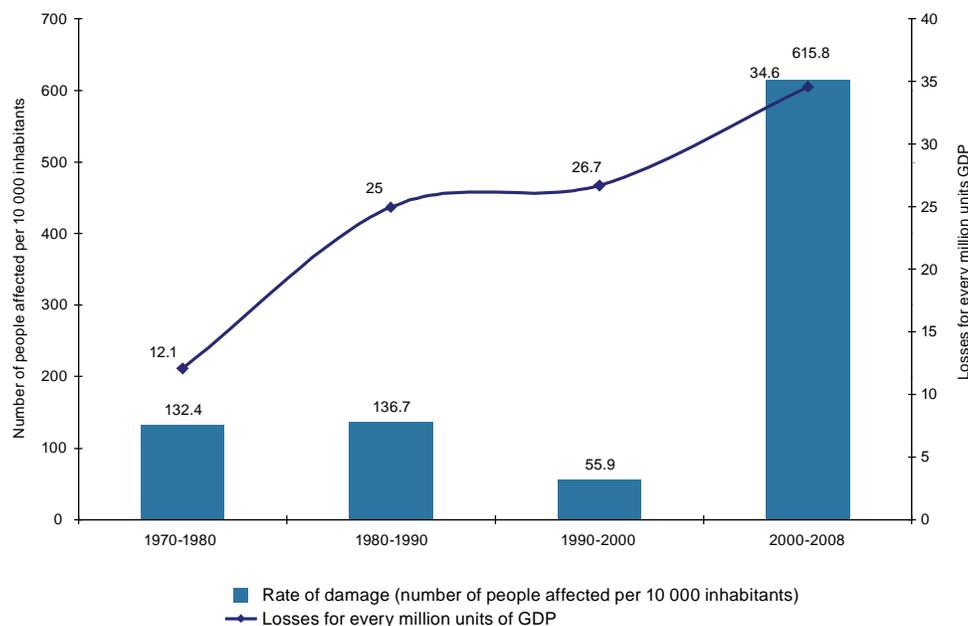
As can be seen in table IV.10 and figure IV.35, the rate of damage by number of inhabitants and the losses per million units of GDP have risen significantly in the last decade.

Table IV.10
LATIN AMERICA AND THE CARIBBEAN: DISASTER IMPACT FIGURES, 1970-2008

Period	Deaths	Population directly affected	Losses (millions of dollars at current prices)	Population (number of inhabitants)	GDP (dollars at current prices)	Fatality rate (deaths per 10.000 inhabitants)	Damage rate (people affected per 10.000 inhabitants)	Losses per million units of GDP (percentages)
1970-1980	38 042	4 229 260	2 639 038	319 522 500	218 369 670 927	1.19	132.4	12.1
1980-1990	34 202	5 442 500	11 719 490	398 132 500	469 427 206 614	0.86	136.7	25.0
1990-2000	32 965	2 671 888	25 074 439	478 286 500	938 967 269 181	0.69	55.9	26.7
2000-2008	9 384	33 641 911	52 470 791	546 287 000	1 517 244 429 123	0.17	615.8	34.6

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

Figure IV.35
LATIN AMERICA AND THE CARIBBEAN: ECONOMIC AND SOCIAL IMPACTS OF DISASTERS



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

Such events have a severe human impact in terms of casualties and the population affected, and the economic implications of lost income due to fatalities and disabilities caused by disasters are difficult to quantify. Catastrophes caused by or related to weather events are increasing in scale (see table IV.11).

Table IV.11
**LATIN AMERICA AND THE CARIBBEAN: HYDRO-METEOROLOGICAL DISASTERS
 AS A PROPORTION OF ALL DISASTERS**
(Percentages)

Period	1980-1990	1990-2000	2000-2008
Deaths	4.1	94.2	86.7
Population directly affected	82.1	78.8	94.0
Damage and losses (millions of dollars at current prices)	45.0	64.2	93.9

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

ECLAC assessments cover stocks and flows in all areas of the economy and society. The resources used for rebuilding assets and capital and for restoring economic flows are taken from other areas of investment and therefore affect current budgets, postponing the fulfilment of the Millennium Development Goals. Weather variation and climate change have led to growth in the scale of disasters over the years.

Studies by ECLAC and the Centre for Research on the Epidemiology of Disasters (CRED) estimate that from 1970 to 2008 the economic cost of disasters in Latin America and the Caribbean is equivalent to 0.34% of the region's average GDP for the period. Thus, weather disasters over those 38 years cost an average of US\$ 14.549 billion per year at 2008 prices, of which US\$ 8.591 billion corresponded to 2000-2008.³⁶

Proactive disaster response measures should therefore include risk management and reduction, and prevention rather than reaction and response. Financial considerations, risk insurance and investment instruments should play a major role in reducing the risks which, judging by available evidence, are becoming more numerous.

There are positive examples of risk reduction measures and adaptation to climate change, including financial risk-hedging instruments such as the Mexican disaster management funds: the Natural Disaster Fund (FONDEN)³⁷ and two prevention mechanisms (FOPREDEN³⁸ and FIPREDEN³⁹). Mexico

³⁶ The records of ECLAC and CRED focus only on the region's largest and most costly disasters, so the estimates do not include smaller events. See ECLAC: "Cambio Climático y Desastres en América Latina y el Caribe: Tendencias observadas y posible evolución de los desastres".

³⁷ FONDEN and the FONDEN Trust Fund are financial mechanisms involving a number of instruments and a variety of federal government agencies in responding to the damage caused by natural phenomena that surpass response capacities. The support provided by the federal programme complements the resources originally allocated to disaster response when those resources are exhausted at the state and federal levels owing to the magnitude of the disaster.

³⁸ The Natural Disasters Prevention Fund (FOPREDEN) is a preventive programme providing resources for actions designed to prevent disasters, including risk identification, mitigation and reduction, as well as promoting a culture of risk reduction, disaster prevention and self-protection.

³⁹ The Preventive Trust Fund (FIPREDEN) is a federal public trust fund whose role is to provide resources to federal departments, semi-public bodies and other entities so that they can apply necessary and urgent measures which have not been planned.

also has a parametric earthquake bond, due to mature in 2009. A similar instrument is the Caribbean Catastrophe Risk Insurance Facility (CCRIF) (see box IV.17). Some countries have partial-cover insurance for certain sectors—such as health and hospital infrastructure—which normally cover specialized buildings and inventories, but there has been little interest in financial coverage for business continuity or in increasing disaster insurance. One area needing greater technical attention is the adoption of parametric or business-continuity coverage, whether through insurance—local, subsidized, self-insurance or international reinsurance—or instruments such as bonds or negotiable derivatives.

Box IV.17

RISK INSURANCE FACILITIES

Mexico was the first country in Latin America to issue a parametric instrument, in the form of a catastrophe bond issued on 12 May 2006 for a value of US\$ 160 million, through Deutsche Bank and Swiss Re. The issue was part of an insurance programme from Swiss Re worth US\$ 450 million, intended to reduce the pressure on Mexico's federal budget and protect the Natural Disasters Fund (FONDEN) against seismic events for three years. The bonds were issued in two series—series A, for US\$ 150 million, and series B, for US\$ 10 million—and were taken up by investors in the United States and Europe, at a six-month LIBOR rate plus 230 basis points for series A and LIBOR plus 235 basis points for series B. The instrument works as an insurance and, given that the parametric trigger has not been reached, the insurance has not been activated in the three years. The Government of Mexico is considering extending it over a longer term and expanding it to cover other events, mainly hurricanes, cyclones and floods.

A similar instrument is the Caribbean Catastrophe Risk Insurance Facility (CCRIF), which is also parametric. The Facility was created in February 2007 and is operated and registered by the governments of the Caribbean Community. Given that it was designed to mitigate the financial consequences of catastrophic hurricanes and earthquakes, it insures governments by providing immediate liquidity when the facility is activated. It is the first regional insurance fund in the world, under which the governments of the Caribbean had a unique opportunity to purchase cover for earthquakes and hurricanes not available in any other way and at the lowest possible cost. The scheme represents a paradigm shift in the management of risk and placed Caribbean countries at the cutting edge of planning for disasters. The financing of the facility was brokered by the World Bank, which called a donors conference to raise the start-up capital. A total of US\$ 47 million was donated by Canada, France, the United Kingdom, the World Bank and the Caribbean Development Bank (CDB). Additional support from the European Union and Ireland is under negotiation. Japan funded the CCRIF feasibility study carried out jointly with the Jamaica Social Investment Fund (JSIF). CCRIF made two payments in 2008—its first year of operation—following an earthquake measuring 7.4 on the Richter scale that hit the eastern Caribbean on 29 November. The Government of Saint Lucia received US\$ 418,976 and the Dominican Republic received US\$ 528,021, which both countries used in the post-disaster recovery efforts. These first payments were seen as proof of the usefulness of the facility and rewarded the vision and planning on the part of the 16 member governments. The governments have fully supported the facility and have sought to make CCRIF a model risk mitigation policy and an example of Caribbean ability to innovate in the area of risk management.

Another interesting example is the insurance for banana farmers on the Windward Islands (WINCROP). The effects of hurricanes and tropical storms on banana production in these Caribbean islands have been significantly mitigated since the insurance was introduced. The policy began in August 1987 as a result of regional cooperation among the Banana Marketing Boards of Dominica, Grenada, Saint Lucia and Saint Vincent and the Grenadines. WINCROP currently provides cover against the windstorms that damage banana crops. The largest premiums correspond to 5% of sales, while payouts cover only 20% of estimated production losses. According to the annual report for 2004, between 1998 and 2004 WINCROP paid out almost US\$ 75 million to banana farmers in the four beneficiary countries. The scheme provides access to liquidity following a disaster, thereby helping farmers along the road to recovery.

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

3. Environment and health

The link between health and the environment has been discussed in this document in respect of each of the targets of Goal 7. Given the importance of that link, however, some of its key aspects are briefly discussed here from the viewpoint of advances and challenges relating to Goal 7.

(a) Urban health

The disorganized expansion of cities, especially in peripheral areas, makes it more likely that the poorest sectors of the population will live in areas which are particularly vulnerable to weather-related disasters and will have little access to basic services such as housing, electric power, drinking water, sewer systems and solid-waste disposal. There are worrisome upward trends in violence and social exclusion. Indicators of quality of life, morbidity and mortality in Latin America and the Caribbean reveal a common pattern of fragmentation, access barriers and inequities which are segmented geographically by socio-economic status, educational level and ethnic origin.

The existence of extensive urban areas and the consequent reduction of natural spaces have produced “hot spots”, where conditions breed infestation by disease vectors. The health impacts of unplanned urban growth are associated with infectious diseases —diarrhoea, dengue, respiratory disorders— and chronic illnesses, such as cancer, diabetes, obesity, and cardiovascular problems, as well as accidents and injuries.

The state of health of the urban population in Latin America and the Caribbean depends on numerous factors, including the lack of street cleaning programmes, violence, traffic congestion, homicides, obesity, urban noise and air pollution. The dynamics of urban life contribute to the spread of infections owing to the diversity and intensity of population movements and contacts and sexual behaviour. Furthermore, macroeconomic problems lead to the impoverishment of certain urban areas and a lack of equipment needed to meet the needs of the poorest groups. The growth of urban poverty and its various consequences —hunger, destitution, child and adolescent prostitution— are major and predictable elements in environmental health risks.

(b) Water and sanitation

Access to drinking water and sanitation are crucial to health. As noted earlier, waste water treatment is a major challenge in the urban environment. There is empirical evidence of high levels of nitrate and heavy metal contamination of surface water and groundwater, but systematic protection and monitoring of water sources has begun only very recently. Even so, it is not a priority area on the research agenda. Water contamination has significant effects in coastal areas, which are home to 60% of the population of Latin America and the Caribbean (UNEP, 2003b).

Per capita production of solid waste has doubled in the last 30 years, and its composition has gone from fundamentally dense and organic to massive and non-biodegradable. Although almost 90% of the waste produced is collected, 40% is not properly treated and consequently pollutes land and bodies of water (Winchester, 2005). Collection and treatment services are vitally important to human health. In Latin America and the Caribbean, child diarrhoeal deaths are still largely due to water shortages, poor water quality and lack of sanitation.

(c) Air pollution

Air quality is a basic factor in human health. Some “mega-cities” such as Mexico City and Sao Paulo have developed more satisfactory monitoring and management of the air pollution from intensive use of hydrocarbons in transport and industry. In Bogota, emissions from motor vehicles have been reduced, but considerable efforts are still being made to reduce air pollution from industrial facilities located in urban areas. Air pollution and its negative impact on health have been increasing in small and medium-sized towns, which have fewer resources and less technology available for control purposes. Poor air quality in homes, which mostly affects low-income groups in urban areas which use biomass for cooking or heating, receives little attention in the urban environmental agenda.

Air quality standards or limits on emissions have been established in only a third of Latin America and the Caribbean. Urban dispersion has increased journey times and demand for public transport, with a combined cost estimated at 6.5% of GDP. As mentioned above, air pollution leads to increases in infectious and chronic respiratory disorders, cancer and cardiovascular disease, especially among vulnerable groups such as children aged under five, older persons and those with chronic illnesses.

The region’s cities are also experiencing rising levels of noise pollution. In Brazil, an estimated 23 million people are significantly affected by urban noise, the main source being vehicular traffic (73%). This may have immediate or medium- and long-term repercussions on human health. Thus, delays in implementing environmental protection policies will have unavoidable and unjustifiable health impacts. A survey on urban noise conducted in the municipality of Curitiba showed that the effects perceived by the community range from irritability (58%) and lack of concentration (42%) to sleep disorders (20%).

(d) Climate change

In addition to its effects on numerous ecosystems, climate change is also expected to have consequences for human health (WHO, 2002). For example, it will change the profile of mortality from exposure to high or low temperatures, although its repercussions for the real morbidity burden cannot be quantified because it is not known to what extent the deaths of sick or fragile people in extreme temperature conditions is caused by that factor. In some regions, the risk of diarrhoea is expected to be 10% higher in 2030 than it would have been without climate change, though there is uncertainty regarding this estimate, because few studies have focussed specifically on this exposure-response pattern.

Estimates of the impact of climate change on malnutrition vary widely from region to region. In 2030, the risk from unmitigated emissions, compared with those in a scenario without climate change, will range from a significant increase in South-East Asia to a slight decline in the Western Pacific. On the whole, although they are rather changeable owing to regional differences in precipitation, estimates of possible risk variations point to a considerable morbidity burden affecting large numbers of people.

Estimates of deaths or injuries resulting from coastal flooding vary widely, but suggest that absolute burdens are low. The impact of inland flooding is expected to increase by a similar proportion and to result in a larger immediate rise in the morbidity burden. These proportional increases are similar in developed and developing regions, but in the latter the initial rates are much greater.

The incidence of a number of vector-transmitted diseases is projected to rise, particularly malaria in regions bordering areas where the disease is already endemic (where less change may be expected). Most temperate areas will continue to resist contagion, either because the climate will remain inappropriate, as in most of Europe, or because socio-economic conditions are unlikely to foster a new invasion of vectors, as in the south of the United States (WHO, 2008).

Chapter V

**THE GLOBAL PARTNERSHIP FOR DEVELOPMENT AND ITS CONTRIBUTION
TO ENVIRONMENTALLY SUSTAINABLE DEVELOPMENT IN
LATIN AMERICA AND THE CARIBBEAN****A. BACKGROUND**

The United Nations Agencies have pledged to support, coordinate and integrate global and national efforts to achieve the Millennium Development Goals (MDGs). The Millennium Declaration emphasizes the need to develop global partnerships for development in order to create an environment that will speed progress towards reducing poverty, improving health and education, achieving gender equality and guaranteeing environmental protection. By placing these issues at the centre of the world agenda, the Millennium Development Goals have become a platform for mobilizing international efforts and strengthening partnerships between developed and developing countries, as well as among developing countries and between the public and private sectors.

In connection with Millennium Development Goal 8, the Member States of the United Nations have adopted specific commitments to “develop a global partnership for development” in the field of trade, official development assistance (ODA), foreign debt relief and access to essential drugs and technology. Strengthening these partnerships should provide crucial support in achieving the other development goals.¹

This chapter aims to identify the ways in which global partnerships favour environmental sustainability in Latin America and the Caribbean and, in particular, how they contribute to the achievement of Goal 7. It tackles three main cross-cutting issues of Goal 8 (see table V.1): international financing for sustainable development (section B); trade aspects of Goal 8 and their links with Goal 7 (section C), and access to new technologies (section D). This chapter also presents and analyses specific issues concerning access to medication, again in relation to environmental sustainability.

¹ Global targets have been ratified by governments in the framework of the various international conferences and instruments that followed the United Nations Millennium Summit of 2000, among which were the initiation of the Doha Round of multilateral trade negotiations (2001), the World Summit on HIV/AIDS (2001), the Brussels Plan of Action for the Least Developed Countries (2001), the International Conference on Financing for Development (2002), the World Summit on Sustainable Development (2002), the World Summit on the Information Society (2003 and 2005), the 2005 World Summit, the Paris Declaration on Aid Effectiveness (2005), the Gleneagles Group of Eight summit (2005) and the World Trade Organization Hong Kong Ministerial Meeting (2005).

Table V.1
**TARGETS OF MILLENNIUM DEVELOPMENT GOAL 8: DEVELOP A GLOBAL
 PARTNERSHIP FOR DEVELOPMENT**

8.A	Develop further an open, rule-based, predictable, non-discriminatory trading and financial system. Includes a commitment to good governance, development and poverty reduction —both nationally and internationally.
8.B	Address the special needs of the least developed countries. Includes: tariff and quota free access for the least developed countries' exports; enhanced programme of debt relief for heavily indebted poor countries (HIPC) and cancellation of official bilateral debt; and more generous ODA for countries committed to poverty reduction.
8.C	Address the special needs of landlocked developing countries and small island developing States (through the Programme of Action for the Sustainable Development of Small Island Developing States and the outcome of the twenty-second special session of the General Assembly).
8.D	Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term.
8.E	In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries.
8.F	In cooperation with the private sector, make available the benefits of new technologies, especially information and communications.

B. FINANCING FOR SUSTAINABLE DEVELOPMENT

Target 8.B

Address the special needs of the least developed countries. Includes: tariff and quota free access for the least developed countries' exports; enhanced programme of debt relief for heavily indebted poor countries (HIPC) and cancellation of official bilateral debt; and more generous ODA for countries committed to poverty reduction.

In 1970, the United Nations General Assembly, in its resolution 2626 (XXV), proposed the objective of increasing official development assistance to at least 0.7% of the developed countries' gross national product (GNP) at market prices. The developed countries reaffirmed this commitment on a number of occasions, including at the United Nations Conference on Environment and Development (1992), the Millennium Summit (2000) and the International Conference on Financing for Development (2002). Even though the developed countries have yet to live up to their promises (only five, Denmark, Luxembourg, Norway, the Netherlands and Sweden, have exceeded the 0.7% commitment), there has been a marked upsurge in efforts to reverse the declining trend in ODA. In 2005, at the Millennium +5 Summit and the Group of Eight (G8) summit in Gleneagles, it was agreed to increase assistance from US\$ 80 billion in 2004 to US\$ 130 billion in 2010 (at constant 2004 prices) and, by 2008, ODA had risen to 0.3% of the developed countries' combined GNP. For these commitments to be effective, the majority of members of the Development Assistance Committee (DAC) of the Organisation for Economic Co-operation and Development (OECD), which currently provide more than 90% of the world's official development assistance, must intensify assistance for the period 2008–2010, doubling the current growth rates of the main development programmes.

ODA is the least procyclical flow of resources to reach the poorest countries and zones that have no other financial flows, and is available for political, economic or natural contingencies. It is therefore a major challenge to guarantee its predictability and stability, in compliance with targets 8.A and 8.B, as well as its effectiveness, as stipulated in the Paris Declaration on Aid Effectiveness: Ownership, Harmonisation, Alignment, Results and Mutual Accountability.

