

# JOHANNESBURG SUMMIT 2002

BRAZIL



COUNTRY PROFILE



UNITED NATIONS

## INTRODUCTION - 2002 COUNTRY PROFILES SERIES

Agenda 21, adopted at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992, underscored the important role that States play in the implementation of the Agenda at the national level. It recommended that States consider preparing national reports and communicating the information therein to the Commission on Sustainable Development (CSD) including, activities they undertake to implement Agenda 21, the obstacles and challenges they confront, and other environment and development issues they find relevant.

As a result, in 1993 governments began preparing national reports for submission to the CSD. After two years of following this practice, the CSD decided that a summarized version of national reports submitted thus far would be useful. Subsequently, the CSD Secretariat published the first Country Profiles series in 1997 on the occasion of the five-year review of the Earth Summit (Rio + 5). The series summarized, on a country-by-country basis, all the national reports submitted between 1994 and 1996. Each Profile covered the status of all Agenda 21 chapters.

The purpose of Country Profiles is to:

- Help countries monitor their own progress;
- Share experiences and information with others; and,
- Serve as institutional memory to track and record national actions undertaken to implement Agenda 21.

A second series of Country Profiles is being published on the occasion of the World Summit on Sustainable Development being held in Johannesburg from August 26 to September 4, 2002. Each profile covers all 40 chapters of Agenda 21, as well as those issues that have been separately addressed by the CSD since 1997, including trade, energy, transport, sustainable tourism and industry.

The 2002 Country Profiles series provides the most comprehensive overview to date of the status of implementation of Agenda 21 at the national level. Each Country Profile is based on information updated from that contained in the national reports submitted annually by governments.

Preparing national reports is often a challenging exercise. It can also be a productive and rewarding one in terms of taking stock of what has been achieved and by increasing communication, coordination and cooperation among a range of national agencies, institutions and groups. Hopefully, the information contained in this series of Country Profiles will serve as a useful tool for learning from the experience and knowledge gained by each country in its pursuit of sustainable development.

## NOTE TO READERS

The 2002 Country Profiles Series provides information on the implementation of Agenda 21 on a country-by-country and chapter-by-chapter basis (with the exception of chapters 1 and 23, which are preambles). Since Rio 1992, the Commission on Sustainable Development has specifically addressed other topics not included as separate chapters in Agenda 21. These issues of trade, industry, energy, transport and sustainable tourism are, therefore, treated as distinct sections in the Country Profiles. In instances where several Agenda 21 chapters are closely related, for example, chapters 20 to 22 which cover environmentally sound management of hazardous, solid and radioactive wastes, and chapters 24 to 32 which refer to strengthening of major groups, the information appears under a single heading in the Country Profile Series. Lastly, chapters 16 and 34, which deal with environmentally sound management of biotechnology, and transfer of environmentally sound technology, cooperation, capacity-building respectively, are presented together under one heading in those Country Profiles where information is relatively scarce.

*At the release of this publication, Brazil had not updated the following chapters of the Country Profile: 2, 2(Trade), 4, 4 (Energy), 4 (Transport), 5, 7, 8, 10, 11, 12, 13, 14, 16-34, 19, 20-22, 24-32, 33, 35, 36, 37, 38, 39, 40, Industry, Sustainable Tourism. The remaining chapters were updated and therefore they contain information that is valid. To the extent that the relevant chapters are updated by Brazil, they shall be included in the final version of the Profile that will appear on our web page: <http://www.un.org/esa/agenda21/natlinfo>.*

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## LIST OF COMMONLY USED ACRONYMS

ACS	Association of Caribbean States
AMCEN	Africa Ministerial Conference on the Environment
AMU	Arab Maghreb Union
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
CARICOM	The Caribbean Community and Common Market
CBD	Convention on Biological Diversity
CIS	Commonwealth of Independent States
CGIAR	Consultative Group on International Agricultural Research
CILSS	Permanent Inter-State Committee for Drought Control in the Sahel
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COMESA	Common Market for Eastern and Southern Africa
CSD	Commission on Sustainable Development of the United Nations
DESA	Department for Economic and Social Affairs
ECA	Economic Commission for Africa
ECCAS	Economic Community for Central African States
ECE	Economic Commission for Europe
ECLAC	Economic Commission for Latin America and the Caribbean
ECOWAS	Economic Community of West African States
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
ESCAP	Economic and Social Commission for Asia and the Pacific
ESCWA	Economic and Social Commission for Western Asia
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FIDA	Foundation for International Development Assistance
GATT	General Agreement on Tariffs and Trade
GAW	Global Atmosphere Watch (WMO)
GEF	Global Environment Facility
GEMS	Global Environmental Monitoring System (UNEP)
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
GHG	Greenhouse Gas
GIS	Geographical Information Systems
GLOBE	Global Legislators Organisation for a Balanced Environment
GOS	Global Observing System (WMO/WWV)
GRID	Global Resource Information Database
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
IAEA	International Atomic Energy Agency
ICSC	International Civil Service Commission
ICSU	International Council of Scientific Unions
ICT	Information and Communication Technology
ICTSD	International Centre for Trade and Sustainable Development
IEEA	Integrated Environmental and Economic Accounting
IFAD	International Fund for Agricultural Development
IFCS	Intergovernmental Forum on Chemical Safety
IGADD	Intergovernmental Authority on Drought and Development