ODA is crucial in supporting the achievement of the other Millennium Declaration Goals. In particular, national policies and programmes are required to ensure the sustainability of the environment and natural resources in Latin America and the Caribbean, but these policies and programmes are unlikely to achieve their goals without financial backing from the international community. So, even though the responsibility for financing environmental policies will continue to fall chiefly to individual governments, the global scale of many environmental issues and the existing income inequality among different countries makes a global partnership essential. Although such instruments as sustainable official development assistance, multilateral concessional funds (such as the Global Environment Facility), financial mechanisms (such as debt-for-nature swaps) and clean-technology transfer will continue to be vital, they are clearly not enough in themselves. The following sections examine certain aspects of these financing arrangements in more depth, placing special emphasis on how they impact the region.

1. Concept of new and additional official development assistance

Latin America and the Caribbean received roughly 9% of the bilateral ODA available worldwide between 1990 and 2007, although in recent years this figure has dropped to around 7%. Despite the fact that funding for the region increased by approximately 50% in current values during the period, the trend has been slightly downward in real terms. In Dominica, Guyana, Haiti, Honduras, Nicaragua, the Plurinational State of Bolivia, Saint Vincent and the Grenadines and Suriname (the countries that benefit most from ODA), the decline represents several percentage points of GDP.

ODA for environmental sustainability includes three basic components: (i) funding allocated specifically for general environmental protection activities that can be clearly identified in the accounting records posted in the OECD Creditor Reporting System (CRS);² (ii) funding for activities with a sizeable environmental component, which are not distinguishable in the aforesaid accounting records but which have been identified qualitatively via the “Rio markers” in recent years,³ and (iii) funding allocated to safe drinking-water- and sanitation-related investment.

According to the OECD Creditor Reporting System, since 2000 the assistance disbursed by donor countries to Latin America and the Caribbean for general environmental protection has stabilized, standing at 3.6% of the total in 2006–2007. In megadiverse countries like Brazil, Costa Rica, Ecuador and Mexico, this percentage is significantly higher (see table V.2). The funding identified by the Rio markers has increased since 2000 and, in 2006–2007, a total of 2% of sectoral assistance for Latin America and the Caribbean had positive implications from the standpoint of environmental conventions resulting from the Earth Summit. Assistance allocated to the region for water and sanitation has also fluctuated, with a period of intense effort between the mid- and late 1990s, when the region received a share of around 10% of the total, followed by a decline in the new millennium to around 4% (see table V.2 and figure V.1).

² In the database of the Development Assistance Committee’s creditor reporting system, “general environmental protection” is classified in the “multisector/cross-cutting” category.

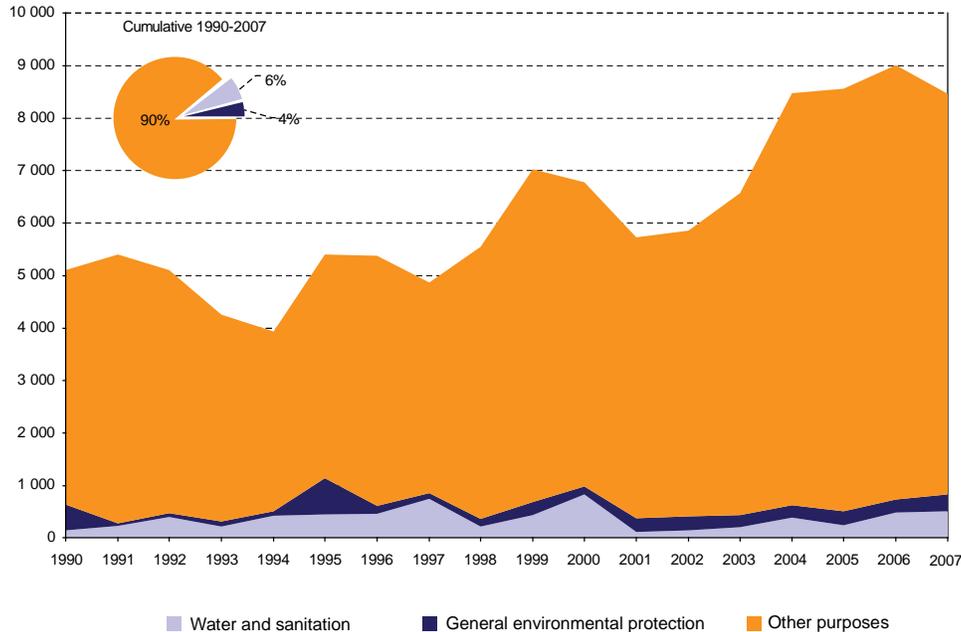
³ The Rio markers are indicators used to identify official development assistance activities for meeting the goals of the three Rio conventions (the United Nations Convention on Biological Diversity, the United Nations Framework Convention on Climate Change and the United Nations Convention to combat Desertification).

Table V.2
**LATIN AMERICA AND THE CARIBBEAN (32 COUNTRIES): DISBURSEMENTS OF OFFICIAL
 DEVELOPMENT ASSISTANCE BY DESTINATION, 2006-2007**
(Percentages)

Country	Environmental protection	Water and sanitation	OECD Rio markers	Other purposes
Antigua and Barbuda	0.6	0.0	1.8	97.6
Argentina	2.9	0.5	3.5	93.1
Barbados	1.0	1.1	0.0	97.8
Belize	2.8	0.0	0.0	97.1
Bolivia (Plurinational State of)	3.3	5.6	2.1	89.0
Brazil	13.3	6.1	2.5	78.2
Chile	3.1	0.4	2.9	93.6
Colombia	2.0	0.3	1.1	96.6
Costa Rica	4.5	2.7	1.3	91.4
Cuba	3.5	3.8	6.2	86.6
Dominica	0.1	4.2	7.6	88.0
Dominican Republic	2.0	4.6	1.4	92.0
Ecuador	8.5	6.7	4.2	80.6
El Salvador	2.7	5.4	1.9	90.0
Grenada	0.5	0.8	2.0	96.7
Guatemala	2.1	3.8	0.5	93.6
Guyana	10.5	10.5	0.6	78.4
Haiti	0.5	1.2	1.5	96.8
Honduras	1.8	5.7	1.8	90.7
Jamaica	2.8	4.5	0.2	92.6
Mexico	4.8	24.0	1.4	69.7
Nicaragua	2.5	3.4	2.9	91.2
Panama	6.9	2.3	2.3	88.5
Paraguay	1.6	0.5	1.4	96.5
Peru	3.0	8.8	2.8	85.4
Saint Kitts and Nevis	0.5	0.0	0.0	99.5
Saint Lucia	16.4	0.5	0.0	83.1
Saint Vincent and the Grenadines	0.3	2.6	0.0	97.1
Suriname	0.7	5.2	1.0	93.1
Trinidad and Tobago	0.4	0.0	2.4	97.1
Uruguay	6.2	1.9	4.5	87.5
Venezuela (Bolivarian Republic of)	2.0	9.4	2.6	86.0
Latin America and the Caribbean	3.6	4.4	2.0	89.9

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Creditor Reporting System (CRS), Organisation for Economic Co-operation and Development (OECD).

Figure V.1
**LATIN AMERICA AND THE CARIBBEAN: TOTAL OFFICIAL
 DEVELOPMENT ASSISTANCE BY PURPOSE^a**
(Millions of current dollars)



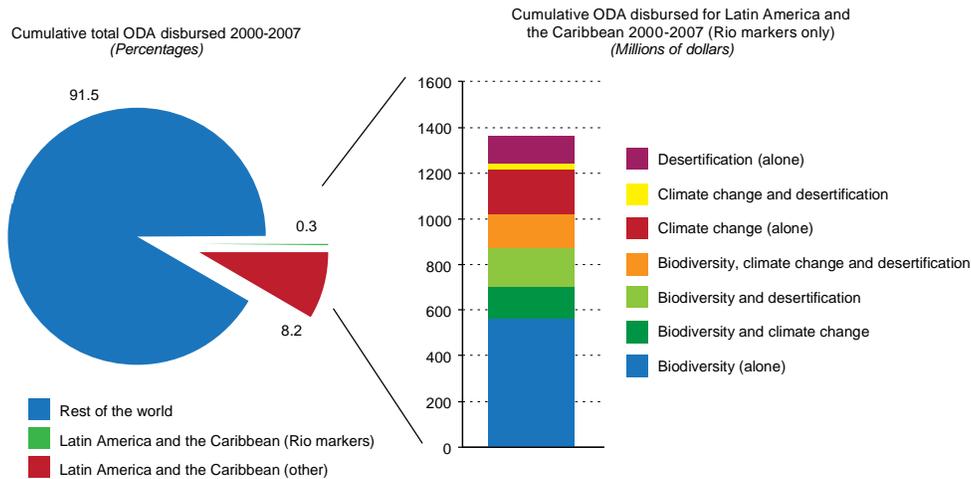
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Creditor Reporting System (CRS), Organisation for Economic Co-operation and Development (OECD).

^a Includes bilateral and multilateral official development assistance.

Taking into consideration all the assistance resources allocated to environmental protection, water and sanitation and sectoral assistance with benefits for preventing climate change, desertification and biodiversity loss, the total amount received by Latin America and the Caribbean in 2006–2007 averaged 10% of all the ODA received (see table V.2). While this may seem a significant proportion, it represents barely 0.02% of the region's GDP. In some countries like Guyana (1.5%), Nicaragua (0.6%), Suriname (0.4%) and the Plurinational State of Bolivia (0.4%), this percentage is proportional to that of the general assistance received.

The small amount of assistance allocated to environmental protection does not seem set to increase substantially. What is more, the emerging trend is for assistance to focus on global problems, such as climate change, which is why mechanisms need to be designed to ensure that the financing for these problems is new and additional to other forms of assistance and aid that are so vital for coping with other environmental problems and development needs. Latin America and the Caribbean therefore faces the challenge of preventing the assistance currently allocated to traditional development goals (including the Millennium Development Goals), which is still extremely necessary, from being directed towards the creation of global public goods and services, of which the region is potentially a major supplier.

Figure V.2
**OFFICIAL DEVELOPMENT ASSISTANCE: TOTAL DISBURSEMENT
 IN OECD RIO MARKERS, 2000-2007**
(Percentages and current dollars)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Creditor Reporting System (CRS), Organisation for Economic Co-operation and Development (OECD).

2. Multilateral concessional funds

The main alternatives for obtaining international financing to tackle environmental issues with global implications are the Global Environment Facility (GEF), the Multilateral Fund for the Implementation of the Montreal Protocol, the Clean Development Mechanism (CDM) of the Kyoto Protocol of the United Nations Framework Convention on Climate Change, and the more recently created Adaptation Fund, put into operation at the thirteenth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 13) in 2007.

The Global Environment Facility, created in 1991, is probably the new financial mechanism that has captured the most resources for developing-country projects with an environmental component. By 2006, GEF had channelled US\$ 1.39 billion into 405 projects, and had mobilized a further US\$ 4.62 billion in cofinancing, chiefly for promoting sustainable transport, renewable energy, forest and wetland conservation, sustainable land management, transboundary water management and payment for environmental services, as well as for exploring alternatives for avoiding persistent organic pollutants. The Latin American and Caribbean region has received a little over 21% of all the funds channelled by GEF—although it has also benefited from global and multiregion projects—with biodiversity-related activities receiving the most funds (around 60%), followed by climate-change-related activities, the share of which has increased to 35% of funds. The remainder is distributed among projects concerning transboundary waters, multiple focal areas, ozone depletion and persistent organic pollutants. A total of 84% of the projects implemented in the region have been judged satisfactory, which is a relatively high percentage.

The Multilateral Fund for the Implementation of the Montreal Protocol came into operation in 1991 in order to assist developing countries in implementing projects for avoiding or reducing emissions of ozone-depleting substances. The Fund operates via four international entities —the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP), the United Nations Industrial Development Organization (UNIDO) and the World Bank— to finance the incremental operating and capital costs of projects. Since 1991, it has approved investments worth more than US\$ 2.3 billion, which has enabled it to develop around 6,000 projects, of which 25% have been in Latin America and the Caribbean.

The current international debate on climate change and the outcomes of the fifteenth session of the Conference of the Parties (COP 15), held in Copenhagen in 2009, have focused attention on new mechanisms for international financing, developed or channelled via development banks (amongst which the World Bank has played a leading role) or by specific countries. Table V.3 shows recent funds and facilities, even though not all are applicable to the Latin American and Caribbean region (for more background, see chapter III).

By 2008, the World Bank had managed 186 projects via its carbon funds, of which 119 emissions reduction purchase agreements, worth more than US\$ 1.8 billion, were signed, and a further 21 were approved and are currently at advanced phases of financing. The East Asia and Pacific region, particularly China, has the largest proportion of active projects, with a total emission reduction value of more than US\$ 1.3 billion (71% of the total). Latin America and the Caribbean and Europe and Central Asia come second (each with 8%), with projects in the renewable energy, waste management and oil and gas sectors.

The capitalization goal of the Adaptation Fund, which is financed from a 2% levy on the value of certified emission reductions (CER) issued, is US\$ 100 million by 2012. The Fund, administered by the World Bank until 2011, is vital for the region in view of the heavy cost of adapting to climate change, both now and in the future. Other initiatives include the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD), set up jointly by the Food and Agriculture Organization of the United Nations (FAO), UNDP and UNEP to help to build capacity for reducing emissions from deforestation, and the MDG Achievement Fund (MDG-F), established under an agreement between UNDP and Spain, which includes climate change as a thematic area.

Table V.3
**LATIN AMERICA AND THE CARIBBEAN: FUNDS AVAILABLE
 FOR CLIMATE CHANGE AND INVESTMENT**

Fund or facility	Start-up year	Purpose	Funding (millions)	Investment in Latin America and the Caribbean (percentage of each fund or facility)
Prototype Carbon Fund	2000	Reducing greenhouse gases	220 (US\$)	15
Community Development Carbon Fund	2003	Clean energy, community development, poverty	129 (US\$)	8
BioCarbon Fund, tranches 1 and 2	2004 and 2007	Agro-ecosystems, biodiversity, reducing emissions from deforestation and forest degradation in developing countries (REDD)	54 and 38 (US\$)	Tranche 1: 43 Tranche 2: 28
Danish Carbon Fund	2005	Clean Development Mechanism (CDM) and joint implementation	90 (euros)	9
Spanish Carbon Fund, tranches 1 and 2	2005 and 2008	Renewable energy and efficiency	220 and 70 (euros)	20
Umbrella Carbon Facility	2006	Purchasing emission reductions	800 (euros)	...
Netherlands Clean Development Mechanism Facility	2002	CDM	..	12
Netherlands European Carbon Facility	2004	Joint implementation	..	0
Italian Carbon Fund	2004	Emission reductions	156 (US\$)	12
Carbon Fund for Europe	2007	European Union Emission Trading System (EU ETS)	50 (euros)	5
Forest Carbon Partnership Facility	2008	REDD	155 (US\$)	...

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of World Bank, *Carbon Finance for Sustainable Development, 2008*, Washington, D.C., Carbon Finance Unit (CFU), 2008.

3. Debt-for-nature swaps

Debt swaps refer to the cancellation of part of a debtor government's foreign debt in exchange for a commitment to mobilize national resources for an agreed purpose, in this case, nature conservation. Latin America and the Caribbean benefited significantly from this mechanism in the late 1980s and throughout the 1990s. Although debt swaps were initially brokered by international non-governmental environmental organizations, later more debt-swap operations began to be arranged directly between creditor and debtor. The Enterprise for the Americas Initiative launched by the United States in 1990 was one of the most dynamic debt-for-nature swap mechanisms in the region during the 1990s. The United States, together with Germany, Canada and Switzerland, are the countries that have been the most active in debt-for-nature swaps. ECLAC (2002) has reviewed the swaps arranged in the region up to 2002. Although the number of debt-for-nature swaps has decreased considerably since 2002, they should not be overlooked. Recent examples include swaps between Colombia and the United States, The Nature Conservancy (TNC) and the World Wildlife Fund (WWF) in 2004; between Paraguay and the United States in 2006; between Ecuador and Spain in 2005 (see box V.1) and one of the largest swaps ever made, between Guatemala, the United States and TNC, to preserve Guatemala's tropical rainforest. While debt-for-nature swaps have provided limited debt relief for developing countries—the total converted amount is very low as a proportion of total debt—in some countries, such as Colombia, El Salvador, Jamaica and Peru, substantial amounts of debt have been cancelled, increasing the amount of national resources channelled into conservation, an area which, though important, is not usually considered a priority (for example, the nominal value of a swap between the United States and El Salvador in 1992 amounted to 5% of El Salvador's GDP and channelled environmental resources equivalent to half a percentage point of GDP).

Box V.1

DEBT SWAP PROGRAMME BETWEEN ECUADOR AND SPAIN FOR EDUCATION AND CLEAN DEVELOPMENT MECHANISM PROJECTS (HYDROPOWER)

On 14 March 2005, Ecuador and Spain agreed to a debt-swap programme to channel resources that would otherwise have been allocated to paying off foreign debt into jointly financed development projects to improve the lives of Ecuador's poor and indigent. The debt-swap operation was worth US\$ 50 million and lasted for four years (2005–2008). Under the agreement of the Binational Committee, these resources are for financing programmes and projects in the education sector (US\$ 20 million) and the hydropower sector (US\$ 30 million). The capital is administered by the Andean Development Corporation.

The selected education projects are aimed at guaranteeing quality education by means of training for teachers of basic education; infrastructure building and upgrading; endowment of teaching equipment and aids and the strengthening of community participation and local organizations. While the initiatives are designed to achieve national, as well as regional, provincial and local coverage, priority is being given to working in the sectors most affected by migration and poverty, with a completion deadline of 24 months.

The hydropower projects selected were those that met the criteria of support for public-private Clean Development Mechanism initiatives aimed at resolving Ecuador's energy deficit, promoting private investment in the sector and allocating public budget appropriations for hydropower to works and services of benefit to vulnerable sectors. The private sector is responsible for carrying out the projects and, owing to their technological and implementation complexity, the completion deadline is between 12 and 36 months.

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Network for Interchanging and Disseminating Excellent Experiences for Achieving the MDGs (Net IDEEA-MDGs) [online] <http://ideea.cepal.org/ideea/ideea.htm>.

4. Other financial resources allocated to environmental sustainability

(a) Clean Development Mechanism projects in the region

When the carbon market began, Latin America was the main supplier of Clean Development Mechanism (CDM) projects, as it had pioneered pilot projects prior to the Kyoto meeting.⁴ Later it figured prominently in the project portfolios of the early carbon emission funds, including those of the World Bank. This came about as a result of Latin American governments' openness to the development of the mechanism, as they had relatively streamlined approval systems and promotion initiatives for this type of project (Eguren, 2007). However, their share has now fallen, in terms of both the number of projects and the amount of emission reductions.

As table V.4 shows, the Asia and Pacific region, particularly China, has the largest amount of annual certified emission reductions and total emission reductions expected by 2012. Latin America and the Caribbean account for 19.6% of all projects, generating 15% of the total emission reductions expected by 2012.

Table V.4
CLEAN DEVELOPMENT MECHANISM PROJECTS, BY REGION

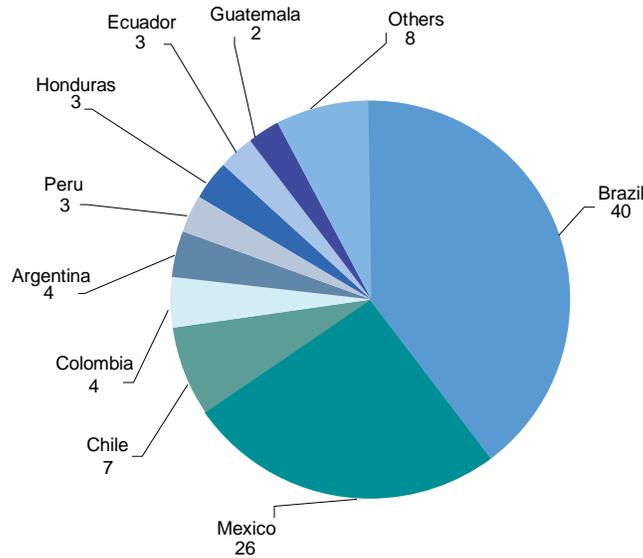
Total Clean Development Mechanism projects in the pipeline	Projects		Certified emission reductions	Certified emission reductions, 2012		Population	Certified emission reductions per capita, 2012
	(quantity)	(percentage)	(quantity)	(quantity)	(percentage)	(millions of inhabitants)	(quantity)
Latin America	800	17.3	77 119	389 368	14.0	449	0.87
Asia and the Pacific	3 628	78.3	522 884	2 263 323	81.2	3 418	0.66
Europe and Central Asia	46	1.0	4 605	18 483	0.7	149	0.12
Africa	111	2.4	20 504	82 759	3.0	891	0.09
Middle East	46	1.0	7 224	32 858	1.2	186	0.18
Total least developed regions	4 631	100	632 336	2 786 791	100	5 093	0.55

Source: United Nations Environment Programme (UNEP), "UNEP Risoe CDM/JI Pipeline Analysis and Database" [online database] <http://cdmpipeline.org/>, 2009, updated to 1 September 2009.

Brazil accounts for 40% of the Latin American and Caribbean region's CDM projects, which are concentrated in biomass power generation, landfill methane destruction, agriculture and renewable energies. Next is Mexico, with 26%, with projects chiefly in the areas of agriculture, biogas and sanitary landfill, followed by Chile, with 7%, with projects relating mainly to biomass and sanitary landfills (see figures V.3 and V.4).

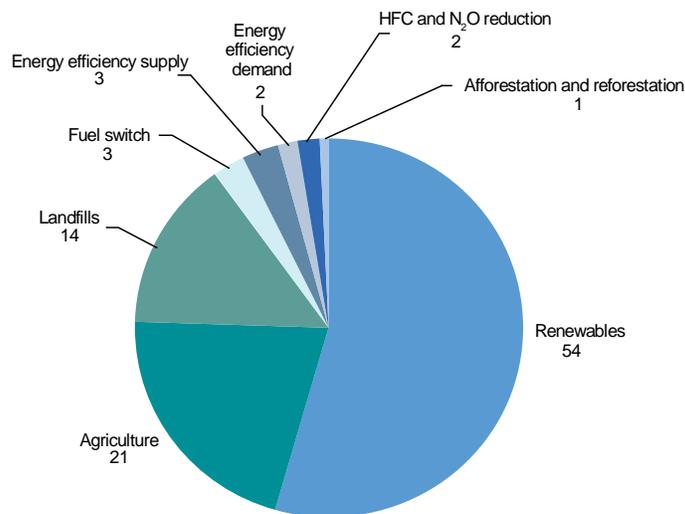
⁴ This information does not include the Caribbean.

Figure V.3
LATIN AMERICA AND THE CARIBBEAN: QUANTITY OF CLEAN DEVELOPMENT MECHANISM PROJECTS
(Percentages)



Source: United Nations Environment Programme (UNEP), “UNEP Risoe CDM/JI Pipeline Analysis and Database” [online database] <http://cdmpipeline.org/>, 2009, updated to 8 August 2009.

Figure V.4
LATIN AMERICA AND THE CARIBBEAN: VOLUME OF CERTIFIED EMISSION REDUCTIONS BY PROJECT TYPE
(Percentages)



Source: United Nations Environment Programme (UNEP), “UNEP Risoe CDM/JI Pipeline Analysis and Database” [online database] <http://cdmpipeline.org/>, updated to 8 August 2009.

The majority of the region's registered projects concern renewables. They include projects for biomass power generation and cogeneration, dominated by Brazil, and projects for processing sugarcane bagasse. Hydropower projects are distributed throughout Latin America. The least numerous, up to now, have been wind power projects —concentrated mostly in Brazil and Mexico— and geothermal energy projects, mostly in Central America. Agricultural projects tend to be associated mainly with methane capture and destruction in pig farms and are distributed throughout the region, although they are of special importance in Brazil, Chile and Mexico. In the transport sector, despite the huge benefits that would be derived from improving transport, CDM has recognized only a methodology for expanding the 'Transmilenio' rapid transit bus system in Bogota.

CDM has harnessed only negligible funds in comparison with the region's mitigation requirements and, up to now, it has been ineffectual as a force for changing production and consumption patterns. Its total contribution to investment is around US\$ 7.8 billion (2002–2006), and it has been responsible for increasing the internal rate of return of projects by up to 3%. It is estimated to have contributed between US\$ 2.1 billion and US\$ 3.2 billion in total investment to Latin America and the Caribbean between 2002 and 2006, that is, an annual flow of US\$ 420 million to US\$ 640 million. This amount is very small in comparison with the requirements of the energy sector and traditional exports.

(b) Reducing emissions from deforestation and forest degradation in developing countries (REDD): the case of the Amazon Fund

The Amazon Fund was created in Brazil in parallel with the global negotiations and was based on the concept of reducing emissions from deforestation and forest degradation in developing countries (REDD) and on a proposal made by the Government of Brazil at the twelfth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 12) in Nairobi. The Fund aims to combat deforestation and to promote the conservation and sustainable use of the resources of the Amazon biome through projects for public forests and protected areas (environmental management and services); sustainable production activities; science and technology development applied to the sustainable use of biodiversity; and institutional development and improvement of oversight mechanisms. The Fund's activities are integrated with policies for the Amazon region and, in particular, with the Action Plan for Prevention and Control of Deforestation in the Legal Amazon (PPCDAM) established in 2003, and the Sustainable Amazon Plan (2006). It is a private fund operating on the basis of voluntary, unconditional donations. Currently it has resources worth US\$ 1 billion donated by the Government of Norway for use until 2011. The aim is to raise US\$ 20 billion by 2020. The Amazon Fund will operate mainly in the Brazilian Amazon, but up to 20% of its resources may be used for forestry oversight and monitoring systems in other biomes in Brazil and in other tropical countries.

The Amazon Fund generates no carbon credits or economic rights that can be traded by donors on carbon markets. Its existence depends on its effectiveness and on donors' confidence that its measures will be effective, as fund-raising by Brazil's National Bank for Economic and Social Development (BNDES) is based on the Fund's performance in reducing emissions from deforestation and forest degradation in the Brazilian Amazon, in accordance with the data and methodology defined by a scientific committee and based on satellite data from Brazil's National Institute for Space Research (INPE).

One of the challenges for the Fund is to modify the drivers of the profitability of activities that cause deforestation. At present, it is more profitable to turn forest land over to crop farming, livestock production or other activities than it is to put it to sustainable use. The chief causes of deforestation in Amazonia are low-productivity extensive livestock production and soybean plantations which, while more recent, are growing. A second challenge is to build capacity for oversight and for imposing penalties for unlawful behaviour.

Since 2005, progress has been made in reducing the rate of deforestation in the Brazilian Amazon, thanks to intensified efforts by the Federal Police in containing unlawful activities, increased monitoring by the Brazilian Environment and Renewable Resources Institute (IBAMA) and the entry into force of a decree by Brazil's National Monetary Council that refuses loans to firms and individuals with a record of unlawful acts affecting the environment.

C. TRADE ASPECTS OF MILLENNIUM DEVELOPMENT GOAL 8 AND THEIR RELATIONSHIP WITH GOAL 7

Targets

8.A Develop further an open, rule-based, predictable, non-discriminatory trading and financial system. Includes a commitment to good governance, development and poverty reduction – both nationally and internationally.

8.B Address the special needs of the least developed countries. Includes: tariff and quota free access for the least developed countries' exports [...]

Millennium Development Goal 8, in particular target 8.A, emphasizes the importance of developing global partnerships in order to promote an open trading system and preferential terms for the least developed countries, stressing the need to create favourable conditions for speeding progress towards achievement of the Millennium Development Goals. This represents acknowledgement of the importance of the multilateral trade rules negotiated in the World Trade Organization (WTO) in channelling the dynamics for progressing (or regressing) in the achievement of the Goals.

One of the aims of the WTO Doha Round of multilateral trade negotiations—initiated in 2001, one year after the adoption of the United Nations Millennium Declaration—is to address the needs of developing countries in accordance with a development agenda. The achievement of target 8.A is being hampered by the failure to conclude the Doha Round, the lack of significant advances in the talks and the likelihood that the original intention to benefit developing countries will not be made good. Moreover, the negotiations have tended to focus on resolving the problem of market access for goods, as well as on farm subsidies, to some extent sidelining other issues of paramount importance for sustainable development, such as services, antidumping-duty rules, fisheries subsidies, the environment and the link between intellectual property rights, the Convention on Biological Diversity and development (ECLAC, 2008d, page 78).

The inability of the global partnership to reach a satisfactory multilateral agreement and to promote a trading environment favourable to developing countries is also hindering achievement of Goal 7, in particular target 7.A. International trade is a key component for Latin American and Caribbean sustainable development strategies, not only because of its contribution to economic growth and poverty reduction, but also because it serves as a vehicle for transmitting the mounting environmental requirements relating to new competitiveness issues and to progress towards low-carbon economies. The integration of these requirements into government policy and their implementation by economic agents will influence environmental sustainability outcomes in the region and progress towards target 7.A.⁵

The issues of trade financing, climate change, investment, and environmental goods and services and their link with Goal 7 are examined below. Section D discusses intellectual property rights and access to technology.

1. Trade financing: the aid for trade initiative

Compliance with environmental requirements for access to international markets should be accompanied by an increasing flow of financing and technology transfer to the countries of the region. Aid for trade is designed to assist developing countries, especially the least developed ones, to build the knowledge and infrastructure they need to benefit from WTO agreements and to use trade tools to foster development and expand their trade relations (OECD, 2009). While Aid for Trade forms part of overall ODA (grants and concessional loans), it is allocated specifically to trade-related programmes and projects. This financing is important in enabling Latin American and Caribbean countries to adapt more effectively to the requirements of international markets and to address supply-side constraints that hamper their full integration into global markets.⁶ As these resources help to incorporate the new environmental requirements into trade policies, they promote progress towards achievement of Goal 7, particularly target 7.A.

While the available data on aid for trade does not disaggregate trade categories on the basis of their importance for environmental sustainability, it is interesting to examine the evolution in aid for trade allocated to the region. Table V.5 shows a rising trend in the amounts of aid.

⁵ The aim of environmental sustainability in a trade context is to change the trend towards specialization in environmentally sensitive exports, to introduce environmentally friendly practices and to exploit the advantages of biodiversity in a sustainable manner.

⁶ Aid for trade finances technical assistance (aid to countries for formulating trade strategies, negotiating more effectively and applying the results), infrastructure (roads, ports and telecommunications linking national and world markets), production capacity (investment in industries and sectors to assist countries in diversifying their exports and exploiting their comparative advantages) and assistance to offset adjustment (aid to defray the costs of tariff cuts, erosion of preferences or deterioration in terms of trade).

Table V.5
LATIN AMERICA AND THE CARIBBEAN: AID FOR TRADE BY CATEGORY
(Millions of current dollars)

	Trade policies and regulations		Economic infrastructure		Production capacity-building		Trade-related structural adjustment	Total	
	2002-2005	2007	2002-2005	2007	2002-2005	2007	2007	2002-2005	2007
Andean countries									
Bolivia (Plurinational State of)	4.8	3.1	73.9	143.6	154.4	132.4	0	233.1	279.1
Colombia	0.3	9.4	1.8	27.8	77.3	92.5	0	79.4	129.7
Ecuador	4.7	1.3	1.5	6.8	39.3	78.2	0	45.5	86.3
Peru	7.1	4.1	33	8.2	91.5	90.9	0	131.6	103.2
Venezuela (Bolivarian Republic of)	0.1	0	0.4	0.1	8.9	1.1	0	9.4	1.2
MERCOSUR and Chile									
Argentina	0.6	0.1	1.3	5.7	42.4	25.2	0	44.3	31
Brazil	0.4	0.7	4.9	6.3	44.6	95.7	0	49.9	102.7
Chile	1.9	0.1	4.8	12.6	33.1	5	0	39.8	17.7
Paraguay	5.1	1	0.7	0.7	8.1	11.5	0	13.9	13.2
Uruguay	0.4	0	0.5	1.7	5	2.6	0	5.9	4.3
The Caribbean									
Antigua and Barbuda	0	0	0	0	2.1	0.2	0	2.1	0.2
Aruba	0	0	0	0	0	0	0	0	0
Bahamas	0	0	0	0	0	0	0	0	0
Barbados	0	0	0	0	0.4	15.2	0	0.4	15.2
Belize	0	0	0.1	0	9.2	3.1	0	9.3	3.1
Cuba	0.1	0	1.4	0.7	7.4	7.6	0	8.9	8.3
Dominica	0	0	6.2	6	6.1	0.2	0	12.3	6.2
Dominican Republic	0	0	1.9	0.1	4.5	0.1	0	6.4	0.2
Grenada	0.4	0.8	31.8	24.3	8.4	69.6	0	40.6	94.7
Guyana	0	1.4	32.8	36.6	48.7	23.7	0	81.5	61.7
Haiti	1.5	0.4	9.3	28.7	23	21.6	0	33.8	50.7
Jamaica	0.1	3.4	11.1	12.9	31.1	17.3	0	42.3	33.6
Saint Kitts and Nevis	0	0	0	0	1.4	0	0	1.4	0
Saint Lucia	0	0.8	3.8	0.3	3.6	7.1	0.8	7.5	8.9
Saint Vincent and the Grenadines	0	0.2	0	0	4.4	7.5	0.2	4.4	7.8
Suriname	0	0	11.3	7.4	11.7	14.4	0	23	21.8
Trinidad and Tobago	0.3	0	0.7	0	14.3	11.5	0	15.3	11.5
Central America, Panama and Mexico									
Costa Rica	0.5	0.6	24.4	2	28.4	22.8	0	53.3	25.4
El Salvador	0.3	4.9	10.4	277.4	18.9	96.7	0	29.6	379
Guatemala	0.3	2.4	1.1	3.9	21.8	17	0	23.2	23.3
Honduras	2.2	1.3	86.7	21	85	7.6	0	173.9	29.9
Mexico	4	0.8	2.3	8.3	18.6	19	0	24.9	28.1
Nicaragua	4	0.4	65.7	21.5	102.7	50.9	0	172.4	72.8
Panama	0	0	4.9	14	4.1	5.4	0	9	19.4
Resources for regional projects									
Central America region	3.7	7.5	8.3	85.4	51.9	68.5	0	63.9	161.4
South American region	4.2	2.8	20.5	19	14.6	46.8	0	39.3	68.6
Caribbean regional	5.9	4.3	0.1	0	4.3	2.4	0	10.3	6.7
TOTAL	52.9	51.8	457.6	783	1 031.2	1 071.3	1	1 541.8	1 906.9

Source: Inter-American Development Bank/World Trade Organization (IDB/WTO), *Implementing Aid for Trade in Latin America and the Caribbean. The National and Regional Review Meetings 2008-2009*, Washington, D.C., 2009.

2. Climate change in relation to trade and its implications for Millennium Development Goal 7

The need to develop global partnerships to create a favourable environment for achieving the Millennium Development Goals has become especially pressing in view of the new requirements arising from climate change, which is commanding much of the world agenda and could delay the Doha process and its development agenda. The various subjects of debate are described below.

(a) Impact on competitiveness

Countries that have made emission reduction commitments under the Kyoto Protocol are promoting measures such as carbon taxes, cap-and-trade schemes and technical barriers that include energy efficiency requirements. The implementation of such measures is changing relative prices and differentiating and increasing the cost of carbon, leading not only to an adjustment in consumption and production patterns and to new business opportunities, but also to fears about a possible loss of competitiveness vis-à-vis exports from countries that have not made emission reduction commitments. However, the competitiveness of high-emissions production is very likely to be eroded as the rising cost of carbon is added to operating costs.

All this has resulted in a set of responses that, in turn, have brought new concepts into the trade agenda, including carbon footprint, carbon leakage, life cycle assessment throughout the marketing chain and responsibilities in relation to global carbon accounting. Moreover, there are several possible points of conflict between the mitigation measures that may be agreed in climate change meetings and WTO trade rules in such areas as subsidies, border measures, technical regulations and standards, public procurement and services.

According to the WTO Director-General, Pascal Lamy, in order to avoid these possible conflicts, as well as the use of unilateral trade measures to tackle the issue of climate change, it will be essential to reach a multilateral agreement on climate change at the earliest opportunity. He believes that “a multilateral agreement, that includes all major emitters, would be the best placed international instrument to guide other instruments, such as WTO, as well as all economic actors on how negative environmental externalities must be internationalized.” Until a truly global consensus emerges on a post-Kyoto regime, WTO Members will continue to hold different views on what the multilateral trading system can and must do (Lamy, 2008). In the final analysis, Lamy envisages a relationship of cooperation, not conflict, between the two multilateral regimes.

If a post-Kyoto agreement is not reached quickly, there is an increased likelihood of industrialized countries introducing unilateral measures that would adversely affect access to their markets by the region’s exports. Indeed, several industrialized countries are studying and implementing measures designed to prevent their own industries from losing out because of differences between their mitigation commitments and those of developing countries. Three main types of measure exist: (i) border adjustment measures, that is to say, taxes on imports to offset the additional costs incurred by domestic producers in applying mitigation measures; (ii) public funding and subsidies to promote the use of renewable-energy and low greenhouse-gas-emission technology, and (iii) energy-efficiency labelling schemes that require information on a specific product’s carbon footprint, including its production and transportation.

Understandably, developing countries have expressed concern that measures such as those described above could have a protectionist effect on national trade interests, which might lead to disputes

with WTO or to mitigation responsibility being shifted to developing countries. Indeed, in the short term developing-country exporters could face a double competitive disadvantage, as not only would they encounter barriers in several of their main export markets but they would also be unable to afford to grant State aid for production redeployment on a scale comparable to that accorded by the Governments of industrialized countries to their domestic producers. This would be in conflict with Goal 8, especially target 8.A, in which an open trading system is considered essential, as well as with the principle of common but differentiated responsibilities guiding international environmental negotiations. All this serves to highlight the importance of reaching an agreement on a new multilateral regime for climate change soon.

(b) Carbon footprint and carbon leakage

One of the central issues in the competitiveness debate is the amount of carbon embedded in the process of producing goods for international trade: the carbon footprint. Internalizing climate costs by estimating the amount of carbon emitted during the production and transportation of traded goods and services would facilitate the task of allocating the cost of emissions mitigation and the measures that authorities should take, whether this involves a carbon tax, compulsory use of labels to inform consumers about the carbon footprint or other measures.⁷

However, it is far from easy to allocate responsibility for the carbon footprint of products and services. Even though the international regime imposes liability on those responsible for emitting carbon during the process of producing and transporting goods or services, the fact is that such goods and services are produced and traded internationally to meet consumer demand. This means that the burden of responsibility for trade-related emissions could also be placed on consumers, who might be considered as the main cause of the carbon footprint. This argument has come to the fore as a result of China and India's role in international trade and their increasing contribution to worldwide production-related emissions, even though these, in turn, have arisen chiefly as a result of demand from countries that consume the goods responsible for the carbon footprint. Nevertheless, the Kyoto Protocol centres on commitments to reduce individual countries' emissions and does not consider the carbon embedded in imported goods.

A study by the Norwegian University of Science and Technology (Peters and Hertwich, 2007) estimates that world trade is responsible for 21.5% of global carbon dioxide (CO₂) emissions. The study also finds that Annex I countries⁸ under the Kyoto Protocol export 18.9% of their domestic CO₂ emissions and import 24.5%, which makes them net emission importers. Meanwhile, non-Annex I countries export 25.3% of emissions and import 17.2%, which makes them net exporters of emissions (see table V.6). This impacts significantly on the ability of Latin American and Caribbean countries to achieve Goal 7 —as regards deforestation, for example— and hinders the achievement of Goal 8, in particular target 8.A.

⁷ Some supermarket chains in the United Kingdom, including Tesco, have declared their interest in creating and promoting the use of labels quantifying the carbon footprint of the products they sell, see [online] <http://www.tesco.com/climatechange/carbonFootprint.asp>. In the United Kingdom, a small black footprint label is displayed on food packaging, in much the same way as nutritional information, detailing the exact number of grammes of carbon dioxide that have been emitted during the process of producing and transporting that product (its “carbon footprint”). The label is appearing in more and more supermarket chains in the United Kingdom and other European countries.

⁸ Annex I of the Kyoto Protocol includes developed countries that have made specific emissions reduction commitments.