ILO	International Labour Organisation
IMF	International Monetary Fund
IMO	International Maritime Organization
IOC	Intergovernmental Oceanographic Commission
IPCC	Intergovernmental Panel on Climate Change
IPCS	International Programme on Chemical Safety
IPM	Integrated Pest Management
IRPTC	International Register of Potentially Toxic Chemicals
ISDR	International Strategy for Disaster Reduction
ISO	International Organization for Standardization
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature and Natural Resources
LA21	Local Agenda 21
LDCs	Least Developed Countries
MARPOL	International Convention for the Prevention of Pollution from Ships
MEAs	Multilateral Environmental Agreements
NEAP	National Environmental Action Plan
NEPAD	New Partnership for Africa's Development
NGOs	Non-Governmental Organizations
NSDS	National Sustainable Development Strategies
OAS	Organization of American States
OAU	Organization for African Unity
ODA	Official Development Assistance/Overseas Development Assistance
OECD	Organisation for Economic Co-operation and Development
PPP	Public-Private Partnership
PRSP	Poverty Reduction Strategy Papers
SACEP	South Asian Cooperative Environment Programme
SADC	Southern African Development Community
SARD	Sustainable Agriculture and Rural Development
SIDS	Small Island Developing States
SPREP	South Pacific Regional Environment Programme
UN	United Nations
UNAIDS	United Nations Programme on HIV/AIDS
UNCED	United Nations Conference on Environment and Development
UNCCD	United Nations Convention to Combat Desertification
UNCHS	United Nations Centre for Human Settlements (Habitat)
UNCLOS	United Nations Convention on the Law of the Sea
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNDRO	Office of the United Nations Disaster Relief Coordinator
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
UNFPA	United Nations Population Fund
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UNIFEM	United Nations Development Fund for Women
UNU	United Nations University

WFC	World Food Council
WHO	World Health Organization
WMO	World Meteorological Organization
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization
WWF	World Wildlife Fund
WWW	World Weather Watch (WMO)

## **CHAPTER 2: INTERNATIONAL COOPERATION TO ACCELERATE SUSTAINABLE DEVELOPMENT IN DEVELOPING COUNTRIES AND RELATED DOMESTIC POLICIES**

**Decision-Making:** The Ministries of External Relations, of Finance, and of Trade, Industry and Tourism are responsible for most of the decisions related to international cooperation and trade.

**Programmes and Projects:** No information available.

**Status:** No information available.

**Capacity-Building, Education, Training and Awareness-Raising:** No information available.

**Information:** No information available.

**Research and Technologies:** No information available.

**Financing:** No information available.

**Cooperation:** Brazil currently takes part in the following bilateral and regional agreements for the use of international watercourses, lakes or groundwater: (At the Bilateral Level) Cooperation Agreement between Brazil and Uruguay for the Use of Natural Resources and Development of the Quara River Basin; Fishing Agreement between Brazil and Argentina; Agreement on Fishing and Preservation of Renewable Natural Resources between Brazil and Uruguay; Agreement between the Government of Brazil and the Government of Paraguay for the Conservation of Water Fowl in Bordering Rivers; Agreement of Amazon Cooperation between the Government of Brazil and the Government of Colombia; and the Treaty for the Use of Shared Water Resources of the Bordering Areas of the Uruguay River and its Tributary, the Pepiri-Guaçu, between Brazil and Argentina; (at the Regional Level) Treaty of the Rio de la Plata, this is an agreement among Argentina, Bolivia, Brazil, Paraguay and Uruguay for flood warning. Information is exchanged daily and most of it is available on the Internet; and there is also the Amazon Cooperation Treaty among Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Surinam and Venezuela.

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## **CHAPTER 2: INTERNATIONAL COOPERATION TO ACCELERATE SUSTAINABLE DEVELOPMENT IN DEVELOPING COUNTRIES AND RELATED DOMESTIC POLICIES - TRADE**

**Decision-Making:** The Ministries of External Relations, of Finance, and of Trade, Industry and Tourism are responsible for most of the decisions related to international cooperation and trade.

**Programmes and Projects:** The Real Plan, launched in July 1994 with strong support from society, was the fourth or fifth attempt carried out to achieve monetary stabilization, after 30 years of persistently high rates of inflation. It succeeded in bringing the annual inflation rate down from an all-time high of 2,708 % in 1993, to about 10% in 1996. GNP is estimated as more than \$800 billion at Purchasing Power Parity rates, having grown at a moderate but positive pace in the five-year period. Foreign currency reserves reached an all-time high, well in excess of US\$50 billion, a result of positive inflows of outside investment. There are over 3.5 million industrial and commercial establishments. The small and very small or micro companies are 98% in number, representing 60% of jobs, and 43% of sales. The informal sector, however, may contribute as much as 40% of GNP. External debt figures have risen since 1992, but totals represent less than one fifth of GNP and only three times the level of foreign reserves.

**Status:** Measures taken by the Government in 1993 and 1994 to eliminate or reduce trade barriers have changed the former positive trade balance figures, observed since 1981, and which had exceeded the level of US\$ 19 billion in 1988, into trade deficits which topped the US\$5 billion mark in 1996. Imports, mostly of durable and capital goods, have risen appreciably.

**Capacity-Building, Education, Training and Awareness-Raising:** No information available.

**Information:** No information available.

**Research and Technologies:** No information available.

**Financing:** Total financial assistance from bilateral and multilateral sources represents less than 0.1% of GNP annually.