Table V.6
SELECTED COUNTRIES: EMISSIONS EMBEDDED IN TRADE, 2001

	Production (millions of tons of CO ₂)	Consumption (millions of tons of CO ₂)	Exports (percentage)	Imports (percentage)
United States	6 006.9	6 445.8	8.3	15.6
Japan	1 291.0	1 488.8	14.5	29.8
Germany	892.2	1 032.1	25.3	41.0
Brazil	321.0	318.5	19.7	18.9
Spain	305.7	336.7	26.4	36.6
Venezuela (Bolivarian Republic of)	155.8	124.0	29.3	8.9
Argentina	120.4	118.4	18.4	16.7
Sweden	59.7	83.4	34.1	73.7

Source: G. Peters and E. Hertwich, “CO₂ embodied in international trade with implications for global climate policy”, *Environmental Science & Technology*, vol. 42, No. 5, Norwegian University of Science and Technology (NTNU), 2007.

In order to improve the relationship between the global carbon accounting system and the carbon embedded in production and consumption, as well as to promote the equitable distribution of responsibility for defraying the costs of carbon embedded in international trade, it has been suggested that the life cycle assessment of internationally traded products and services should be taken into account. This would mean including in the carbon footprint not only the carbon emitted when producing a product or service, but also that emitted in its transportation, use and final disposal, throughout the production chain.

Another important issue in the debate on trade and climate change that is closely linked with relative competitiveness shifts is the possibility that climate-change mitigation measures taken by annex I countries (under the Kyoto Protocol) might lead to industrial relocation. This would mean energy- and carbon-intensive industries shifting their production to developing countries that currently impose no emission limits. One region’s emissions reduction would then cause an increase in another region. This would jeopardize the ability of Latin American and Caribbean countries to reach Goal 7 and environmental sustainability. In addition, creating incentives for border tax adjustment in industrialized countries would not aid progress towards achievement of target 8.A of Millennium Goal 8.

In conclusion, taxes on the carbon footprint of imported goods and other unilateral measures are no substitute for a multilateral agreement on emission reduction targets. The imposition of carbon footprint taxes would hit especially hard the exports from countries geographically remote from the main consumer centres, including a number of Latin American and Caribbean countries.

3. Opportunities and challenges of trade in environmental goods and services

According to the OECD definition,⁹ Latin America and the Caribbean is a growing market for environmental goods and services, chiefly because of the region’s lack of environmental infrastructure,

⁹ The OECD definition describes the environmental goods and services industry as “activities which produce goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air and soil, as well as problems related to waste, noise and ecosystems.” The environmental goods and services industry includes the provision of safe drinking water; waste water treatment; pollution control; waste management; environmental sanitation; services related with environmental legislation compliance and environmental goods and services. However, no internationally agreed definition exists.

coupled with its population growth and high urban density. Furthermore, it is a market that is starting to respond to the new regulatory frameworks and to increased social preference for environmental protection. This is intensifying in countries whose exports specialize in environmentally sensitive industries, such as those of South America, which will need to increase their investment in new processes, equipment, environmental technology and services in order to meet the growing environmental requirements of international markets.

The market for environmental goods and services, including treatment plants, waste management systems, renewable energies, emission trading and carbon capture in the context of the United Nations Framework Convention on Climate Change, may well become one of the main drivers of economic development for many countries. All this makes it even more important to broaden the definition and to build capacity in those goods and services that are advantageous for exporting.

The market for environmental goods and services is growing rapidly, representing US\$ 548 billion worldwide in 2007–2008 and expected to reach US\$ 640 billion by 2010, on a par with the pharmaceutical or information technology industries.¹⁰ Although the developed countries dominate the market at present, with an 84% share, in the developing countries the market has grown by an annual 8%, compared with only 1.6% per year in the developed countries.

Environmental goods and services relate directly to Goal 7, especially targets 7.A, 7.B and 7.C (and more indirectly to target 7.D because of their contribution to improving the lives of slum dwellers). Around 50% of total trade in environmental goods and services, as defined by OECD, is for equipment and services to capture and treat water.

Within the context of the Doha Round, the developed countries have proposed liberalizing trade in environmental goods and services, which has aroused opposition from many developing countries. This is partly because global trade in environmental goods and services, linked with the environment industry, is currently dominated by the industrialized countries, and opportunities for developing countries are limited. Moreover, some developing countries have proposed expanding the list to include ecological goods and services, where they offer more export advantages. Brazil has suggested including ethanol in the environmental goods and services category, whereas the developed countries consider it to be an agricultural product.

A proposal for environmentally preferable products, promoted by some countries in the region, is currently under discussion and would involve widening the OECD definition to include products whose production processes incorporate ecosystem or ecological services. Environmentally preferable products include organically grown agricultural products, sustainably harvested timber and non-timber products, sustainably produced fishery products, goods and services derived from the sustainable use of biodiversity and products made from natural fibres (ICTSD/IIDD, 2005).

In the future, the environmental goods and services industry is very likely to become one of the main drivers of economic development in many countries, and the outcome of the WTO negotiations will determine not only the degree to which Latin America and the Caribbean will be able to profit from growth in this market but also the contribution that the sector of environmental goods and services and environmentally preferable products will make to sustainability in general and to Goal 7 in particular. All this makes it even more important to broaden the definition of environmental goods and services and to

¹⁰ United Kingdom Department of Trade and Industry.

strengthen those that offer production and exportation advantages. In fact there are some promising initiatives in the region designed to boost the environmental goods and services sector (see box V.2).

Box V.2

BOOSTING ENVIRONMENTAL GOODS AND SERVICES IN BRAZIL

The Brazilian state of Espirito Santo is developing a strategic environmental business plan that is climate-neutral and involves both the public and private sectors. The plan seeks to increase knowledge about the environmental goods and services market, its definition criteria and its potential for Espirito Santo's development plans.

The plan is currently in the phase of structuring analyses of potential demand for environmental goods and services and available supply, especially in the SME sector. The strategic plan is intended to operate in an integrated fashion with other related programmes and forums in the state of Espirito Santo, such as the forum on climate change, the State forum on sustainable production and consumption, and the materials reutilization programme. This plan will help to promote and strengthen a new and promising production sector as a contribution to Espirito Santo's sustainable development, creating tools to publicize the products, technologies and services on offer to consumers and businesses. The main aim of the plan is to help to create new jobs and businesses in Espirito Santo's environmental goods and services market.

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

4. Policy space and trade and investment commitments in bilateral and regional agreements

A fourth important aspect in the relationship between international trade and Millennium Development Goal 7 relates to investment and, in particular, to bilateral and regional agreements on trade and investment. The target sector and quality of the investment and its role in technology transfer are all key factors when it comes to finding a route towards less-polluting, more knowledge-intensive production systems that contribute significantly towards achieving more sustainable development patterns in the recipient country.

The impossibility of making progress in multilateral negotiations on trade and investment (especially in the context of the WTO Doha Round) has led to a proliferation of bilateral free trade agreements (which include investment protection clauses) and bilateral investment agreements in parallel with regional agreements. These impose conditions on the treatment of foreign investment and, in so doing, tend to reduce recipient countries' room for implementing pro-environment policies. This has come to light in disputes between investors and the State involving Latin American countries (see box V.3), and in situations of open and violent conflict (see box II.4).

In spite of all this, there has been something of a change in direction in United States policy on the matter in recent years, in the sense of "rebalancing" foreign investors' rights with the host country's right to regulate in the public interest, including for environmental purposes. This change of direction is evident when comparing the investment chapters in free trade agreements concluded by the United States with countries in the region, such as Chile, Peru and Central American countries (all concluded since 2003) with the investment chapter in the 1994 North American Free Trade Agreement (NAFTA).

Box V.3

THREE STATE-INVESTOR DISPUTES ILLUSTRATING THE CONSTRAINTS PLACED ON POLICY SPACE BY TRADE AND INVESTMENT AGREEMENTS

The system for resolving disputes between the State and investors has been called into question on several counts (Mortimore, 2009). A number of cases have revealed the problems faced by national and local governments in implementing waste-management and urban-planning policies in compliance with their international commitments.

ARB(AF)/97/1, *Metalclad vs. Mexico*: The case concerned the operation of a hazardous-waste landfill by the United States corporation Metalclad in the Municipality of Guadalcázar, State of San Luis Potosí. The municipal authority issued an ecological decree declaring that the site was a natural area, effectively blocking the construction and operation of the industrial waste landfill. However, the federal authorities had already granted Metalclad the necessary permits. The legal arguments for the judgment were adduced in terms of compliance with NAFTA regulations. Metalclad argued that the San Luis Potosí State government and Guadalcázar municipal council had wrongfully prevented the landfill's operation and demanded compensation of more than US\$ 130 million. The arbitration tribunal ruled that the actions of the San Luis Potosí State government and the Guadalcázar municipal council had resulted in Mexico infringing its NAFTA obligations, as it had failed to treat Metalclad's investment in a fair and equitable manner under international law and had adopted measures equivalent to expropriation of its property. Mexico contested the arbitral award before the Supreme Court of British Columbia (BCSC), Canada. The Canadian court concluded that the arbitral tribunal had exceeded its authority and rejected part of the arbitral award. However, it agreed that the ecological decree issued by the State Governor declaring the landfill site to be part of an ecological reserve was an indirect expropriation of Metalclad's investment. On 26 October 2001, the Federal Government of Mexico and Metalclad agreed to settle the dispute by signing an agreement for the payment of US\$ 16 million compensation to Metalclad and a contract transferring ownership of the property to the Federal Government.

ARB 01/07, *MTD vs. Chile*: The Malaysian firm MTD, together with Chile's Foreign Investment Committee, began formalities for the construction of a residential and commercial building complex in a region south of Santiago. The Committee authorized MTD to bring US\$ 17.5 million into Chile for the project. However, to implement the project it would have been necessary to change the land-use plan, which was for agricultural use. The Ministry of Housing and Urban Affairs did not accede to change the land-use plan, however. Following a protracted dispute, the Chilean State paid MTD compensation of US\$ 8 million.

ARB (AF) 00/02, *Tecmed vs. Mexico*: The case referred to a toxic waste landfill in the city of Hermosillo, Sonora, owned by Cytrar, a subsidiary of the Spanish firm Tecmed. In 1996 and 1997, Mexico's National Ecology Institute (INE) granted Cytrar permits to operate. However, in November 1998 it refused to renew the permit and ordered definitive closure of the landfill on environmental protection and public health grounds. In May 2003, the arbitral tribunal constituted in pursuance with the agreement on the promotion and reciprocal protection of investments between Spain and Mexico ordered the Government of Mexico to pay Tecmed compensation.

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of International Centre for Settlement of Investment Disputes (ICSID).

5. Ensuring consistency in the global partnership for development

A key aspect of the global partnership for development is to ensure consistency between the negotiations and the commitments made in various trade, climate, environmental, financial and other international meetings. The sort of inconsistencies that tend to emerge, for example between rules of trade, production-sector subsidies (to fossil energy or "dirty" sectors), biodiversity conservation and development assistance policies, can be spotted and rectified in the appropriate manner if they are identified in good time.¹¹ A prerequisite for guaranteeing this consistency and enabling the countries of the region to progress towards

¹¹ The European Union has made an effort in this respect with its sustainable development policy, see [online] <http://ec.europa.eu/environment/eussd/>.

sustainable development is to integrate the principles of sustainable development into policies worldwide (target 7.A), particularly in developed countries (see box V.4).

Box V.4

THE BARRIER TO ANDEAN BIOTRADE IS INCONSISTENT AND HINDERS EXPLOITATION OF BIODIVERSITY ADVANTAGES^a

An example of a trade barrier to biodiversity in the Andean countries is the European Union's Novel Foods Regulation. In 1997, the European Parliament approved Regulation No. 258/97 regulating the use of novel foods and new food ingredients in the countries of the European Union in order to safeguard public health and food safety. The main aim of the regulation was to regulate the entry into the European market of foodstuffs that contain or are derived from genetically modified organisms (GMOs), or foodstuffs with a new molecular structure or those arising from new production processes.

The Novel Food Regulation defines novel foods as foods and food ingredients that were not used for human consumption to a significant degree within European Union countries before 15 May 1997. Under the European definition, "novel" foods are not only those involving new production processes, products not previously used for food or foods containing GMOs. The main deciding factor of whether a food or food ingredient is considered "novel" is whether it is new (subsequent to May 1997) to Europe. Thus, the regulation fails to expressly recognize traditional foods or agrobiodiversity products that were not formerly imported or were not used for human consumption to a significant degree within European Union countries before the date stipulated.

This has turned the regulation into an import barrier to agrobiodiversity products and natural food ingredients from non-European countries, despite their being traditional and non-novel foods outside the European Union. For example, in 1999 the European authorities refused to approve stevia (*Stevia rebaudiana*), a plant traditionally cultivated by the Guarani indigenous peoples of Brazil and Paraguay, which is used as a natural sweetener in countries like China, Japan and the Republic of Korea. Maca (*Lepidium meyenii*), a root that has been used in Peru since pre-Colombian times, is listed as a new, unauthorized food in a rapid alert system employed by the European authorities to restrict the entry of foodstuffs into the European market or to withdraw them from it. Other plants from Andean and Amazonian agrobiodiversity are at risk of being refused entry to European markets because of the requirements imposed by the novel food regulation.

It should not be forgotten how important it is, from the trade and environmental standpoints, for Andean countries to succeed in expanding the international-trade share of sectors that exploit the comparative advantages of Andean biodiversity and promote the production of environmentally and socially sustainable goods and services. Colombia, Ecuador and Peru, all megadiverse countries, have made major institutional efforts to foster the sustainable use of biological resources and have developed projects such as the Biotrade initiative with the support of organizations like the United Nations Conference on Trade and Development (UNCTAD), the Andean Development Corporation, the Centre for the Promotion of Imports from Developing Countries (CBI), the International Plant Genetics Resources Institute (IPGRI) and the German Technical Cooperation Agency (GTZ).

Source: International Centre for Trade and Sustainable Development (ICTSD), "Barreras al biocomercio andino en negociación comercial con UE", *Bridges*, vol. 10, No. 3, July 2009.

^a The term "biotrade" refers to the collection, production, processing and marketing of goods and services derived from native biodiversity (genetic resources, species and ecosystems) that employ conservation and sustainable use practices and environmentally, socially and economically sustainable methods.

D. ACCESS TO NEW TECHNOLOGIES

Target 8.F

In cooperation with the private sector, make available the benefits of new technologies, especially information and communications.

Technology transfer has been recognized as a necessary means for enabling developing countries to meet their international environmental commitments and to achieve the targets of Millennium Development Goal 7. While some countries have local technological capacity, the region in general tends to be more of a taker of foreign technology for resolving environmental problems relating to the targets of the Millennium Development Goals. The most important issues that the partnership for development should tackle are rules of trade concerning intellectual property rights, biotechnology as it relates to biodiversity and information and communication technologies. These issues are discussed briefly below.

1. Intellectual property rights: importance of trade rules

The effort to ensure global harmonization of the rules governing knowledge and innovation and the incorporation of intellectual property rights into the rules of trade have significantly altered the development of the knowledge economy and allowed global development policies to encroach on matters that were formerly the sole domain of national policy. In the past, many of today's industrialized countries used a system that included exclusions from patentability. Industrialized countries were allowed to develop their industry locally, facilitating imitation, adaptation and reverse engineering—all practices that are now prohibited under the trade regime that formerly enabled local technological capacities and structures to mature. The recent incorporation of intellectual property into the rules of trade has been a response to pressures from knowledge-intensive sectors, especially the most sensitive and easily imitated ones, such as the chemical and pharmaceutical, entertainment and information technology industries.

In addition, the scope and breadth of intellectual property rights have recently been extended by a new generation of bilateral trade agreements representing the most concrete manifestation of a far-reaching harmonization of intellectual property standards and regimes (Roffe and Santa Cruz, 2006). As in any other sphere of international policy, a multilateral, regional or bilateral system does not automatically benefit environmental sustainability, which will depend on balancing environmental, social and economic interests.

The development of more environmentally benign alternatives to environmentally undesirable products or processes will generate the corresponding intellectual property rights. That is to say, insofar as the answer to environmental problems lies in technological innovation, the current structure of the intellectual property regime and international trade rules can provide significant opportunities to innovators, by guaranteeing them the right to capture a proportion of the rents arising from improved environmental performance (see box V.5).

Box V.5

INCREASE IN RECEIPTS FOR ROYALTIES AND LICENCE FEES

In recent years, knowledge has become an especially important means for wealth creation, productivity and development. This is reflected in the growing proportion of high-technology goods in world trade and increasing receipts for technology licences. For example, United States receipts for royalties and licence fees are estimated to have grown six-fold between 1986 and 2003, from US\$ 8.133 billion to US\$ 48.227 billion. Moreover, Latin American countries' payments to the United States increased from US\$ 258 million in 1986 to US\$ 2.293 billion in 2003, although they represented only 5% of the total. According to the 2005 Human Development Report of the United Nations Development Programme, "Firms in developed countries currently account for 96% of the royalties from patents, or US\$ 71 billion a year".

Source: Pedro Roffe and Maximiliano Santa Cruz, "Los derechos de propiedad intelectual en los acuerdos de libre comercio celebrados por países de América Latina con países desarrollados", *serie Comercio internacional*, No. 70 (LC/L.2527-P), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), April 2006. United Nations Publication, Sales No. S.06.II.G.54 and United Nations Development Programme (UNDP), *Human Development Report*, 2005, New York, Oxford University Press, 2005.

However, as compulsory coverage by the intellectual property regime is broadening in scope and the intellectual-property protection period in bilateral free trade agreements is lengthening, in practice there is very little technology dissemination. Indeed, intellectual property provisions restrict traditional reverse engineering methods and other forms of imitative innovation, limit exclusions from patentability—which affects pharmaceutical and food products in particular—and reduce forms of compulsory licensing (Schaper, 2007). All this hampers the efforts of Latin American and Caribbean countries to improve their level of technological development, to modernize and to pursue a process of sustainable development that would contribute to achieving the Millennium Development Goals. Added to this is the importance of intellectual property provisions for access to genetic resources, biotechnology development and the equitable distribution of biodiversity benefits, which are of relevance to targets 7.A and 7.B.

2. Biotechnology and biodiversity

The capacity to develop knowledge, technology and innovation and to apply it to biological resources, especially biotechnology, is imperative for the sustainable development of Latin American and Caribbean countries and for their achievement of target 7.B, especially in view of their vast supply of genetic resources and rich biodiversity.

New third-generation biotechnologies (essentially recombinant DNA and cell fusion) and advances in the field of microelectronics and testing techniques for biological materials have increased the value of biodiversity and this has heightened the interest of pharmaceutical, chemical, biotechnology and seed production companies in both wild genetic resources and the traditional knowledge of indigenous peoples and local communities.

Advances in techniques for exploring live organisms and the economic potential of biotechnology have enhanced the value of genetic resources and biochemicals from biodiversity. As a result, the biological wealth of the countries of the region and the associated traditional knowledge are emerging as a new economic, scientific and technological frontier (Cabrera, 2008).

Some thought needs to go into the type of intellectual property required for these new technologies, and mechanisms are needed for accessing and transferring them. While conventional

technology tends to be mostly in the public domain, with large-scale State participation in the research process, biotechnology advances are in the hands of the private sector.

As regards the WTO agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), specifically article 27.3 (b), experts on the subject have concerns about a number of issues, ranging from the risk of encouraging biopiracy of traditional resources and knowledge, to peasant farmers being banned from keeping and trading seeds of protected species, to the possible environmental impact of genetically modified organisms.¹²

The emergence of an international legal framework in the Convention on Biological Diversity and the International Undertaking on Plant Genetic Resources of FAO has highlighted the conflict between efforts to strengthen intellectual property rights and the goals of biodiversity conservation and sustainable use and of equitable distribution of the benefits derived from the use of genetic resources.

3. Access to information and communication technologies

New information and communication technologies (ICTs) are changing the economy, politics, international relations and culture, and opening up a new phase in globalization. They are now a key component of strategies for achieving the targets of Millennium Development Goal 7. With the collapse of dot-com companies in 2001, the Internet took a crucial new direction: Web 2.0 was created. In cyberspace, the centre of gravity shifted from the passive viewing of information to interactive websites. New ways of promoting responsible citizenship were born. A set of social software tools and information-sharing and collaboration architectures based on decentralized conversations supported by multiple interconnected media was developed. The emergence of social networks and media has enabled users to actively facilitate, create, supply, copy, share, circulate and comment on multimedia content, creating a space for shared knowledge creation, collaborative working, publication and dissemination of every type of content and the organization of responsible groups that promote socio-environmental causes, all on a global scale.

Social media are a real emerging phenomenon that should not be overlooked when analysing ways to promote a culture of sustainability and socially and environmentally responsible citizenship. A large number of websites exist that use web-based citizen participation to promote responsible or ethical consumption, movements to support fair trade, sustainable transport and housing, cause-marketing campaigns, social responsibility and business activism to foster environmental neutrality (see box V.6).

Not only the private sector and civil society are promoting such initiatives. Many countries are introducing the “government 2.0” concept into the practice of government, to make it: (i) more like a process than a monolithic structure; (ii) like a provider of products and services geared to citizens; and (iii) like a co-creator of initiatives in conjunction with citizens and civil society.

Amongst other benefits, ICTs have permitted effective monitoring of deforestation in the Brazilian Amazon, advances in wind power in Mexico, more effective and efficient sanitation facilities in the region and the dissemination of good practices (see box V.7).

¹² Article 27.3 (b) refers to exclusions from patentability of plants, animals and biological processes for the production of plants or animals.

Box V.6

EXAMPLES OF WEB 2.0 APPLICATIONS FOR PROMOTING SUSTAINABILITY

In the United Kingdom, research is being conducted into the way people's behaviour is shaped by communication, insofar as the information they receive can influence their lifestyle (see [online] <http://business.kingston.ac.uk/charm>). The project involves informing individuals about their electricity consumption; if it exceeds that of others in their social group, which is also included in the study, they are told that their consumption is high. In the absence of any other incentive, when individuals become more aware of their level of consumption, they tend to reduce their electricity use and, little by little, their behaviour is shaped by feedback on the performance of their social group.

Initiatives like *One Block off the Grid* (see [online] <http://1bog.org/>) provide a participatory platform for coordinating solar communities. A facilitator coordinates groups of home owners living on the same block to install electricity generators powered by cost-price solar energy. Another case is Carrotmob (see [online] <http://carrotmob.org/>), a method of socio-environmental activism that leverages consumer power to promote socially and environmentally responsible business practices through social networks. Firms compete to do the most good and then a large group of responsible consumers buys their products in order to reward whichever business made the strongest commitment to improving their practices. The Freecycle Network (see [online] <http://freecycle.org>) is another such venture; it is made up of more than 4,800 groups with over 6.5 million members across the globe, whose goal is to keep recyclable and re-usable items out of landfills by gifting them to others. Each group is moderated by a local volunteer who coordinates a local e-mail group in which all types of material items are offered, sought and accepted free of charge. Firms like Prosper (see [online] <http://prosper.com>) and Zopa (see [online] <http://zopa.com>) have created a system of peer-to-peer lending to cut out the middleman, in which both borrowers and savers participate. In addition to putting lenders into contact with borrowers, these systems assess loan repayment risks, recover bad debts and facilitate the formation of diversified investor portfolios. Following this model of peer-to-peer lending, Kiva (see [online] <http://kiva.org>) sets out to alleviate poverty and promote sustainability by means of a similar system of microfinance.

Source: A. Schuschny, *La Red y el futuro de las organizaciones. Más conectados... ¿Más integrados?*, Buenos Aires, Editorial Kier, 2007.

Box V.7

CONTRIBUTIONS OF INFORMATION AND COMMUNICATION TECHNOLOGIES TO ENVIRONMENTAL SUSTAINABILITY IN THE REGION

It is difficult to list all the many ICT applications in the area of environmental protection. They range from the use of satellite imagery for monitoring fishing vessels to prevent illegal fishing, to the use of satellite positioning systems for tracking individual species threatened with extinction in order to monitor their behaviour and migration routes and so devise measures to protect them. As part of a Chilean project to support the conservation of the South Andean deer (*Hippocamelus bisulcus*) or huemul, pumas are fitted with a GPS tracking collar to determine their predatory impact on the huemul and other species. The use of satellite imagery to monitor deforestation has signalled a significant step forward in biodiversity protection. The Brazilian Institute for Space Research (INPE) works with high-resolution images covering all 5 million square kilometres of the Brazilian Amazon, as well as other areas of special interest like the Mata Atlantica forest. INPE runs a variety of programmes for keeping tabs on deforestation in the Amazon region and has developed new applications for monitoring it in real time, in order to detect forest fires and to identify areas with incipient processes of degradation where loss of forest cover has not yet occurred.

In the case of bioprospecting (the systematic search for bioactive substances that can be used to develop new commercial products from biodiversity, such as drugs, nutrients or cosmetics), the development of data-processing systems in conjunction with other cutting-edge technologies (in this case, robotics) enables a vast number of tests to be conducted rapidly in order to identify active compounds, antibodies or genes and to determine their potential usefulness.

No less important has been the development of geographic information systems (GIS), in which georeferenced information is stored and analysed and different socio-economic variables are managed, facilitating the design and implementation of investment policies and projects, including those for achieving the targets for safe drinking water and sanitation.

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

ICTs are estimated to generate 2.5% of global greenhouse-gas emissions at present, a figure that is set to increase as access to ICTs becomes more widespread. At the same time, ICTs could be key to solving the problem of climate change in all sectors, promoting the creation of more energy-efficient devices, systems and processes, reducing inventory accumulation cycles and the need for transport by means of web-based collaboration and just-in-time distribution systems.

In some cases, international cooperation has helped to ensure access to appropriate technologies (see box V.8). In other cases, access has been routed through the market, where the foreign firms that own the technology license it to local public and private firms and institutions, or by means of free software tools. The constraints on wider access to technology are financial and tend to be linked closely with regulations on intellectual property or on building technological capacity and expertise. Changes in practices always lag behind a technology revolution. What is needed is promotion of the use of social media and available tools, together with the necessary digital literacy, in both the public and private sectors.

Box V.8

RETScreen AND ITS CONTRIBUTION TO THE ACHIEVEMENT OF TARGET 8.F: FREE SOFTWARE FOR ANALYSING CLEAN ENERGY PROJECTS USING ICTs

RETSscreen is a decision-support tool developed to analyse the viability of different renewable energy technologies (including wind, small hydro, solar, biomass and geothermal power) to reduce the costs, time and errors associated with the preparation of the feasibility and pre-feasibility studies so crucial for informed decision making. The RETSscreen software, which can be downloaded free of charge in 35 languages, is used to evaluate the energy production and savings, life cycle costs, emission reductions, financial viability and risk for various types of renewable-energy and energy-efficient technologies. It includes product, cost and climate databases. Access to this software offers a way over the barrier encountered by some renewable-energy-based projects that would otherwise be stymied by lack of pre-feasibility studies. Using the RETSscreen software cuts these costs, helping to achieve not only target 8, but also Millennium Development Goal 7.

Between 1998 and 2004, the benefits of RETSscreen were as follows:

- Savings for users: US\$ 240 million in Canada and US\$ 600 million worldwide.
- Reduction in greenhouse gas emissions: 130 kilotonnes of CO₂ per year in Canada and 630 kilotonnes of CO₂ per year worldwide.

Below are some of the Latin American and Caribbean projects in which RETSscreen was used:

Country	Organization	Description	Size	Value (Millions of dollars)
Brasil	Negawatt Ltda.	Small hydropower plant	4 MW	6.0
Costa Rica	Inti Tech solar	Photovoltaic power plant (32 projects)	40 kW	0.5
Guatemala	Electroriente S.A.	Small hydropower plant	3.5 MW	7.5
Nicaragua	Comisión Nacional de Energía	Mini-hydro plant (8 projects)	12 MW	18

Source: Stephen Graham and Steve Higgins, SGA Energy Ltd., *An Impact Assessment of RETSscreen® International 1998-2012, Final Report to CETC-Varenes*, April 2004 [online] <http://retscreen.gc.ca>.

Chapter VI

SUMMARY AND GUIDELINES FOR ACTION**A. ADJUSTMENTS THAT NEED TO BE MADE TO THE DEVELOPMENT MODEL**

As discussed in chapters II and III of this report, certain features of Latin America and the Caribbean largely explain the progress and delays in attaining the targets of the seventh Millennium Development Goal, as described below.

- Persistently high levels of poverty have resulted in the occupation of precarious land plots and the formation of slums in the region's cities. The low payment capacity of much of the population poses a major challenge in terms of ways to supply drinking water, sanitation and housing services. The poor are most affected by environmental deterioration, the effects of land degradation on food security, the vulnerability of slum dwellings to weather-related disasters, the risk of contracting diseases and limited access to health services. High levels of inequality mean that different realities coexist within countries and cities —realities that are diametrically opposed in terms of the quality of life of their inhabitants and their relation with the environment.
- The region has a major infrastructure deficit that diminishes its inhabitants' quality of life and renders its countries less competitive, leading to inefficient individual consumption decisions. Legal and financial structures often discourage investment in systems and technologies which, while yielding a lower return in the short run, are more economical and even profitable in the long term and have a smaller environmental impact.
- Enterprises, and the private sector generally, have made investments to gain knowledge of and manage the effects of their activities on the environment; but business behaviour is highly variable, and small and medium-sized enterprises (SMEs) in particular face numerous difficulties in gaining access to resources that would allow them to perform better in this area. The environmental impact of industrial and business activity in the region as a whole depends on the nature of that activity, which in turn is defined by the countries' specialization pattern. This remains largely centred on natural-resource- and land-intensive primary sectors, and on natural resource-based industries, which are among the most environmentally sensitive.
- Civil society has engaged increasingly in environmental issues by creating non-governmental organizations and exercising its right to access to information and environmental justice. Nonetheless, the lack of mechanisms for broad participation in policy design and implementation, and the limited application of measures agreed upon, impair its leadership and capacity to exert a positive influence on the sustainability of development. Moreover, access to environmental justice is hindered by its high cost, poor public knowledge of environmental duties and rights and difficulties in dealing with the relevant institutions.
- Latin America and the Caribbean is more vulnerable to climate change than most other regions of the world, so the relevant adaptation measures put new pressures on public and

private resources. Both the effects of climate change and competition for resources could raise additional obstacles to satisfying the population's basic needs and environmental demands that are not directly related to this meteorological phenomenon. Climate change raises new problems in attaining environmental and biodiversity targets, expanding drinking water and sanitation services and improving conditions of life for slum dwellers. Moreover, the foreseeable consequences, which are already becoming visible, make it even more urgent to strive towards the stated objectives. The recent clarity acquired by the scientific community regarding the specific effects of climate change shows that it is impossible to continue moving along a development path that ignores the environmental externalities of human activity.

- Rapid land occupation in an area characterized by fragile ecosystems has not only upset the equilibrium of those systems, but also generated demands that put additional pressure on environmental quality. For example, the expansion of cities without an adequate solid waste management system has led to refuse being inappropriately discharged into water bodies or soil, which impairs the provision of ecosystem goods and services.
- The global economic and financial crisis has also heightened competition for scarce public and private resources. Nonetheless, in conjunction with the challenges and global efforts involved in mitigating the impact of climate change, the crisis also provides an opportunity to change development and growth patterns, as proposed in the Green Economy Initiative. The region's Governments and enterprises must be prepared to engage competitively in a global economy that is tending towards the less intensive use of fossil fuels.
- Latin America and the Caribbean is a region of crucial global importance in terms of the ecosystem services it provides. In view of the principle of shared but differentiated responsibilities, there is a need to strengthen the commitment of the international community, and of developed countries in particular, to provide funding to ensure environmental sustainability and conserve the region's ecosystem services. Climate change poses new challenges and financial demands in this regard.

In brief, as shown by the major backlogs in fulfilling the Goal 7 targets identified in chapter IV, the prevailing development model has failed to resolve the region's poverty and social-exclusion problems, protect the environment or detain processes of environmental deterioration, to ensure basic needs are satisfied and underpin the prosperity of future generations. This reality calls for adjustments to create a different development model—a sustainable development scheme—which values the importance of environmental resources for the long-term well-being of the region's inhabitants and the global ecological balance. The traditional approach to the environment taken by public policies, where environmental quality is viewed as a secondary and superfluous goal of economic development and social welfare, is an anachronism. The international community's reaction to the twin challenges of the crisis of contemporary capitalism and climate change is pointing in this new direction, and the region should therefore adopt a proactive approach in this process. Basically, “green” growth seeks to ensure that the full cost of activities that pollute and harm the environment are internalized, so that decisions can be made on the basis of real data.

Although altering the prevailing development model calls for perseverance from the various stakeholders, whether public, private or civil society, the State has an important and unique role to play in establishing conditions that permit and promote this change.

In this context, this chapter reviews progress made towards fulfilling the Goal 7 targets, based on the analysis performed in chapter IV; it also proposes a number of guidelines for action.

The chapter is structured around three thematic areas that group Goal 7 issues together. The first addresses the first part of target 7.A, which concerns the various elements of policy and governance needed to integrate sustainability principles into decisions on public policies, plans, programmes and projects. A second area covers the second part of target 7.A along with target 7.B, which aim to reduce the loss of environmental resources and biodiversity. The third refers to targets 7.C and 7.D, which highlight basic aspects of the quality of life in human settlements: access to drinking water, sanitation and reduction of the number of people living in slums.

Each section summarizes the main conclusions of this document and proposes a number of guidelines for action on the issues covered by the various targets and indicators, with reference to complementary topics where relevant. The last section of the chapter sets forth a number of recommendations for improving indicator measurement and, hence, the report on the fulfilment of Goal 7 in the region's countries.

B. INTEGRATE THE PRINCIPLES OF SUSTAINABLE DEVELOPMENT INTO COUNTRY POLICIES AND PROGRAMMES: TARGET 7.A

A cornerstone of the sustainable development concept is that the environment must form an integral part of the development process and cannot be considered in isolation from it (Principle 4 of the Rio Declaration on Environment and Development). This is clearly reflected in the first part of target 7.A of Goal 7: "Integrate the principles of sustainable development into country policies and programmes." Meeting this target is crucial for enhancing the sustainability of analysis and decision-making models and, directly, for progressing towards the other targets of Goal 7.

1. Summary of the situation

Latin American and Caribbean countries have made substantial progress in terms of environmental legislation and the creation of institutions with mandates directly related to the environment. Nonetheless, effectively implementing the institutional arrangements and new laws remains a huge challenge, as does integrating the sustainability approach —particularly the environmental component— into decision-making processes in other sector areas, such as energy, agricultural or demographic policy. When policy objectives clash, it is usually the sector goals that prevail in most of the region's countries. Environmental protection aims promoted by new or recently created institutions, which have relatively less importance and political capacity and whose resources tend to be inadequate to the scale of their mission (see chapter IV), tend to be relegated in favour of sector objectives of well established political importance and measurable economic impact that the population can easily comprehend. Many government institutions are only just starting to understand environmental and sustainable development issues and to incorporate them into their decision-making processes. Insufficient coordination and consistency of decisions and policies in public institutions means that the pursuit of sectoral objectives actually encourages environmental degradation: subsidized loans are offered for livestock raising in areas prone to deforestation; infrastructure projects are promoted with only a partial assessment of their environmental and social costs; and technological alternatives that have less negative effects are not considered.

Environmental degradation is diminishing the welfare of the region's inhabitants, as shown by the increased incidence of diseases, higher operating costs of economic activities, aggravated social conflicts and greater vulnerability to climate change.

2. Guidelines for action

Effectively integrating the principles of sustainable development into policies and programmes is a long and complex process in which the specifics of individual countries and Governments and each type of policy should be taken into account. A number of generally applicable guidelines are provided below.

(a) Improve decision-makers' understanding of the economic and social importance of the environment as part of a country's wealth

From an economic perspective, protecting the environment generates positive externalities or helps to create public goods, such as robust ecosystems and climate stability. In the absence of tools to internalize these externalities, environmental protection tends to be undervalued, which is harmful for society. A corollary to this is that the beneficiaries of environmental protection —the world as a whole in the long run— are not the same as the agents that degrade the environment —public or private entities or firms that operate on the basis of legal and financial systems that prioritize the short term and do not protect environmental resources or poor communities that are only trying to survive. In simpler terms, the deterioration of the various indicators reveals a lack of awareness and knowledge in society at large, and among decision-makers in particular, of the benefits provided by ecosystems, of how we damage them and of the eventual related costs, especially in the long term.

Making the changes to production and consumption patterns needed to attain targets 7.A and 7.B, entails obtaining full knowledge of both the economic and social costs of environmental degradation and the economic benefits of environmental protection, and taking them into account in public and private policy-formulation and decision-making.

The following suggestions are offered in this regard:

- Invest to improve national statistics capacities, including the introduction of a system of integrated accounts; improve population, housing and agricultural censuses; and prepare and implement methodologies for performing economic assessments of environmental degradation, the opportunity costs of conservation and the costs of inaction. Dissemination of this knowledge among public policy-makers in the various domains of government and in the private sector should be a priority.
- Bring the methodological “languages” of policy and project evaluation used in the various domains of public policy closer together. This means using the usual employment, fiscal and other multipliers when analysing environmental projects, plans and programmes —traditionally based on cost-effectiveness— but also including other variables that reflect the value of the environment.
- Strengthen capacities to monitor resource management and compliance with regulations, including the adoption of geospatial technologies.

- Harmonize environmental policies on issues of regional importance.
- Encourage studies and measurement of the economic value of environmental services.

(b) Improve the coordination and consistency of public action to guarantee the sustainability of development

The following measures are suggested:

- Create permanent mechanisms to coordinate public action between the various authorities, sector areas and administrative levels.
- Design and implement systems to evaluate and monitor the effects of policies, programmes and projects on the sustainability of development.
- Foster harmonization and consistency between national policies on production sector activities that have a high environmental impact and environmental policies for managing the related natural resources.

(c) Lay foundations for a development model that incorporates the external costs of environmental degradation as well as the external benefits of activities that do not damage the integrity of ecosystems.

- Reduce the profitability of activities and sectors that have a high environmental cost. The following is proposed for that purpose:
 - Review and eliminate subsidies, such as fiscal incentives and public credits, for activities that have identifiable links with environmental degradation processes.
 - Adopt regulatory measures and tools (for example, fiscal and economic instruments, public credit policies, sustainability criteria in government procurement) that promote efficient resource use and force economic agents to take account of the long-term costs of the negative externalities associated with their technological choices. The pricing of activities that pollute or cause environmental degradation should reflect the social cost of the externalities in question.
 - Allocate financial, human and technological resources to strengthen inspection activities and the monitoring of the observance of environmental laws, thereby increasing the costs of non-compliance.
- Increase the profitability of activities, sectors and technological choices that have a smaller environmental impact:
 - Take steps to ensure that the interests of public or private agents coincide with collective interests or those of society as a whole. It is worth noting here that the social benefits of conserving forests, oceans and biodiversity, among other things, are generally greater than those actually perceived by the private agents, firms or persons responsible for deciding whether to conserve or degrade the environment. This convergence can be pursued by undertaking new activities that are based on better knowledge and greater capacity for managing ecosystems. Resources will have to be transferred, for example, by

having agents pay for ecosystem services. In the case of climate change initiatives, this can be achieved by incorporating the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD Programme) into the market mechanisms of the climate regime established through international negotiations. An effective system is also needed for accessing and distributing the benefits arising from the use of genetic resources and the relevant technologies, recognizing that the possession of traditional knowledge is an income source for population groups that conserve forests and the related biological diversity.

- Introduce regulations, incentives and financing schemes that take into account the long-term profitability and the cost of negative environmental externalities, to promote the development of new sectors and technologies that incur lower environmental costs. Here firms will need help to take advantage of the new markets that will emerge or expand as the development model improves. The implementation of sustainable government procurement programmes, for example, has the double effect of ensuring consistent State action in relation to changes in the model and fostering the creation of new markets.
- Invest in systems for exchanging and replicating successful experiences to tackle the common challenges in this process.

C. THE SUSTAINABILITY OF THE NATURAL ENVIRONMENT: TARGETS 7.A AND 7.B

Table VI.1 summarizes the targets in question and the related official indicators. Each indicator is then analysed in light of the main conclusions arising from this report and a number of suggested guidelines for action on the corresponding aspects of environmental sustainability.