**Cooperation:** The South American Common Market Agreement (MERCOSUL/MERCOSUR) entered by Argentina, Brazil, Paraguay and Uruguay became operational in 1995, and has since been joined by Chile and Bolivia. A Common Import Tariff, applicable to over 9000 items, varies from zero to 20%; exceptions not exceeding 400 items per country are allowed until the year 2001. A Mercosul product must have at least 60% of its inputs produced locally.

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## CHAPTER 3: COMBATING POVERTY

**Decision-Making:** An Advisory Board and an Executive Secretariat, at the Presidential level, are responsible for establishing sectoral and geographic priorities, promoting decentralized projects undertaken by all three levels of government, and attracting broad participation by society in their implementation. Among the governmental organizations that have direct responsibility for programs and projects aimed at combating poverty, can be mentioned: Ministry of Pensions and Social Security (MPAS)/Social Assistance Office (SEAS): the Social Assistance Act, which defines the objectives and beneficiaries of social assistance, was used as the basis for the National Social Assistance Policy (PNAS). This Policy provides for the structuring of programs, projects, services and benefits that aim to ensure the minimum social needs of the poorest populations. The Office for Special Projects oversees implementation of the PNAS, identifying priorities and guidelines for their execution, acting mainly at the family level. The SEAS also executes other assistance actions in rural and urban areas. MPAS/National Social Assistance Council (CNAS): this Council, comprising representatives of civil society and government, is responsible for approving, regulating, monitoring and assessing the PNAS. *Comunidade Solidária* Program (PCS): an autonomous program, structured in 1995, based on a partnership of the government with civil society organization at federal, state and local levels. It is directed by the *Comunidade Solidária* Council and administered by an executive secretariat. More recently, in 1999, the *Comunidade Ativa* Program was established, also coordinated by the PCS Executive Secretariat, that represents a new stage of this Program, meeting the challenges of the Local Integrated and Sustainable Development Program. The PCS also promotes partnerships between governmental bodies at the three levels of government.

**Programmes and Projects:** Ministry of Pensions and Social Security (MPAS): the National Social Assistance Policy, comprises programs specifically geared to families that: Have members with AIDS; Are disaggregating; Do not have housing; Face drug use and distribution problems; Are dependent on garbage picking in dumps; Are in nomad or transit situation; Live in settlements; Depend on former prison inmates; Were victims of calamities or epidemics. Furthermore, the SEAS develops wide-reaching actions for combating poverty, such as: Capacity building of community agents and leaders; Community organization; Implementation of small workshops for micro-companies; Support for the small rural producer in food production and in the sustainability of his establishment; Seeking economic use of regional raw materials and absorbing local human resources; Professional qualification, refresher and recycling, within a process of income generation; Formation of productive micro-units to provide opportunities for holders of traditional know-how, making ethnic-cultural sustainability economically feasible; Support to the implementation of trading centers for local production. *Comunidade Solidária* and *Comunidade Ativa* Programs: The first program, together with its partners, benefits 1369 municipalities (around 25% of the total), with investments of around R\$ 7.8 billion, reaching more than 53 million people, through its programs in education, health, food, sanitation, housing and income generation. Among the results obtained were an increase of 18% in primary school admissions and a drop in the infant mortality rate from 82.6/thousand in 1994 to 47.2/thousand in 1997 in the municipalities concerned. Launched in mid 1999, the *Comunidade Ativa* Program began its implementation within the guidelines of the Local Integrated and Sustainable Development Program, in 157 municipalities, and it is expected to reach more than one thousand by the end of 2002. One of the important characteristics of this new program is that the development actions are decided by the communities themselves, in an effort to break the usual model based on assistance and imposition of activities. By mobilizing the communities, the municipalities themselves identify their talents, necessities and priorities. The idea is basically to stimulate the development of sustainable communities that can carry on themselves, without dependency from governmental special assistance. The selection of the municipalities to implement the programs is based on criteria that take into consideration both the level of poverty and an assessment of the local capacity to respond. In a collective effort, all sectors – governments (federal, state and municipal), private sector and non governmental – act in total respect for the municipal realities.

**Status:** One of the most relevant factors for the evaluation of sustainability in Brazil is the poverty. Poverty line may be defined as the total household income necessary first, to acquire basic foodstuffs compatible with

recommended minimum nutrient requirements, and secondly, to have access to basic services. The indigence line, on the other hand, only takes into account the first parameter. In 1990, thirty percent of the population nation-wide was poor, and twelve percent was indigent, reflecting, among other things, significant rural-urban and regional imbalances. In the same year, fifty-three percent of the rural population was poor, whereas in urban areas the poor constituted eighteen percent of the total. A disproportionate number of the poor live in the Northeast, which has thirty percent of the country's population but fifty-five percent of all the poor in Brazil. Poverty levels seem to have declined since the inception of the Real Plan in July 1994. A comparative study of the six largest metropolitan areas, which account for one third of the overall urban population but which may have a higher than average percentage of the urban poor, indicated a reduction from 14.8 million at that time to 10.7 million poor in December 1995, or a return to the absolute figures for 1990 and consequently to smaller percentages. There again the average income and access to services within the poor group in the Southeast, as shown in social indicators, remained higher than in the Northeastern metropolises.