Table VI.1
TARGETS 7.A AND 7.B AND ASSOCIATED OFFICIAL INDICATORS

Target	Indicator
Target 7.A Integrate the principles of sustainable development in the country policies and programmes and reverse the loss of environmental resources	7.1 Proportion of land area covered by forest
	7.2 CO ₂ emissions, total, per capita and per \$1 and GDP (PPP)
	7.3 Consumption of ozone-depleting substances
	7.4 Proportion of fish stocks within safe biological limits
	7.5 Proportion of total water resources used
Target 7.B Reduced biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss	7.6 Proportion of terrestrial and marine areas protected
	7.7 Proportion of species threatened with extinction

Source: United Nations, Millennium Development Goals Indicators [online] <http://mdgs.un.org/unsd/mdg/Host.aspx?Content=Indicators/OfficialList.htm>.

1. Proportion of land area covered by forest: Indicator 7.1

(a) Summary of the situation

Deforestation increased during the review period (1990-2005), particularly in South America, which accounts for 90% of Latin American and Caribbean forests and 86% of losses. The main causes were: the expansion of economic activities such as crop farming and livestock raising, which are more profitable than those more compatible with the conservation and sustainable exploitation of forest areas; and policy mistakes such as granting tax benefits or subsidized credits to livestock raising in sensitive zones. The available evidence shows that some of the planet's most valuable regional ecosystems are deteriorating fast, largely because of economic activities that operate on an unsustainable basis and the predominance of short-term profit-seeking that ignores the long-term external effects of economic decisions.

The repercussions of deforestation include loss of biodiversity, destabilization of soils, disturbance of the hydrological cycle and a reduction in the CO₂ sink effect. These situations are largely irreversible, undermine productivity in key sectors of the region and have significant social and economic consequences. Agriculture is a particularly sensitive sector, since it directly affects food security.

In addition to its environmental dimension, deforestation has a direct impact on the region's economies—for example through the effects of changed hydrological cycles on agricultural productivity—and on the world at large owing to its contribution to climate change. Deforestation in Latin America and the Caribbean makes a significant contribution to total CO₂ emissions, both regionally and worldwide.

The loss of biodiversity that accompanies deforestation is also a strategic problem, both from the economic standpoint and in terms of the region's development possibilities. The new biotechnologies have increased the perceived value of biodiversity; and this has elicited interest among pharmaceutical, chemical, biotechnology and seed-producing firms, both in wild genetic resources and in the traditional knowledge of indigenous peoples and local communities. The biological wealth of the region's countries and the related traditional knowledge have thus become a new economic, scientific and technological frontier. Nonetheless, an international regime governing access to genetic resources needs to be consolidated to ensure fair and equitable participation in the benefits obtained from their use and to help eradicate practices of illegal trade and appropriation of those resources and the related traditional knowledge.

Deforestation also undermines the way of life of local communities that depend directly or indirectly on forests, particularly indigenous peoples; and its social and economic effects tend to produce a vicious circle of migration to the cities and poverty.

In the Caribbean, forest coverage actually expanded during the period under review. This is partly the result of a deliberate national programme in Cuba to increase forested areas, which included converting sugarcane plantations into tree plantations. Moreover, as tourism has replaced agriculture as the main source of income on many Caribbean islands, abandoned fields have regenerated plant cover naturally. Nonetheless, the lack of recent data on forestry inventories makes it hard to quantify the extent of this spontaneous development that has led to the formation of secondary forests.

Regionwide, planted forest areas are increasing as the area of natural forests declines, but at a much slower rate. Moreover, while it is true that tree plantations generate a number of ecosystem services such as CO₂ capture, they cannot replace the ecological functions of natural forests or protect biodiversity in the same way.

(b) Guidelines for action

- Adopt measures to internalize the costs of environmental degradation, thereby helping to reduce the profitability of activities that cause deforestation vis-à-vis those that are compatible with sustainable forest use. This requires a detailed review of price distortions and policy mistakes, including the ways in which some subsidies and tax exemptions have been granted. Environmental guidelines also need to be adopted for productive activities in economic sectors that have traditionally been associated with deforestation, such as crop farming, livestock raising, mining, hydrocarbons and the timber industry.
- Promote the sustainable management of native forests, including the comprehensive exploitation of wood and non-wood forestry products and environmental services. This can contribute to the conservation of such forests by generating periodic and permanent incomes for their owners.
- Strengthen inspection activities and the application of sanctions against unlawful conduct. Progress has been made in this regard in the Brazilian Amazon region, where the following measures have succeeded in slowing the rate of deforestation: (i) intensification of federal police actions to suppress illegal activities; (ii) closer monitoring by the Brazilian Environment and Renewable Resources Institute (IBAMA); and (iii) entry into force of the National Monetary Council decree eliminating credits for enterprises and individuals with a history of illegal actions damaging the environment.
- Extend the use of satellite images to monitor deforestation and protect biodiversity. This would make it possible to quantify the extent of Latin American and Caribbean forests, using agreed-upon measurement and monitoring methods, and would improve the supply of reliable and up-to-date information. High-resolution satellite images make it possible to detect fires, identify degradation processes and monitor illegal deforestation activities.¹
- Develop more profitable alternative industries for local communities, which are often the agents of deforestation. There are several recent examples of this in the region, especially in agriculture² and tourism.
- It is essential to implement mechanisms whereby ecosystem services are paid for, such as the REDD initiatives, which recognize the contribution made by forestry conservation to climate security, emissions mitigation and biodiversity protection. Costa Rica and Mexico have recently made interesting progress on this.

¹ In Mexico, the National Commission for Knowledge and Use of Biodiversity (CONABIO) has successfully implemented this practice, while also providing support to other countries in the region. In addition, Brazil has also had a positive experience through the Institute for Space Research (INPE), whose satellite monitoring covers the 5 million km² of the Brazilian Amazon.

² Panama has implemented an initiative to support local production based on an environmental business scheme (see [online] <http://www.laestrella.com.pa/mensual/2009/06/30/contenido/11264936.asp>).

In Brazil, local communities have set up a small farmers' cooperative under the high-density reforestation project RECA (*Reflorestamento Econômico Consorciado e Adensado*) with a view to developing production methods that provide incomes for families but also guarantee environmental sustainability. Its products are organically produced and have certification, which adds value to them and enables them to enter preferential market niches (for further information, see [online] <http://ideea.cepal.org/ideea/ideea.htm>).

- Invest in capacity to develop knowledge, technologies and innovations and in their application to biological resources, particularly biotechnology, bearing in mind the vast range of genetic resources available in the region and its biological wealth. This would lay the foundations for a more sustainable use of biodiversity, which in turn would make it possible to more fairly distribute the benefits obtained from using genetic resources. The current biotechnology ownership regime needs to be reviewed, and fairer mechanisms need to be found for accessing and transferring such ownership. Unlike what happens with conventional technology, which is mostly of a public nature and benefits from State-supported research, biotechnological progress is usually in the hands of the transnational private sector, which puts local communities and the countries that own the assets in question at a disadvantage.

2. Carbon dioxide emissions: Indicator 7.2

(a) Status summary

The total volume of CO₂ emissions in Latin America and the Caribbean has grown steadily since 1990. There is a lack of data and information on this subject, however: the available official figures only consider emissions from the burning of fossil fuels and cement production and exclude emissions caused by land-use change and deforestation. They therefore tend to underestimate the level of regional emissions. The relation between CO₂ emissions in GDP has remained broadly stable through time, declining slightly, largely due to the change in the regional production structure. In particular, the growth of the services sector, technological innovation and implementation of regulations aimed at developing more energy-efficient economies has helped reduce CO₂ emissions per unit of GDP. Nonetheless, the expansion of the transport sector and changes in the energy mix including the greater use of fossil fuels have prevented a greater reduction. According to the projections presented in chapter IV (see box IV.3), the region's CO₂ emissions will most likely continue to grow, because energy decoupling and the decarbonization of economies are still insufficient to offset burgeoning energy demand and economic growth.

One of the key challenges facing the region is to reduce CO₂ emissions generated by land-use change and, particularly, by deforestation which is directly and closely related to the forest-cover indicator. In Latin America and the Caribbean, net emissions arising from land-use change and forestry are positive, whereas the carbon-sink effect outweighs emissions in other developing regions. Amazonia is a crucial area in this process. Apart from its contribution to emissions and its mitigation potential, the Amazon jungle plays a fundamental role in the region's climate system, although it has to be said that this ecosystem is at a turning point, involving small carbon capture which in the future could even outweigh the carbon-sink factor. As the region also possesses one third of the world's forestry biomass and two thirds of the world's tropical forestry biomass, it has major potential to help mitigate global climate change through the CO₂ retention services its forests provide.

Even with the increase recorded, regional CO₂ emissions are a small fraction of those in developed countries, whether in absolute terms or in relation to GDP or per capita. The Latin American and Caribbean emission figures only exceed those of the African continent. Climate change and global mitigation measures nonetheless increase the need to move towards greater carbon efficiency. The underlying problem is the pattern of energy consumption that prevails in our societies, not just fuel substitution. For that reason, energy efficiency needs to become one of the pillars of a sustainable development policy premised on "doing more with less energy".

(b) Guidelines for action

The region faces two main challenges regarding emissions generated by fossil-fuel use: (i) effectively dealing with the growth in energy demand that will accompany development over the next few decades in a setting of economic and demographic expansion; and (ii) maintaining a competitive position in a new low-carbon international trade and investment paradigm. The following guidelines aim to address these challenges.

(i) Consolidate efficient energy use. It is important to create and maintain the conditions, incentives, technologies and standards needed to make substantial progress in terms of energy efficiency. The recent experiences in Brazil, Chile and Mexico, mentioned in chapter II, are interesting in this regard; but there is still major potential to be exploited, for example, in terms of developing energy-efficiency policies in industries and buildings, including in low-income housing. Another area showing significant progress is sustainable government procurement, which entails taking advantage of the substantial purchasing power possessed by Governments which can influence markets and force production and consumption to be sustainable. The pioneering experiences in the region, such as those in Chile, have placed major emphasis on energy efficiency.

(ii) Create an ad hoc regulatory framework to promote lower carbon intensity through efficient energy use and the development of renewable energies. This regulatory framework should include economic incentives, tax breaks and other related measures. The economic rationale underlying this new generation of public policy measures is to shift the relative profitability of the various types of energy in favour of those that emit less CO₂. In this way, technologies, industries, materials and construction methods which generate high levels of CO₂ will become more expensive than their less polluting counterparts. Here too there are interesting examples in Brazil, Chile and Mexico. In terms of regulation, the use of strategic environmental assessments in energy development policies, programmes and plans at the national and subnational levels should help to internalize externalities more quickly and make it possible to find more sustainable solutions.

(iii) Take initial first steps in terms of mitigation and the financing of adaptation measures. Although the region is not a large CO₂ emitter on the global scale, international agreements and particularly trade conditions make a number of mitigation steps necessary. One of these is to make progress in estimating the emissions generated by land-use change and deforestation. Information and communication technologies (ICTs) could be very useful in this task, along with cooperation between countries that share ecosystems. Moreover, in international negotiations, the region's countries should lobby for more integrated carbon markets and the valuation of global operations aimed at financing adaptation initiatives. Another opportunity to mitigate climate change in the region involves exploiting the methane gas produced in sanitary landfills. If this were to be channelled into energy production, it would no longer produce a greenhouse effect but would become an important source of clean energy.

3. The consumption of ozone-depleting substances: Indicator 7.3**(a) Summary of the situation**

Regional emissions of ozone-depleting substances have decreased steadily, in the wake of steps taken under the Montreal Protocol on Substances that Deplete the Ozone Layer, including international cooperation, technological progress and successful public-private collaboration.

(b) Guidelines for action

The positive results achieved thus far make it necessary to maintain efforts and not relax them. Progress still needs to be made in eliminating the production of ozone-depleting substances, such as hydrofluorocarbons (HFCFs), which, while having a smaller depletion effect, nonetheless contribute to global warming. For that reason, the countries decided to bring the elimination timetable forward, which will also help reduce greenhouse gas emissions. These results are largely due to international financing for the replacement of ozone-depleting substances by others whose use and production is economically and technically viable. The challenge, therefore, is to consolidate the observed reduction and to promote safe storage or destruction, or both, as the case may be, of substances such as chlorofluorocarbons (CFCs).

4. Proportion of fish stocks within safe biological limits: Indicator 7.4**(a) Summary of the situation**

Although Latin America and the Caribbean is not one of the regions most affected by overfishing, the status of the number of species, such as Chilean hake, puts the continuity and stability of the fish populations at risk. Moreover, a number of fish farming and fishery practices, which do not comply with the Code of Conduct for Responsible Fisheries, compounded by the modification of habitats and increasing anthropogenic pollution of land and oceans, put major pressure on hydro-biological resources.

Fish farming is clearly the zootechnology that will make it possible to close the gap between growing global demand for protein of marine origin and the maximum sustainable yield of the planet's fisheries. In this regard, the region will continue to cultivate aquatic species, given its large territorial expanse and propitious conditions for aquaculture.

Although the management of certain species has incorporated sustainable practices, these are still recent and the results are not yet fully valid or consistent.

(b) Guidelines for action

(i) Make progress in generating and providing reliable, relevant and up-to-date information. As is true of other environmental issues, suitable information to evaluate this indicator is generally lacking in Latin America and the Caribbean. This hinders the sustainable management of aquatic resources (oceanic and inland), which are vital to secure the various ecosystem services and support human well-being itself. In this regard, the region's countries should apply the following measures:

- Generate and maintain databases and up-to-date and relevant information on marine and continental resources and their level of exploitation to underpin decision-making and the formulation of policies on production and environmental protection on an objective and timely basis.
- Develop control and supervision mechanisms, both on board vessels and in port, maintaining an up-to-date record of private agents engaging in industrial fishery activities, listings and information on small-scale fishermen and control of vessels flying international flags operating on the high seas.

- Develop records and data on agents engaging in aquaculture, together with information systems on their environmental, social and economic interactions.
- Expand the knowledge base on small-scale fishing and the corresponding stakeholders. This is a sensitive issue given its links to pockets of poverty and coastal environmental problems.
- As in other areas, ICTs—for example the use of satellite technology—and cooperation between the countries of the region (South-South) could be very useful for making information more available.
- Create regionally standardized sustainability indicators that track long-term trends, respond to citizens' perceptions and are independent and publicly accessible.

(ii) Develop suitable resource management tools. Among other measures, sustainable management of fishery resources requires shared responsibility between users (fishermen) and the Government in managing national fishing grounds, together with continuous scientific evaluation of fishery resources within national jurisdiction—including participation and dialogue with the beneficiaries of those resources—to define the most appropriate mechanisms to make fisheries sustainable and protect biodiversity, in accordance with the ecological, social and economic situation. This means setting up a suitable institutional framework with suitable processes of participation, information, access and control. This should be accompanied by an environmental regulatory framework.

(iii) Formulate recovery plans for fishery resources under threat—such as those that are overexploited—through repopulation programmes, establishment of a closed season, or both, based on population studies that ensure fishery sustainability.

(iv) Encourage the application of good fishery and aquaculture practices by formulating national policies and strategies to promote the sustainable development of both activities, within a framework of land management, harmonious coexistence with other economic activities and emphasis on the direct human use of water resources.

(v) Use a precautionary approach to evaluate the capacity of the local environment to support aquaculture growth, and introduce environmental quality standards verified through public inspection mechanisms as benchmarks to guarantee sustainability. These are fundamental elements that must be incorporated into policy.

(vi) Increase the profitability of fishery activity per unit of output. Marine and inland ecosystems could benefit from efforts to add value to the products they generate. This would help increase profitability per unit of product extracted and would eventually reduce pressure on the corresponding resources. An initiative of this type would require a public policy package which, among other things, would facilitate credit for processing and upscaling in value chains, promote research and development and introduce new regulations.

5. Proportion of total water resources used: Indicator 7.5

(a) Summary of the situation

Although Latin America and the Caribbean is one of the world's most water-abundant regions, the resource is distributed very unequally and subject to multiple pressures, including increasing pollution, degradation of watersheds and the depletion and unsustainable use of aquifers as a result of population growth, socioeconomic development, and societies' increasing interference in the hydrological cycle. Effective management of water resources has become more important owing to the likely effects of climate change on precipitation distribution and intensity, rising sea levels, changes in temperature patterns and their consequences for glaciers.

(b) Guidelines for action

(i) Improve the production and availability of reliable, relevant and up-to-date information. The water balance is hard to quantify, particularly in the case of underground water resources, and it needs both spatial and temporal dimensions to be properly covered. Thus, in various places, the real volume of water resources available today—resulting from specific supply and demand—is unknown or only partly known, or else the data are unreliable and out of date. This is a basic for progress on sustainable management of water resources. The region's countries must take steps to broaden their knowledge base and, where possible, conduct studies on future trends in the context of climate change. ICTs can make a significant contribution in this.

(ii) Promote integrated management of water resources. This involves the following measures:

- Improve legislation on water resources to more faithfully reflect the nature of problems of access, distribution, use and reuse of water, in accordance with the visions and practices of society in the geographic area in question.
- Strengthen water resource management organizations, particularly water and watershed authorities, to ensure that they operate independently of sector uses and have technical, operational and financial capacities that match their responsibilities. Ongoing education and training of the professionals involved is a key element, as has been identified in a recent study on the situation in a number of Caribbean countries (ECLAC, 2007).
- Move towards multiple and integrated water management, taking special account of the relations that exist between the various uses—drinking water, sanitation, irrigation, industrial, hydroelectric, ecosystem conservation, navigation and others—and their effects on water bodies and marine-coastal zones. The following section (on targets 7.C and 7.D) considers the situation of drinking water and sanitation.
- Strengthen the governance of the integrated water resource management process, for which national legislation needs to consider three essential elements: participation, transparency and accountability. To that end, effective measures need to be implemented to ensure participation by all stakeholders, including economic resources, help in capacity-building among participants and the creation of effective opportunities for interaction. Measures are also needed to improve the transparency of management processes, promoting free, timely and equal access to the information used. In addition, accountability mechanisms need to be

set up within States, between the State and citizens, and between these and other stakeholder institutions. Lastly, water resource management should incorporate mechanisms to prevent and combat corruption.

- Promote integrated management of transboundary water resources, formalizing the relevant mechanisms by means of international instruments.

(iii) Introduce legal frameworks for water management that are more compatible with present-day challenges. The following measures in particular are recommended:

- Water laws should clearly specify that water resources are State public goods.
- Legal provisions should clearly establish that rights granted under conditions of efficient and beneficial water use, or conditions that encourage this, and which do not cause environmental harm, are protected by constitutional provisions governing private property. This is the fundamental legal element in systems that have successfully harnessed private investment to develop the economic potential of water resources.
- Nonetheless, as long as the law retains its economic dimension, legislation can provide for economic aspects to be regulated in a general way, to reflect ecological and social sustainability needs.
- Water allocation systems and rules governing the granting of relevant use rights must have the highest constitutional rank and they must be uniform and not allow exceptions, to prevent manipulation by individual interests.
- In this regard, water use rights are granted when there are flows available, when they do not affect the rights of third parties or ecological requirements and when the relevant authorities judge the request to be compatible with the public interest.
- The only priority when granting a request for water rights should be use in drinking water and sanitation services, provided safeguards are in place to ensure that this privilege does not prevent the creation of clear signals of existing water scarcity, and does not result in inefficient use, without prejudice to the conservation of flows or water courses for ecological reasons.
- In cases of legal reform, pre-existing rights and uses should generally be recognized, including traditional and indigenous rights and uses, provided they are effective, beneficial, habitual and up to date, without prejudice to the imposition of regulations governing adequate use of the water.
- Planning mechanisms need to be set up for the purpose of developing a shared vision on the future trend of water resource exploitation at the basin level.
- A public information system is needed covering all aspects of water management, which also affords transparency to actions affecting this public good.

6. Proportion of terrestrial and marine areas protected: Indicator 7.6

(a) Summary of the situation

Although the extent of protected terrestrial and marine areas has increased, a number of challenges related to resources and management need to be overcome to ensure the effectiveness of that protection. Even in conjunction with other strategies to halt biodiversity loss —plantations and community management of forests, payment for environmental services, certification and land management— protection has not been sufficient to halt the loss of biodiversity in the region which, as happens in large-scale agriculture, suffers from the heavy pressure exerted on natural habitats by economic activities. Regionally speaking, existing protected areas also fall short in terms of representativeness and connectedness.

(b) Guidelines for action

(i) Evaluate and expand the quality and quantity of existing protected areas in the countries of the region. In particular, steps need to be taken to guarantee that all major ecosystems are represented in each country's protected areas. Where protected areas are fragmented —as a result of schemes in which public and private systems complement each other, for example, including those that involve local or indigenous communities— biological corridors are needed to ensure the conservation of ecosystems.

(ii) Strengthen schemes for managing the affected areas. The regional diagnostic reveals weaknesses in management capacity and the financing of protected areas. Here the capacities of stakeholders involved in their management need to be strengthened, and this offers an interesting niche for South-South co-operation.

(iii) Explore and implement innovative mechanisms for sustainable exploitation of protected areas. In particular, the region's countries could seek ways to:

- place an economic value on the goods and services provided by protected areas;
- keep the income and administration of protected areas within local communities;
- regulate and develop an infrastructure that is compatible with the load-bearing capacity of protected areas or their buffer zones;
- encourage the non-consumptive use of resources available in protected areas; and
- seek and implement sustainable production alternatives, particularly in buffer zones.

7. Proportion of species threatened with extinction: Indicator 7.7

(a) Summary of the situation

As this indicator has only recently been included, information on species threatened with extinction is still preliminary, and comparable and harmonized statistics are not available for identifying historic trends. Nonetheless, many of the most recent evaluations and studies on this issue suggest that the region's immense biodiversity is being lost, or is seriously threatened by human activities, at all levels and throughout almost the entire territory. Five of the 20 countries with the largest number of threatened fauna species, and seven of the 20 with the most plant species under threat are in Latin America and the Caribbean.

(b) Guidelines for action

(i) Improve the generation and availability of reliable, relevant and up-to-date information. As in the case of the indicators mentioned above, the lack of information needs to be resolved. ICTs, in conjunction with local or traditional knowledge, can make a substantial contribution to creating a better knowledge base to underpin decisions on resource coverage and management.

(ii) Improve the inspection (oversight and vigilance) of inappropriate practices and improve legal channels for sanctioning them. In this regard, countries should strengthen mechanisms for disseminating information on the substance of environmental justice and access to it, particularly regarding domestic and international trade in threatened species.

(iii) Make progress on the sustainable wildlife management. As in the case of other ecosystem goods and services, sustainable management benefits wildlife, including species threatened with extinction—for example through reproduction in captivity for the purposes of repopulation and trade in this type of species. Implementing this approach requires a number of government-level initiatives, including the following:

- Economic valuation of ecosystem goods (plants and animals) and related services, such as medicines and water regulation.
- Establishment of rights of use, including the possibility of concessions.
- Develop certain aspects of the productive chain such as green customs,³ transport, traceability, censuses and certifications, together with tools that promote the movement and exploitation of wild flora and fauna. For these purposes, consideration could be given to capacity-building among officials and other law-enforcement agents for detecting unlawful trade in environmentally questionable products, pursuant to the relevant international agreements, adopting measures in this regard and promoting lawful trade in the goods in question.

D. SUSTAINABILITY OF THE HUMAN ENVIRONMENT: TARGETS 7.C AND 7.D

Targets 7.C and 7.D relate directly to health and the quality of life of individuals, mainly those living in poverty. The importance of these issues was recognized in the establishment of the human right to drinking water, sanitation and housing (see chapter I).

Table VI.2
TARGETS 7.C AND 7.D AND ASSOCIATED INDICATORS

Target	Indicator
Target 7.C Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.	7.8 Proportion of population using an improved drinking water source. 7.9 Proportion of population using an improved sanitation facility.
Target 7.D By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers.	7.10 Proportion of urban population living in slums.

Source: United Nations, Millennium Development Goals Indicators [online] <http://mdgs.un.org/unsd/mdg/Host.aspx?Content=Indicators/OfficialList.htm>. Host.aspx?Content=Indicators/OfficialList.htm

³ See UNEP *Green Customs Initiative* [online] <http://www.unep.fr/ozonaction/partnerships/greencustoms.htm>.

This section summarizes the diagnostic in relation to these two targets provided in chapter IV, and proposes a number of guidelines for moving towards achieving them. In relation to drinking water and sanitation, in addition to the official indicators, the chapter discusses waste water treatment, owing to its importance. Also for this reason, the section on slums touches on the topics of urban atmospheric pollution, urban management and disaster-risk management in human settlements.

1. Proportion of population using an improved drinking water source and sanitation services: Indicators 7.8 and 7.9

(a) Summary of the situation

While the overall situation remains highly variable, the region has made significant progress in expanding drinking water and sanitation services. The goal of most of the urban population having access to improved drinking water sources has been reached regionwide, and it is close to being achieved in the case of sanitation. The region is better placed in terms of drinking water than with regard to sanitation, and urban coverage is greater than rural for both services. Nonetheless, there are substantial differences in this regard, both between and within countries, and in the cities, reflecting the high level of income inequality. In the case of drinking water, improvements are needed in terms of coverage, the quality of the water supply and proper disinfection, and to reduce problems of intermittent supply and loss rates.⁴ The situation is similar in the case of sanitation: the weak points are coverage and service quality.

Although significant progress has been made over the last decade, the treatment of urban sewage is a pending task in much of the region. This has resulted in the pollution of surface and groundwater, seas and coastlines. In most cities, sewage is discharged into rivers and sea with little or no treatment.

The region has had both good and bad experiences with public and private service provision. Success or failure have not reflected the ownership regime so much as the regulatory and institutional framework, the financial system and prevailing structural conditions —macroeconomic, social, corruption and others.

(b) Guidelines for action

Improving the supply of drinking water and sanitation services depends on the priority that governments attach to the sector, particularly in terms of budget allocation and the improvement of regulatory models and financing of services, especially for the poorest population groups. The following guidelines are based on the region's experiences over the last few decades and relate to two major thematic areas: financial sustainability and regulation (Jouravlev and Solanes, 2005; Jouravlev, 2004; and Jouravlev and Solanes, 2009).

(i) Financial sustainability and the inclusion of low-income sectors. Firms, whether public, private or of mixed ownership, must be self-financing, but the limitations of local economic capacity need to be known. Service provision by private agents in areas with high poverty rates, insufficient coverage and low payment capacity is unprofitable and, therefore, unsustainable. Effective subsidy systems also

⁴ It is worth noting that the availability, salubrity, (lack of microorganisms or a chemical or radioactive substances that could pose a threat to health) and the physical and economic accessibility of water resources are among the key elements for exercising the right to water established under the International Covenant on Economic, Social and Cultural Rights (Committee on Economic, Social and Cultural Rights, 2002).

need to be implemented to guarantee low-income sectors at least a basic level of consumption. The structure of subsidies should be carefully designed to ensure that they really benefit those who need them.

(ii) Regulation. While emphasis needs to be placed on increasing efficiency, it needs to be remembered that efficiency and equity are not antagonistic but complementary, since the former helps to reduce costs, which means greater opportunities for use. The most common inefficiencies are: incorrect transfer prices, excessive borrowing, corruption, superfluous labour, high transaction costs, biased decisions by interest groups and loss of economies of scale and scope. The following considerations are relevant in this regard.

- A key requirement is that governments should impose adequate regulation on public, private and mixed-ownership providers of the services in question, based on principles of reasonable profitability, useful and usable investment, good faith, due diligence, obligation of efficiency and transfer of related profitability to consumers. In the case of public enterprises, the regulatory framework should be complemented with objective, personal, and non-institutional responsibility to provide a service that is economically efficient.
- Decentralization and municipalization do not always allow the exploitation of economies of scale and can hinder regulation and oversight activities. At the same time, there is overwhelming evidence of economies of scale in this sector. Hence, the institutional and industrial structure should aim to maximize economies of scale and scope and reduce transaction costs through balanced systems in which powers are assigned to the appropriate levels of government.

Appropriate regulation of public, private or mixed-ownership providers requires adequate information, particularly compulsory and standardized accounting, oversight of procurement and contracting, and effective participation by consumers in regulatory processes, to avoid the regulated industry dominating the process via its control of information. Clear institutional separation is advisable, with an independent and stable regulator, endowed with sufficient resources and subject to rules of conduct and ethics.

Regional experience shows that it is inadvisable to give operators and investors artificial guarantees and protection, since these reduce the incentive for firms to make effective decisions that are compatible with the local reality. Countries should conduct a critical analysis of alternatives for expansion, along with financing methods, technologies, modes of service provision, public guarantees and others, designing them so that they do not become a burden on the economy and citizens. Here more extensive analysis is needed of the effects of international investment protection agreements on national capacity to regulate public services.

(iii) The links between water management and the right to the resource. A link needs to be established between the solution of problems in the drinking water and sanitation sector and water management, including the treatment of waste water. Expanding coverage of these services leads to increases in water use and in the volume of waste water discharged, which reinforces the need to implement effective management systems. This requires: (i) water legislation that adequately addresses the nature of the problems of water-resource access and use and societies' priorities and practices; (ii) a water authority that is independent of user sectors, with resources to match its responsibilities; (iii) an efficient dispute-settlement system; (iv) a water allocation system that promotes investment in developing the economic potential of water resources and their conservation, while also ensuring efficient and organized use, avoiding monopolization and allowing for oversight based on the public interest; and (v) a

system for controlling water pollution, which is capable of mobilizing economic resources to finance the large investments needed for waste-water treatment. Public participation in these mechanisms could be an important element. A relevant example here is the experience of Porto Alegre in improving waste-water treatment (see chapter II).

Lastly, consideration must be given to four particularly important aspects of the right to drinking water and sanitation, which, as seen in chapter I, stem from the commitments assumed by States under the International Covenant on Economic, Social and Cultural Rights; the Convention on the Rights of the Child; and the Convention on the Elimination of All Forms of Discrimination against Women. These include the following:

- The duty to respect. Governments should not interfere unjustly in a person's means of access to drinking water and sanitation services. A focus on expanding access could endanger longer-term results if there is no protection against the suspension of services and pollution. Services should be interrupted only if there is sufficient justification, together with adequate procedural guarantees and an alternative source of water that is convenient and appropriate.
- The duty to protect: Both public and private agents must be prevented from violating the rights of others, for example by polluting water resources or charging unaffordable prices. The State has a basic duty to ensure service providers are efficient, that they respect the right of participation, they are adequately regulated and do not impair exercise of the right to water.
- The duty to provide the service. Governments must use all available resources to progressively improve exercise of the right to water. This includes preparing a plan and strategy to expand access to water resources under accessible conditions; to protect the quality of the water supplied; to actively procure available resources both nationally and locally; and to apply the plan and oversee its execution through time, and establish accountability systems. This also means that States must guarantee everyone immediate access to a minimum quantity of water, unless they can show that available resources are insufficient.
- The duty to not discriminate and to guarantee equality between men and women. In the pursuit of their objectives, States must pay adequate attention to the most disadvantaged groups, ignoring the temptation to focus on slightly more prosperous sectors, which are easier to connect to the service network.

2. Proportion of urban population living in slums: Indicator 7.10

Latin America and the Caribbean is the world's most urbanized developing region. Historically, demographic and economic dynamics linked to major shortcomings in urban management have spawned a heavy concentration of slums in the region's main cities. This section provides a brief overview of the status of progress and guidelines relating to indicator 7.10, together with a review of crosscutting issues: key aspects of urban management that particularly affect the lives of people living in poverty (see box VI.1), and management of the risk of climate disasters, to which marginal neighbourhoods are more vulnerable and whose frequency and intensity are likely to increase as a result of climate change (see box VI.2).

Box VI.1
THE SUSTAINABILITY OF CITIES, BEYOND THE SLUMS

Policies to reduce the number of slum dwellers and improve their quality of life form part of the broader challenge of ensuring the sustainability of cities in Latin America and the Caribbean. Currently, 75% of the population lives in urban areas, and the figure is expected to reach 84% of the population projected for 2020, or 526 million people. Inter-city migration and natural urban growth are the main drivers of the increase, although climate change could cause a larger rise than expected. In this scenario, the region's urban sustainability faces challenges that go beyond slum dwellings and deficiencies in the provision of basic services directly related to poverty, such as access to health and education.

- Urban transport. Mass transportation remains inefficient and inadequate. This entails high mobility costs for the poor and has spawned a numerous and growing fleet of private vehicles that make circulation within cities difficult.
- Solid waste. The management of solid waste in the region's large cities is inadequate and unacceptable. The resulting direct and indirect social and environmental costs are significant and mostly affect the marginal areas.
- Green areas. The vast majority of Latin American and Caribbean cities do not comply with the green area per capita recommendation of the World Health Organization (WHO), namely 9 m² per person and an urban design that includes accessible green areas within 15 minutes' walking distance from any dwelling. In addition, green areas are distributed unevenly within cities.
- Many of the region's large cities do not satisfy international standards or even national guidelines on air pollution. Exposure to different types and concentrations of pollutants which are frequently found in urban areas has been linked to heightened risk of mortality and morbidity caused by a number of conditions including respiratory and cardiovascular diseases.

Guidelines proposed on city sustainability include the following:

- Promote greater population density in equipped urban areas, seeking to achieve a link between eco-efficient infrastructure, social relations and mobility.
- Prioritize comprehensive solid waste management by promoting the recycling of nonorganic residues and building awareness of the related energy potential, which could represent a subsidy for mass transportation and other urban costs. Document and disseminate the exploitation and management of solid waste as a job-creating economic sector.
- Prioritize sustainable (non-motorized) schemes of urban transport and mobility, promoting the creation and consolidation of urban neighbourhoods and zones that are diversified in terms of use and occupation, relatively independent from the traditional centre, of a size that permits circulation on foot or by bicycle. This can be achieved by strengthening collective and mass transport rather than individual motorized transport. Among other alternatives, instruments could be designed to provide incentives for financing the former, together with mechanisms to discourage the emergence of new routes and itineraries that favour the latter. It has also been proposed to optimize and maximize existing urban road transport schemes rather than high-performance but high-cost systems such as inter-urban trains or metros.
- Analyse and define initial subsidy schemes for urban-land-use development projects and programmes, especially involving urban infrastructure and collective services implemented under eco-efficiency parameters (such as prior compensation until they become competitive or achieve a scale suitable for mass use). This policy and projects alternative is currently being promoted to delink development from emissions, and represents a specific operational alternative for adapting to the challenges and effects of climate change in and from human settlements.
- Create new tools for investment decision-making to assist political processes of territorial management in urban conglomerates.
- Introduce the eco-efficiency approach in public policies on infrastructure and collective services, including institutional, regulatory and financing aspects.

Box VI.1 (concluded)

- Develop strategies and plans at the city and regional levels to make the urban system compatible with sustainable development, and incorporate viability conditions including adequate financing, participation mechanisms, regulatory tools or backup or “armour-plating” rules, along with dissemination, information and training schemes. These strategies and plans should include a portfolio of feasible projects and programmes for infrastructure and collective services, designed under eco-efficiency criteria.
- Reduce atmospheric pollution, complying with national and international standards, and develop and implement systems to compensate for particulate emissions.

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of R. Jordán and D. Simioni, “Guía de gestión urbana”, *Manuales* series, No. 27 (LC/L.1957-P/E), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2003. United Nations publication, Sales No. S.03.II.G.114.

Box VI.2

MANAGING THE RISKS OF METEOROLOGICAL DISASTERS

As a result of climate change, extreme weather events and disasters are expected to increase in number and intensity in the region. Accordingly, greater efforts must be devoted to proactive preventive action. Insurance and investment instruments should be considered as key mechanisms in managing disaster risk.

The following measures need to be adopted in this regard:^a

- Set up integrated funds to avoid competition for resources arising from differentiation between funds for risk management and adaptation to climate change.
- Generate and organize data and information to identify and analyse risk and vulnerability, and disseminate them on a coordinated basis among the relevant public bodies. Databases on the socio-economic effects of disasters should also be created.
- Implement programmes to reduce construction vulnerability, including mechanisms to ensure compliance with land management and building safety laws, easier access to information on available techniques and technologies, and the introduction of structures to protect against flooding and mudslides.
- Stabilize the different segments of disaster funds based on experience and priority sectors. Decision-making criteria need to be established to balance the speed of deployment with opportunities for use, to distribute funds between the national, provincial and municipal levels and to channel additional resources to deal with damage in the most vulnerable poor sectors.
- Increase resources for disaster prevention and mitigation, support infrastructure maintenance programmes, promote vulnerability studies and encourage the financing of cost-benefit studies for mitigation projects related to basic installations.
- Promote catastrophe insurance systems through regional insurance between governments or national entities, as necessary, making it compulsory to insure public infrastructure, for example (see box IV.17).
- Consider the possibility of setting up earmarked funds for catastrophe insurance through regional or subregional financial institutions for the contingency of large-scale disasters. Experiences of the Caribbean Catastrophe Risk Insurance Facility (CCRIF) and the Windward Islands Banana Insurance scheme (WINCROP), also in the Caribbean, both described in chapter IV, provide important references in this.

Steps also need to be taken to develop inter-agency coordination systems or mechanisms for reaction and response to weather disasters, to mitigate and reduce the relevant effects, mainly in terms of injury to health and physical integrity of persons and the restoration and re-establishment of services in the affected areas.

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of ECLAC/Inter-American Development Bank (IDB), *Information on disaster risk management: case study of five countries. Main technical report* (LC/MEX/L.805), Mexico City, ECLAC subregional headquarters in Mexico, 2007.

^a There are a number of regional initiatives such as the Caribbean Disaster Emergency Response Agency (CDERA), which have worked well. The topic could also be included on the work agenda of regional and subregional integration schemes.

(a) Summary of the situation

Between 1990 and 2005, the number of slum dwellers in the region fell by around 5 million. Although this represents a significant drop in the proportion of the urban population living in marginal neighbourhoods, from 37% in 1990 (110 million people) to 25% in 2005 (106 million), it clearly represents insufficient progress. Assuming that in Latin America and the Caribbean the target of reducing this ratio by 2020 (see chapter IV for an interpretation of the geographic distribution of the target) is roughly equivalent to 13.8 million people, a performance in 2005-2020 equivalent to that displayed thus far will not be sufficient to meet the target. Nonetheless, the problem is more complex than the speed with which the target is achieved. The trend of the number of slum dwellers has not been linear, but has depended markedly on cycles of growth and recession. It cannot be said that there is an established pattern of steady reduction in marginal neighbourhoods or an improvement in the living conditions of their inhabitants. More than 100 million Latin American and Caribbean people still live in unacceptable conditions.

Given the magnitude and severity of the slum problem, the target—for which the deadline of 2020 is longer than that for other MDG targets—is unacceptably modest: “A target that ignores almost 90 per cent of slum-dwellers and seeks to significantly address the housing needs of a small group, appears contrary to the obligations of States to provide a minimum level of security of tenure and shelter to all”⁵ (OHCHR, 2008). Efforts thus far have targeted the poor with ability to pay, complemented by public subsidies.

(b) Guidelines for action

In general terms, it is important to consider three approaches when designing initiatives to reduce the number of slum dwellers: (i) prevent the formation of marginal neighbourhoods through timely urban planning and the improved habitability in rural areas (basic services, employment, housing and others); (ii) improve the conditions of existing slums; and (iii) improve housing conditions in rural areas, since rural-urban migration will gather increasing momentum, saturating basic services and fostering new precarious settlements in areas where they did not exist before.

Improving the quality of life of slum dwellers requires a poverty-reduction strategy that comprehensively addresses needs for housing, employment and income, basic services and infrastructure, public spaces and land-use policies, together with secure landholding. Experience shows that resisting migration attempts, preventing urban growth or assuming that precarious settlements will disappear automatically as a result of economic growth are not effective strategies.

Experience points to the following recommendations:

(i) Implement systemic and integrated approaches to improve housing conditions, both by providing new homes and by upgrading public housing, consolidated neighbourhoods or even neighbourhoods that have become slum districts (Jordán and Martínez, 2009). This could include following measures:

⁵ The right to housing is contained in the Universal Declaration of Human Rights. Article 25 (1) states that “Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, ...” (OHCHR, 2008, p. 41).

- Incorporate a number of complementary aspects into housing policy, such as production, financing, employment and income sources, secure landholding, infrastructure and basic urban services, health and education, among other factors;
- Improve connectivity with the rest of the metropolis;
- Promote coordination of sector level interventions in neighbourhoods, and
- Make use of environmental impact assessments.