**Capacity-Building, Education, Training and Awareness-Raising:** The first step considered in all programs is the strengthening of local capacities and awareness raising, because they are the main instruments that allow for the implementation of local integrated and sustained development. Actions aimed at education and training are implemented in accordance with the necessities of the communities, in cooperation with the Ministry of Education and the private and non governmental sectors.

**Information:** There is considerable diversity within Brazil as to household income levels and expenditures, purchasing power in general and with respect to the minimum wage, as well as costs of goods and services. The Brazilian Institute of Geography and Statistics (IBGE – <http://www.ibge.gov.br>) constitutes the main provider of data and indicators, including social, economic, geographic and statistical information. The information is used by all sectors as basis for the development of specific projects as well as for their evaluation. In accordance with IBGE data, the main social indicators in 1999 were: unemployment: varies from region to region – from 8,00% to 11,4%; illiteracy: 13,3%; family income: 31,1% below minimum wage.

**Research and Technologies:** No information available.

**Financing:** The programs and projects implemented are financed by many contributors, from governmental organizations to the private and non governmental sectors.

**Cooperation:** International organizations contribute to the fulfillment of the agendas of the Ministry of Pensions and Social Security, of the National Institute of Social Security and of the Dataprev (national databank of information on social security) in the implementation of investigations, studies and research; in the divulgation of publications on social security; in the organization of capacity building courses and seminars; in the publication of documents on social security issues; in the exchange of experiences among member institutions; and in the promotion of the adoption of international regulations that facilitate the coordination among different systems and promote the internationalization of social security rights.

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## CHAPTER 4: CHANGING CONSUMPTION PATTERNS

**Decision-Making:** The Government bodies dealing this issue are the Ministry of Environment and the National Environment Council. The bodies that constitute the Commission for Sustainable Development Policies and Agenda 21 also take part in decision making, such as the Ministry of Environment, Ministry of Planning and Budget, Ministry of Science and Technology, Ministry of External Relations, Strategic Affairs Secretariat and Social Policies Chamber, the Brazilian Business Council for Sustainable Development, the Onda Azul Foundation, and the National Environment Council. At the local and provincial levels, the State and Local Secretariats for Environment, Industry, Trade and Tourism and Justice are responsible. Important legal instruments in this area include: The 1998 Environmental Crimes Law; the 1990 Consumer Protection and Defense Code; the 1985 Diffuse Rights; Codes of Practice for industries, Standards or Guidelines that include the ISO 14000 standards; the Green Protocol; Declaration of Industry Principles for Sustainable Development. The national strategy to address issues related to sustainable patterns of consumption and production is given by the 1981 National Environment Policy and the 1990 National Policy for Consumption Relations, both instituted through laws. The National Consumer Protection System consists of state and local consumer protection bodies (PROCON), the National Institute of Metrology, Standardization and Industrial Quality (INMETRO), the Institute of Weights and Measures (IPEM), the Consumer Protection and Guidance Association (ADECON), the Brazilian Institute for Consumer Rights and Policies (BRASILCON), the Brazilian Institute for Consumer Protection (IDEC) and the Minas Gerais Consumers and Housewives Movement. The National Policy of Consumption Relations aims to meet the needs of consumers, to respect their dignity, health and safety, to protect their economic interests, to improve their living conditions as well as to ensure transparency and harmony in consumption relations and establishes the general rules for application of administrative sanctions. The Government, in cooperation with trade associations, has promoted actions to encourage companies to adopt the NBR-ISO 14000 environmental standards. The 1997 National Water Resources Policy recognizes water as a finite and vulnerable good, with economic value. Five additional instruments essential to good water use management were also defined: National Water Resources Plan, Granting of Water Usage Rights; Charging for Water Use; Classification of Water Bodies According to Use; and the National Information System on Water Resources. The National Policy for the Environmental Management of Solid Wastes and the National Recycling Program, propose as fundamental principles, in order of importance: the non-generation of wastes; the minimization of wastes; reutilization; recycling; appropriate treatment and final disposal of wastes. The Brazilian Forest Policy aims at the continuous and sustainable production of forest goods and services, conservation of biological diversity and of the vital processes associated to forest ecosystems, and improvement in the quality of life of the Brazilian people. In 1991, the National Traditional Populations Center was created to improve the social, land and environmental issues, as well as to encourage the extraction of certain natural resources, which besides bringing significant socio-economic effects, strengthens safeguarding of borders and the Amazon biome. NGOs, under nationwide coordination of the Brazilian NGO Forum, are represented in several government fora, such as the National Environment Council; the Commission for Sustainable Development Policies and Agenda 21; and the National Water Resources Council.

**Programmes and Projects:** To approach this issue there exists the Institutional Strengthening Programme for Environmental Licensing. There is also the Brazilian Recycling Programme: The Ministry of Industry, Commerce and Tourism instituted in 1998 an Interministerial Working Group, with the participation of the private sector, to draft a proposal for the Brazilian Recycling Programme, to add value and increase use of urban, industrial, mineral and agricultural wastes as raw materials as well as development of recycling plants. The Project for Life Cycle Analysis of Packaging for the Brazilian Market aims at establishing life cycle analysis for products and processes related to packaging and to the environment, and has been seeking to conform to ISO 14000 standards, this project is being developed by the Packaging Technology Center (CETEA) of the Institute for Food Technology (ITAL), together with a consortium of associations and companies, and with the support of the Sao Paulo State Foundation to Support Research (FAPESP). Additional projects include: the National Environmental Education Programme - PRONEA, the National Programme for Education and Control of Noise Pollution (SILENCIO), the National Programme to Combat Water Waste, the Citizens for Water Movement, the Decentralized Execution Projects (National Environment Programme), the Programme to Conserve and Revitalize Water Resources, Programme to