(ii) Develop innovative financing mechanisms to give the population access to the housing market and justify public investment in infrastructure: microcredit, materials banks, buying-up of land by the State, subsidies that factor in the positive externalities of urban infrastructure, self-help housing cooperatives and others.

- Combine municipal contributions, cross-subsidies and beneficiary contributions to ensure the financial feasibility of improving precarious settlements.
- An integrated approach to housing development and financial sustainability are crucial for ensuring policy continuity and making sure housing projects do not turn into slums.

(iii) Create mechanisms for participation and coordination between the different types of stakeholder—public, private and community—and sectors—employment, education, health, transport, public spaces, drinking water and sanitation.

- Within the community, the aim is to encourage initiatives by slum dwellers, recognize the role played by women as home providers and consider the specific needs of the most vulnerable groups, such as women living in poverty, older adults, the disabled and children.
- Involve tenants and owners in the search for solutions, prioritizing the collective interest.

(iv) Guarantee secure landholding, consolidate possession rights and regularize informal settlements. All individuals should enjoy some degree of security of land-holding that guarantees them legal protection against eviction, harassment or other threats. This certainty has a multiplier effect on a number of rights. In adopting measures to improve landholding security, care must be taken to ensure that the model chosen does not worsen the situation of the poor. For example, the granting of individual land titles in a number of slum improvement projects has had negative consequences, inasmuch as residents have been left out of the process, even though they have occupied the land for a long time and could be left homeless. The granting of property titles could also encourage the sale of homes to the middle-class and the formation of a new marginal neighbourhood elsewhere. Corruption can lead to the wealthier and better connected groups obtaining these more secure land plots and homes. Slum upgrading and regularization projects also need to take women's rights into account. In practice, the fact of authorizing a single person to sign permits or property titles reduces the possibility of joint occupation or ownership and the right of women to use or occupy the land, which can limit women's autonomy and increase their dependency.

(v) Implement and monitor land management and city development strategies prioritizing the poorest inhabitants, in conjunction with investment and urban management plans. It is necessary to adopt a broader, long-term vision of urban space use. This means, among other things, providing land equipped with minimum services for building homes and planning in advance to promote sustainable land use, taking account of areas bordering the city to minimize its ecological footprint.

E. IMPROVING MEASUREMENT AND REPORT PRESENTATION FOR GOAL 7

1. Enhancing information and statistics

In the last decade, the official production of environmental statistics and indicators has improved significantly, albeit unevenly in the various countries. Nonetheless, the volume of data is still insufficient to meet the growing needs and demands for information on the part of decision-makers and the public at large.

Institutionalizing the production of environmental statistics and indicators within official systems—national statistical offices and ministries—is still an ongoing process, as is the inter-agency coordination needed to strengthen the collection of environmental data. Whereas in 1998, just three countries published official bulletins containing environmental statistics and sustainable development indicators, recent studies by ECLAC show that, in 2008, many countries are systematically publishing both statistical compendia and reports containing environmental (or sustainable development) indicators; and that a total of 21 countries of the region have official environmental statistics programmes and have produced at least one official annual publication on the subject. Nonetheless, of the 21 countries analysed, 62% of the institutions that participated in this study have no more than three people working on environmental statistics and indicators.

One of the priority areas to develop is natural resources, specifically water, soil degradation, biodiversity and marine-coastal resources. Here, it will be recalled that, as noted in chapter IV, there is currently no information available to calculate indicators of the proportion of fish stocks within safe biological limits (7.4), or the proportion of total water resources used (7.5).

In terms of pollution, much remains to be done to strengthen indicators on highly hazardous pollutants such as dioxins, particulate matter smaller than 2.5μ (MP2,5), toxic waste and persistent organic pollutants. Another major areas needing work is the production of information and indicators relating to the political commitment to ensure the environmental sustainability of development (first part of target 7A). One (indirect) approach to this topic is to measure the resources allocated to the environmental authorities and the system for measuring public environmental expenditure through the Classification of Environmental Protection Activities and Expenditure (CEPA), which is at an initial stage of development in some countries (see chapter IV).

Basic official statistics on the environment are the essential raw material for environmental and sustainability indicators, which are so urgently needed to strengthen the analysis of the main trends, and to improve the design and monitoring of both environmental and sectoral public policies. As a complement to this, greater efforts are needed to adopt the System of Integrated Environmental and Economic Accounting (SEEA), which presents systematic and interrelated stock and flow accounts for the environment and the economy. Just one country (Mexico) has an official scheme of this type, while others have implemented a number of pilot projects either on SEEA overall or on a number of specific accounts, such as water, energy, forests, protected areas and subsoil assets.

Progress in generating statistics should satisfy the quality criteria established under international environmental statistics standards, and continuously pursue statistical harmonization and reconciliation. A number of countries in the region have participated in such efforts. Here it is worth noting the progress made on the regional statistical conciliation agenda for improving monitoring of the millennium development goals (www.cepal.org/mdg) and the ongoing efforts made by the UNEP Regional Office for

Latin America and the Caribbean and ECLAC to coordinate and harmonize the indicators of the Latin American and Caribbean Initiative for Sustainable Development (ILAC) with those of Goal 7.

Although the countries themselves recognize that the initiatives undertaken by their national institutions, supported statistically by ECLAC, in coordination with the inter-agency system in the region, have made a methodological contribution to the production of environmental statistics and indicators and integrated economic-environmental accounts, it is important to back these efforts and to strengthen financial and technical investment in each country. This will help to move forward in developing a specific institutional framework for official environmental statistics, and in the production and dissemination of series with growing coverage of variables, territories and timeframes, adopting good statistical practices and international and regional recommendations with a view to strengthening diagnostics and improving public programmes and policies to ensure the environmental sustainability of development in Latin American and Caribbean countries.

The UNEP Regional Office for Latin America and the Caribbean has contributed to statistical development, mainly by stimulating production as a user of environmental statistics and indicators. UNEP has played a key role within the Forum of Environment Ministers of Latin America and the Caribbean and in facilitating the Working Group on Indicators of the Latin American and Caribbean Initiative for Sustainable Development (ILAC); it has also promoted the production of the indicators and reports from that initiative and provided permanent support to countries in producing global environment outlook reports both in countries, cities and subregions, and across the region as a whole.

This process of developing and reconciling environmental statistics in the region must be continued, articulating the work of countries and institutions, in collaboration with the ECLAC Working Group on Environment Statistics of the Statistical Conference of the Americas —a task that has benefited from coordination with specialized international agencies working in the region. The official indicators and commitments relating to the Millennium Development Goals fulfil a basic function in this process, serving as central axes for the work and resources both of international agencies and regional governments.

Lastly, official environmental statistics not only give an up-to-date picture of the status of the various issues, but should also serve as inputs for preparing different prediction models which, in turn, support decision-making. Environmental projections are an area of work that requires considerable effort in the region, to adequately support decision-making processes that affect the environment and sustainability.

2. Fine-tuning the analysis: the subnational scale and breakdowns by sex, age group and other variables

Countries and international agencies working in the region have made use of Millennium Development Goal indicators that complement official statistics, whenever they reveal elements that are not included in the official list used worldwide.

Over the last few years, it has become apparent that indicators need to be calculated not only with respect to countries as a whole, but also at the subnational level, such as states, provinces and even municipalities —as far as permitted by the basic statistics that are comparable with primary sources. It is specifically these levels that display inequities in progress towards the targets of the Millennium Development Goals that, to some extent, are masked in national aggregates or averages. It is also necessary to produce and present information on the indicators broken down by sex and age group, in accordance with the different analysis needs.

Given that the sources of data compilation in most of the countries do not yet have the capacity to produce these indicators broken down by sex, age group or even income bracket, it is important to strengthen work on censuses, surveys and other sources so that in the future the relevant microdata can be produced or processed to give more detailed breakdowns and cross-referencing of statistical information.

3. Sustainable development maps: territorial aspects and the geo-referencing of indicators

Another major challenge in producing environmental statistics is the increasingly accessible use of geo-referencing and remote sensing technologies. Forest cover is one of the indicators that is calculated through interpretation of satellite images, so its geo-referenced representation is technically possible at the outset.

The most fruitful use of these technologies involves overlaying layers of information on specific territories, which makes it possible not only to use more complete and complex information than traditional statistics, but also to spatially identify the problematic hot spots and therefore target interventions, and to represent them spatially on maps.

Although some of the region's countries have made progress on this issue, use of this method of producing or representing environmental indicators requires strengthening those efforts and improving national capacities in terms of geographic information systems (GIS), geomatics and image interpretation. The entities that produce and use this type of information could also provide more wholehearted support to national initiatives, helping to create regional and local capacities.

F. CONCLUDING REMARKS

This report has offered a regional overview of the environmental situation in general and regarding Millennium Development Goal 7 in particular, as summarized in this chapter and discussed in detail in the document, identifying challenges and specific lines of action. Nonetheless, in itself, the application of those measures is not sufficient to bring about substantial progress towards sustainable development. The great complexity of the ecological, socio-economic and cultural situation make implementation and transformation processes crucial. How to involve the various stakeholders and sectors—who participates and who feels excluded—and the transparency with which information is managed, how to assume responsibilities on the various issues and what accountability arrangements to adopt are just a few of the key elements in both processes.

Moreover, the current global context of undeniable interdependence between countries, sectors and ecosystems, together with a history of differentiated responsibilities—albeit now acknowledged as common—demand coordinated action between the countries of the region and those in the developed world. Here, greater consistency must be achieved between the conditions arising from global mechanisms and forums and the region's real needs. Chapter V of this report addresses issues such as international financing, world trade and technology. In all cases it is urgent to make sure that developed and developing countries work together under an effective global partnership for development in order to contribute to the region's environmental sustainability.

METHODOLOGY NOTES ON THE INDICATORS OF PROGRESS TOWARDS GOAL 7 OF THE MILLENNIUM DEVELOPMENT GOALS IN LATIN AMERICA AND THE CARIBBEAN

This report evaluates the Latin American and Caribbean region's progress towards Goal 7 of the Millennium Development Goals (MDGs) up to 2009. The report acknowledges the advances made in the production of official environmental statistics and indicators for the region, but notes that they are incipient, very uneven and still insufficient to meet the analytical needs of public policymaking. The statistical series for both official and complementary indicators available up to October 2009 were presented in chapter IV. These series were carefully reviewed and selected from available statistical databases for the purpose of constructing indicators for as many countries of Latin America and the Caribbean as possible.

Period analysed and base year

The base year for evaluating progress towards Millennium Development Goal 7 is 1990. Three interval years —1990, 2000 and 2005 (or the most recent year for which data are available)— were chosen as analytical waypoints, which allows for analysis of the evolution of advances or regressions recorded for variables captured by the indicators.

Official and complementary indicators of Goal 7

This report provides statistical information on nine official indicators of Goal 7 and on a series of complementary regional indicators of trends towards environmental sustainability of development in Latin America and the Caribbean. It also presents standalone statistical data that do not constitute indicators per se, but which serve to illustrate the reasoning in the report.

Advances and lags in meeting the targets of Goal 7

The advances for most of the indicators are evaluated as they relate to environmentally sustainable development in Latin America and the Caribbean. In the case of drinking water and sanitation indicators, for which the target is quantitative, advances and lags (both in absolute terms and in percentages) were evaluated.

Countries covered

The report covers the 33 member countries of ECLAC, insofar as available data allow. The data and statistical series come from three types of sources —global, regional and national— which are used on a regular basis by national and international bodies. These sources classify countries and regions in ways that do not always match ECLAC classifications and, therefore, territorial adjustments have been made as needed.

About the statistical sources used

Three types of sources are used to calculate the indicators for Goal 7 for the 33 countries of the Latin American and Caribbean region. Each type reflects the varying scales of work done by compilers or producers whose data feed into the indicators for Goal 7 for Latin America and the Caribbean. Each type of data source or gatherer of these statistical series addresses the needs of different end users, on varying scales and each introduces specific advantages and disadvantages that may affect the analytical properties of the report.

- (i) Global sources: these are the databases and statistical information of international bodies that are global in scale. The main characteristic of these data is that they give broad coverage of the countries in their scope. These data serve on those occasions when estimates or figures are needed for countries that have no official national data. Another characteristic of global sources is that they apply uniform, homogeneous methods when making calculations and estimates, irrespective of any differences in the statistics-generating capacities of the countries or regions.

The main global data source used in preparing this report was the United Nations Millennium Development Indicators Database (<http://unstats.un.org/unsd/mdg/Default.aspx>), which presents data, definitions, methodologies and official sources for more than 60 indicators, compiled by the United Nations agencies, funds or programmes that specialize in the matter. The Inter-agency and Expert Group on Millennium Development Goal Indicators conducts the gathering of indicators and production and dissemination of their respective metadata, under the coordination of the United Nations Statistical Division. The Database is updated mid-year, at the time of publication of the Secretary General's global report on the Millennium Development Goals. This report relies on the latest version of that database as at 5 October 2009.

- (ii) Regional sources: these consist of databases and statistical information drawn from specialised regional organizations and agencies. These data generally offer only partial coverage of the countries of the region, but the statistical processes used in gathering national data make it useful for drawing regional comparisons. In those cases where regional statistics on Goal 7 are available, this report relies on the ECLAC database known as CEPALSTAT, specifically, the Environmental Statistics and Indicators Database (BADEIMA), which is completely updated in direct consultation with the countries in even-numbered years and partially updated in odd-numbered years. Also used in preparing this report were the Social Indicators and Statistics Database (BADEINSO) and the Economic Indicators and Statistics Database (BADECON), both of which are maintained, as is BADEIMA, by the Statistics and Economic Projections Division of ECLAC. Energy data were obtained from the regional database of the Latin American Energy Organization (OLADE).

Furthermore, some data were obtained from the reports, *Global Environmental Outlook* (GEO), of the United Nations Environment Programme (UNEP) and complementary data were provided by the UNEP Regional Office for Latin America and the Caribbean (ROLAC). Some specific and relevant tables and data come from the Pan American Health Organization (PAHO), as indicated in the sources at the foot of the respective tables.

Other specific information comes from specialized agencies, such as the United Nations Human Settlements Programme (UN-Habitat) (data on shanty towns), UNEP, the Food and Agriculture Organization of the United Nations (FAO) (data on forests, fishing and land), the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) (data on water and sanitation). Although these agencies have regional offices, they produce global-scale data on indicators for Goal 7 and, therefore, the data used were drawn and compiled from the statistical units of the different headquarters or from each agency's specialized database.

- (iii) National sources: these are official institutions responsible for environmental statistics for each of the countries of the region (environmental ministries or secretariats or national statistical offices). Data from these sources tend to be of high quality and reliability, though they cover smaller areas and are not always comparable with other data from the region.

The ministries and secretariats of the environment for the countries of the region collaborated by providing their series through a formal statistic-gathering process aimed at assessing the extent of budget execution and the size of their staff during the period studied.

In some instances, available data for some pivotal variables only allowed for the generation of boxes that illustrate isolated cases, given that the data, while reliable, are specific or sporadic in nature or are insufficient for generating national aggregates.

Each indicator was calculated by selecting the best available source, seeking to balance regional and subregional coverage while at the same time safeguarding the data's comparability and quality. The indicators presented in each case offer regional or global comparability, as required. When comparability or representativeness are lacking, these indicators are presented in boxes to highlight cases of specific countries or subnational territories.

For each case, the source is indicated, as is the time of the latest update, given that all sources are updated at different intervals and on different dates, which means that the series in this study might not coincide with subsequent consultations of the same databases.

Access to metadata or methodological records

Official metadata exist for the official and complementary indicators of Goal 7, which describe the calculation formulas applied and define their respective constituent variables. This information can be found on the official website of the Millennium Development Goals (see [online] <http://unstats.un.org/unsd/mdg/Metadata.aspx>). The metadata for the complementary regional indicators used can be found in their corresponding publications and on the BADEIMA website, which has technical records for these indicators (see [online] <http://websie.eclac.cl/sisgen/ConsultaIntegrada.asp?idAplicacion=2>).

Primary complementary information

Some ad hoc compilations of data were also conducted to prepare tables and figures on specific issues about financial resources and personnel in the ministries of the environment and national studies were conducted on public spending on the environment, to complement other information.

Discrepancies and statistical reconciliation

It is possible that, in comparing figures and values of Goal 7 indicators presented in this report with those in other documents, some statistical discrepancies might arise because of differences in how concepts are defined and in the methodological options chosen. These could be simple, such as the differences in years covered and countries included; or they could be more complex differences, such as the use of approximate indicators (proxies), different spatial coverage (regional, national or local), different updating intervals for the databases or the use of different population and GDP denominators.

A special effort has been made in this document to reconcile the statistical data, presenting the conceptual definitions and methodologies used in the most explicit and comprehensive manner possible. For further information on the extent of, and reasons for, the discrepancies in values for the MDG indicators from a regional perspective, and for further details on statistical reconciliation, see the ECLAC website (http://www.cepal.org/mdg/aspectest_es.html).

About population and GDP denominators

The utilization of different population denominators can also cause discrepancies. Whenever possible, and for the purpose of using a regional source that offered comparability, the data of total urban and rural populations were taken from the Latin American and Caribbean Demographic Centre (CELADE) - Population Division of ECLAC. ECLAC is working with the Population Division of the United Nations Department of Economic and Social Affairs to ensure that the latter uses data provided by CELADE when entering the demographical series for Latin American countries into its database. This will eliminate this source of discrepancy in the future.

Most GDP figures for the region are taken from the annual statistical series of national accounts, produced by the ECLAC Statistics and Economic Projections Division, because they offer regional comparability. Depending on the case, real and nominal series have been used, updated through October 2009.

DATABASES USED

The following databases were used as official statistical sources, particularly for chapter IV, and also for statistical information cited in other parts of the document. Official and complementary indicators for the seventh Millennium Development Goal were calculated and graphed on the basis of these sources, which were also used to extract the additional information presented here.

AQUASTAT (Global information system on water and agriculture of FAO)
<http://www.fao.org/ag/agl/aglw/aquastat/dbase/indexesp.stm>

BADECON (Economic Statistics and Indicators Database of ECLAC)
<http://websie.eclac.cl/sisgen/ConsultaIntegrada.asp?idAplicacion=6>

BADEIMA (Environmental Statistics and Indicators Database of ECLAC)
<http://websie.eclac.cl/sisgen/ConsultaIntegrada.asp?idAplicacion=2>

BADEINSO (Social Statistics and Indicators Database of ECLAC)
<http://websie.eclac.cl/sisgen/ConsultaIntegrada.asp?idAplicacion=1>

CEPALSTAT (Database of social, economic and environmental indicators and statistics of ECLAC)
<http://websie.eclac.cl/sisgen/ConsultaIntegrada.asp>

CDIAC (Carbon Dioxide Information Analysis Center)
<http://cdiac.ornl.gov/>

CELADE (Latin American and Caribbean Demographic Centre-Population Division of ECLAC)
http://www.cepal.cl/celade/proyecciones/basedatos_BD.htm

FAOSTAT (FAO Statistical Databases)
<http://faostat.fao.org/>

INEGI (National Institute of Statistics and Geography of Mexico)
<http://www.inegi.org.mx/inegi/default.aspx>

IUCN (International Union for Conservation of Nature and Natural Resources)
<http://www.iucnredlist.org/static/stats>

MPA Global (World Database on Marine Protected Areas)
<http://www.mpaglobal.org/home.html>

OLADE (Latin American Energy Organization)
<http://www.olade.org.ec/>

SIEE (Energy-Economic Information System) of the Latin American Energy Organization (OLADE)
<http://www.olade.org.ec/siee.html>

UN-Habitat (United Nations Human Settlements Programme)
http://ww2.unhabitat.org/programmes/guo/urban_indicators.asp

United Nations Population Division

<http://www.un.org/esa/population/unpop.htm>

United Nations Millennium Development Goals indicators database

<http://mdgs.un.org/unsd/mdg/Host.aspx?Content=Data/Trends.htm>

WDPA (World Database on Protected Areas), United Nations Environment Programme (UNEP)

<http://sea.unep-wcmc.org/wdbpa/>

WHO/UNICEF (World Health Organization/United Nations Children's Fund)

Joint Monitoring Programme for the Water and Sanitation Sector

<http://www.wssinfo.org/en/welcome.html>

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