Develop the Forest Sector, the National Programme for Native Forest Seeds, the Programme to Control Air Pollution from Automotive Vehicles, Brazilian Molecular Ecology Programme, the Programme for Energy Development in the States and Municipalities of the North Region, Efficiency of Public Lighting Systems. There is also the creation of the Programme to Combat Energy Waste - PROCEL and the Programme to Conserve Natural Gas and Oil Byproducts - CONPET. To motivate consumers, the National Energy Conservation Prize and the Energy Efficiency Seal were created. With respect to sustainable energy alternatives, the following projects may be highlighted: 1) Photovoltaic Energy Generation Project, developed by the Minas Gerais Electricity Company (solar energy); 2) the Wind Energy Generation Project, developed by the Ceara Electricity Company; and 3) the Biomass Project, using GEF resources; and 4) PROALCOOL, the National Alcohol Programme, alcohol is added to gasoline. Some of the major programmes and projects underway or planned to address issues related to consumption and production patterns include: Decentralized Execution Projects (National Environment Programme) such as Partnerships with associations, local governments, universities and government environment agencies were tested and implemented: the Programme to Conserve and Revitalize Water Resources; the Programme to Develop the Forest Sector; National Programme for Native Forest Seeds, started in 1994 by the Ministry of Environment; Federal University of Ceara (UFC); Federal University of Para; Poverty in Environment Programme; technical support and installation of 15 drinking water supply microsystems in rural communities; organization of self-management sanitation systems; management of cut-over land for formation of agroforestry systems; implementation and dissemination of techniques for cultivating medicinal plants; development and dissemination of techniques for storing agroforestry products; and development of techniques to implement policultures and reduce the malnutrition of poor populations and reduce environmental degradation; National Energy Commission/Radioprotection and Dosimetry Institute (CNEN/IRD); University of Brasilia, Physics Department (UNB); PONS A.S.A; RONDOPAR. The National Alcohol Programme (PROALCOOL) was a programme of great impact, initially created to reduce oil imports during the 1973 crisis, by developing unique technologies for the production of anhydrous alcohol on a large scale, and the development of equipment using that fuel. Although there are several sectoral programs that directly or indirectly address the issue of sustainable consumption and production, the main constraint today is the non-existence of a specific national program on the issue of sustainable consumption and production.

**Status:** The company established a partnership with the Federal University of São Carlos (UFSCar). The company also hired those with scholarships from the Industrial Technological Development; Federal University of Santa Catarina/ Mechanical Engineering Department/ Refrigeration, Ventilation and Air Conditioning Center (UFSC/DEM/NRVA). The research is also part of agreements with interested universities and companies such as EMBRACO (Brazilian Compressor Company); University of Campinas/ Physics Institute (UNICAMP/IF): development of Advanced Carbonous Materials, such as fullerene, activation through plasma of mesophase microspheres, carbon-carbon compounds and research on uses of agroforestry wastes. USIMINAS requested a patent for an Advanced Carbonous Material developed with the aid of researchers from the project.

**Capacity-Building, Education, Training and Awareness-Raising:** The Ministry of Environment and the Ministry of Education formulate national policies, to encourage, guide, strengthen, follow and assess ongoing environmental education actions, based on the National Environmental Education Programme - PRONEA, where specific actions on environmental education are to be found. The National Environmental Education Programme - PRONEA, instituted in 1994, establishes guidelines for formal and informal environmental education actions. Under two perspectives: the first has the school system as its instruments; the second, which is directed towards sound environmental management, aims to raise public awareness and to produce information to reach three main groups: a) public administrators, congressmen, professionals, scientists, business leaders and leaders of social movements; b) farmers, ranchers, timber workers, miners; and c) radio, television and the press, cinema, theater. The Multifibras project permitted capacity building of human resources in the areas of thermal systems and electronic components to develop highly efficient refrigeration products. The developed research led to a reduction of energy consumption in refrigeration equipment and replacement of CFC and HCFC, which are harmful to the ozone layer. The project further enabled integration of Brazilian and foreign universities, with exchange of experiences and absorption of technologies. The National Programme for Education and Control of Noise Pollution (SILENCIO), established in 1990 by the National Environment Council. CONAMA recently approved the

mandatory Noise Seal for household appliances. The National Programme to Combat Water Waste has as its main object promoting the rational use of water for public supply, to benefit environmental sanitation and service efficiency. The productive sector encourages and supports capacity building of agents that act in institutions that provide professional training and social action such as SENAI (National Industrial Training Service), SENAC (National Commercial Training Service), SESI (Industry Social Service), SESC (National Commercial Service) and in other extension courses such as those at SEBRAE (Brazilian Service to Support Small Business) and EMBRAPA (Brazilian Agricultural Research Corporation; Also included are the education programme Usina Hidrelétrica do Xingu (The Xingu Hydroelectric Power Station), promoted by IBAMA in 1998; and the capacity building program in Environmental Management for government and private sector technical personnel under MERCOSUL, held by the Specialized Meeting of Science and Technology of the Sub-Working Group - Environment (defined as a continuous and permanent activity). The strategic actions to raise awareness include: Promote and encourage all forms of access to environmental information that can be used in producing programs, news, debates and other means of communication; Promote training opportunities and seminars, produce technical material and support other initiatives designed to improve the capacity of the sector; Support transmission of information of an educational nature on the environmental issue, through the media in general, and specially using the National System of Educational Radio Transmission - SINRED, as well as educational radio and television stations; Encourage artistic and literary production in its many forms. The Citizens for Water Movement was created to provide visibility for actions that benefit water. There are already more than 60 Reference Centers, which coordinate the process of repeating the actions of citizens in each Municipality.

**Information:** The information on the [National Environment Policy and Brazilian environmental legislation is available in \[www.mma.gov.br\]\(http://www.mma.gov.br\)](#). Information is also available in the following web sites: [www.cni.org.br](http://www.cni.org.br), [www.cetesb.br](http://www.cetesb.br), [www.cempre.org.br](http://www.cempre.org.br), and [www.mict.gov.br](http://www.mict.gov.br).

**Research and Technologies:** The Environment Technology Development Division of IBAMA promotes the development, access, incorporation and application of environmentally sound technologies. The major reference center in the country is the Environmental Sanitation Technology Company (CETESB) of São Paulo, which concentrates solid waste management activities and provides technological support and technical cooperation to state and local bodies. The National Confederation of Industry System also includes the following centers: Technology Centers - National Environmental Technology Center, the Industry Technology Center, the National Clean Technologies Center and the Industrial Social Service Laboratory, all providing services and guidance to industry. Environmentally sound technologies used in packaging, labeling, product design, manufacturing and other processes are being promoted in particular by the System of the National Confederation of Industry and SEBRAE. The National Solid Wastes Policy, as well as the Brazilian Recycling Programme, is among the instruments to identify appropriate technologies for waste treatment by the Government. Among the technology-related programmes in this area are the following: Program to Control Air Pollution from Automotive Vehicles, created in 1986. The maximum emission limits for pollutants were determined, with a specific timetable for three distinct categories of vehicles: Light Passenger Vehicles, Light Commercial Vehicles and Heavy Vehicles. In 1992, the use of catalytic converters became necessary. In 1997, besides catalytic converters, new devices such as electronic injection have also become necessary. Brazilian Molecular Ecology Program for the Sustainable Use of the Amazonian Biodiversity: a three pronged consolidation of biodiversity, biotechnology and bioindustry. The Program for Energy Development in the States and Municipalities of the North Region installed solar panels in 41 community centers of agrarian reform in municipalities of the North Region. Efficiency of Public Lighting Systems, enhanced efficiency of public lighting systems lead to reduced energy consumption. The Program to Combat Electricity Waste – PROCEL was created in 1985 and restructured in 1995, to combat waste, which represents 1/3 of all the energy consumed in the country. Integrated action between supplier and consumer will result in a reduction of consumption of 130 billion kWh by the year 2015, resulting in net gains of up to US\$34 billion. National Program to Rationalize the Use of Oil and Natural Gas Byproducts - CONPET was created in 1991. In the residential and commercial sector, the LPG (liquefied petroleum gas) is used by circa 85% of the population. CONPET actions are both economic: it is expected to reduce consumption by about 230 thousands barrels a day by the year 2010; and environmental: preservation and improvement of air quality in both small and large cities.

**Financing:** Although resources are insufficient, the sector is financed by the national budget, partnerships with the private sector and external assistance.

**Cooperation:** Cooperation in this area takes place through the Montreal Protocol Multilateral Fund; the GEF Multilateral Cooperation; bilateral cooperation with Germany in projects such as WEAVES (for weaving industry, to replace dyes with biodegradable dyes); SHIFT (in the area of research and technology; and with UNIDO for the Clean Production Center.

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## CHAPTER 4: CHANGING CONSUMPTION PATTERNS - ENERGY

**Decision-Making:** No information available.

**Programmes and Projects:** To date support has been given to the development of projects that aim to consolidate an institutional technological competence for a greater conservation efficiency of the national energetic systems. Priority was given to projects that had a sustainable perspective of the environment, with the objective of providing a clean production and an efficient use of conventional energetic resources (non-renewable) and the development of methodologies more appropriate to the technological systems that use renewable resources. The projects are mainly concentrated in the following areas/sectors: Refrigeration and Combustion, Management of Electric Energy Demand, Energy Accumulators and Hybrid Systems, Energy Conservation, Alternative Energies, Biomass and Artificial Intelligence (neural networks) applied to the operation of Energy Substations. Among others, the most significant results are: RONDOPAR - Lead and Lead Products: This company which produces batteries, achieved significant improvements in the production process of electrical plates and accumulators, implementing changes that permit productivity increases and increased product quality with optimization of inputs. The company established a partnership with the Federal University of S o Carlos - thus ensuring the transfer of technologies. Also worth noting is the absorption of development/technological/industrial scholarship students to the technical staff of the company; CEPTEL - Electrical Research Center: worth highlighting is the development of software to improve techniques for simulating transmission systems, neural networks and inferior points; development of hydrological forecasting models; research in transformers and superconductivity; improvement of equipment and procedures in the area of electrical motors; development of transducers and communication systems and courses on alternative energy sources. The work developed represented technological advances in the generation of processes and products in areas that are priority for the electricity sector, with a short term application in optimizing the operation of reservoirs; supervision, control and protection of electrical systems, energy conservation and training in the area of alternative sources; The CTM - Navy Technological Center: developed a static frequency converter with characteristics for use in ultracentrifuges and implemented a pilot lot with 600 installed units in an active uranium enrichment plant in Aramar (Iper-SP). This converter has automatic acceleration and simplicity in the components used, at a low final product cost. A prototype of a modular inverter was also developed for benchmark tests. The research developed is of essential interest to the strategic technological sectors, and may generate specific technologies to rationalize energy consumption. The project led to interaction with Federal University of Santa Catarina and companies such as TECTROL Ltda.; PROCEL/ELETRONBRAS has implemented The National Energy Conservation Program which has among its noteworthy results: the decentralization and expansion of conservation actions and greater efficiency in the use of electric energy, conceptual and methodological updating of staff with respect to the planning and management of energy conservation, and awareness raising of the technical and managerial staff of companies for the relationship among conservation, energy efficiency and improved business competitiveness. The interaction with the academic sector and technical schools resulted in the formation of qualified professionals and in fostering research in conservation and efficiency improvement in energy production; UFSC/DEM/NVRA - Federal University of Santa Catarina/Department of Mechanical Engineering/Refrigeration, Ventilation and Air Conditioning Center: The dimensioning of capillary tubes based on software and selection diagrams, improved application of compressors to refrigeration systems; experimental determination of the thermal load of a refrigeration system in order to adjust the compressor dimensioning; dimensioning of roll-bond evaporators, in order to optimize the refilling of refrigerant and consequent improved application of the compressor with the possibility of reduction in the consumption of energy. This research is also part of agreements between the university and companies interested in the issue such as EMBRACO (Brazilian Compressors Corporation), a company that produces refrigerating equipment; MULTIBR S Eletrom, sticos (Household appliances): this project enabled capacity building in the area of thermal systems and electronic components to develop high efficiency refrigeration products. The research developed represents a contribution to the reduction of energy consumption in refrigerating equipment and substitution of HCFC, which is harmful to the ozone layer. The project furthermore facilitated connections between Brazilian and foreign universities through exchanges of experiences and absorption of technologies; NEGAWATT Ltda.: this consulting company's project on

rationalization of energy developed computer programs for the PC in Q-Basic to calculate and optimize the distribution of lighting with respect to the geometry of lamps. These products have immediate application in the optimization of specular reflectors for fluorescent lighting; UNICAMP/IF - University of Campinas/Physics Institute: development of Advanced Carbonous Materials such as fullerenes, activation via plasma of mesophase microspheres, carbon-carbon compounds and research in use of agroforestry wastes (development of combustion chambers to burn wood and briquettes from roasted agroforestry wastes). Patents were requested by USIMINAS with respect to an Advanced Carbonous Material obtained with the assistance of project researchers. The fullerenes were produced and provided to other laboratories involved in various research activities; UFPA - Federal University of Par: several products and processes were generated, in particular a network configurator, status estimator with Waltcom-C code, a module for forecasting of active and reactive charge in the short term; specialist system to treat alarms; analysis module for static safety for the Eletronorte System; interfaces with the application programs of the local supervision network; programs to assist post-dispatch. Also to be noted is the participation of Eletronorte technical personnel in courses on operational systems; UFSC/NPC - Federal University of Santa Catarina / Research and Construction Center: adaptation of software to simulated the thermal-energetic performance in buildings; preliminary development of a CD-ROM for teaching energy conservation in buildings; setting up high vacuum workbenches for cleaning and charging of heat tubes, determination of thermal contact resistance and thermosiphon test with two phases of stainless steel and water; qualification of solarimetric data; calibration and installation of a solarimetric station. The research in this last area enabled the creation of an infrastructure necessary to create the solarimetric atlas of Brazil with monthly, daily and three-hourly data. The university also established a partnership with ELETRONORTE to carry out research and six projects are underway. In the area of Renewable Energy Sources, emphasis has been placed on coordinating Science and Technology activities carried out in the country related to the development and use of alternative energy sources. Among the most relevant activities are: consolidation of the National Reference Center for Hydropower Efficiency in Small Scale Plants, created in 1996 with support from the MCT in cooperation with the Ministries of Mines and Energy; Industry, Commerce and Tourism; and Environment; Minas Gerais Science and Technology Secretariat, Brazilian Electricity Headquarters with the objective of promoting and disseminating programs, projects and results of research on the use of Small Hydroelectric Plants; follow-up of work on: Biomass, Wind Energy and Solar Energy; feasibility study of projects related to the use of sugar cane for energetic purposes, to make better use of the bagasse, straw and leaves to generate electric energy; and monitoring of the project undergoing implementation by COPERSUCAR and by DEDINI to develop the process for producing alcohol based on bagasse and sugar cane tips. These projects are being carried out with the support of UNDP and GEF funds, as well as counterpart funds to be provided by COPERSUCAR to the amount of US\$ 3.5 million; monitoring of technological development projects to generate electrical energy based on the gasification of wood, carried out with support from MCT and a consortium made up of ELETROBRAS, CHESF and Shell.

**Status:** It is hoped that with the advent of the Federal Government's new policies for restructuring the energy sector, which include breaking the generation monopoly and privatizing energy distribution, there will be increased competition in the production and use of new energy sources. Research and development (R&D) now has an essential role to play in the reduction of production costs and in the search of more efficient and environmentally sound systems.

**Capacity-Building, Education, Training and Awareness-Raising:** No information available.

**Information:** No information available.

**Research and Technologies:** See under **Programmes and Projects**.

**Financing:** No information available.

**Cooperation:** No information available.

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## **CHAPTER 4: CHANGING CONSUMPTION PATTERNS - TRANSPORT**

No information available.

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## CHAPTER 5: DEMOGRAPHIC DYNAMICS AND SUSTAINABILITY

**Decision-Making:** Ministries more directly involved in demographic issues are Planning and Budget, Health, Education, Labor, and Social Security. Those, as well as the Ministries of Justice and the Environment coordinate their efforts in the fields of population, environment and development.

**Programmes and Projects:** No information available.

**Status:** The annual population rate of growth, which was high until the 1960s, has shown a marked decline since then. A rapid drop in the fertility rate took place in every region, most specifically in urban areas and in the high income and educational levels. As such, fertility rates have come down from an average of 5.8% in the sixties to 3.2% in the eighties, and the resultant annual population growth rate from 2.9% to 2.1% respectively. The 1991 census figures have been updated by annual household sample surveys. Projections are leveling off at about 250 million around the year 2050.

**Capacity-Building, Education, Training and Awareness-Raising:** No information available.

**Information:** No information available.

**Research and Technologies:** No information available.

**Financing:** No information available.

**Cooperation:** No information available.

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## CHAPTER 6: PROTECTING AND PROMOTING HUMAN HEALTH

**Decision-Making:** The Brazilian Federal Constitution establishes that: “Health is a right for everyone, and an obligation of the State, to be granted through social and economic policies aimed at reducing the risks of disease and other health problems, and to providing universal equalitarian access to actions and services for its promotion, protection, and recovery”. Primarily involved in this area are the Ministry of Health, through the Unified Health System (UHS), involving Federal, State and Municipal levels and community participation. The UHS is not limited to the provision of basic health care involving prevention, promotion and care at all complexity levels. Public health system goes along with private offer of health care services. Part of these services are hired by UHS and other services can be accessed through individual or collective private Health Insurance Plans. The Brazilian Government regulates the provision of health services by these plans through a specific agency under the Ministry of Health. The UHS is decentralized and has enough flexibility to meet the needs dictated by the epidemiological profile of each different region of the country. Besides decentralization, the UHS enhances its capacity through an innovative action that encompasses the work of community health agents and family health teams. These combined strategies work together with local health units and give priority to integral and continuous care. Populations in remote areas or poor settlements are listened to and cared for taking under consideration their physical and social environment. Social control is part of the UHS through community participation in Health Councils where policies and their implementation are widely discussed. According to the decentralization of UHS, Councils are active and interconnected at the municipal, state and federal level.

**Programmes and Projects:** Although absolute priority is given to the main tasks of the UHS, several programs are developed within the system as a means to enhance or focus on specific problems or mechanisms. Among these we can mention the Community Health Agents Program, the Family Health Program, the Sexually Transmitted Diseases and AIDS Program, the Woman’s Health Program, the Child Health Program, the Accidents and Violence Program, the Food and Nutrition Program, the Purchasing and Distribution of Medicines, the Basic Pharmacies Program, the Science and Technology Program, the Diabetes Program, the Accreditation Program, the Cardiovascular Diseases Program, the Health Promotion Program, the “Viva Mulher” Program, the Rheumatic Diseases Program, and the Hospital Infections Program.

**Status:** Health care remains one of the major concerns, especially for low income groups. The Unified Health System, a decentralized public health system which integrates all levels of government, has worked hard to better use resources available and to improve financing for necessary actions to comply with its constitutional and legal obligations. Public figures show that, although all efforts undertaken by the health sector and other Government areas, basic sanitation services are still not available for a significant part of the population and that some endemic diseases still persist as an important issue. The situation of communicable diseases in Brazil is complex and can be divided into three main tendencies. The first would be related to the group of diseases whose control and prevention show great positive results. In this group are included diseases for which control tools are available, such as diseases preventable through immunization, where we have seen drastic reduction of incidence rates. A good example is Polio, which had its eradication certified in 1994. Measels is about to be eradicated as well, and its transmission has not occurred within the country since December 2000. Wild Yellow Fever, although under control, still needs attention. Wide vaccination strategies are being undertaken to avoid the risk of its urbanization, including intensive vaccination in ports, airports and frontiers. A second tendency relates to diseases like leishmaniasis and esquistosomiasis, which are suffering modification of their traditional epidemiological patterns with a clear geographical expansion. Processes like urbanization and migration are leading to persistence and/or expansion of other such diseases as Malaria in the Amazon region, apart from excellent results obtained on drastic reduction of its most serious forms by *P. falciparum* and the decrease of correspondent mortality. One last group expresses within the country the global phenomena of emerging and reemerging of diseases like hantavirus and break bone fever (dengue) which are now one of the greatest priorities for public health in Brazil. In this group we can include the HIV/AIDS epidemic, towards which the country has developed a worldwide-known strategy, putting emphasis on free distribution of antiretrovirals. Positive results obtained by the Brazilian program are

undeniable. Brazil has developed the capacity to produce vaccines locally and has undertaken wide vaccination campaigns as well as regular immunization schemes with excellent results in terms of coverage. At the same time, actions for vectors control have been decentralized and reformulated to include the participation of communities and to employ methods and environmentally-friendly substances. Procedures related to pregnancy and delivery represent the main cause of hospitalization within the UHS. Over the last five years, 91,5% of deliveries have occurred in hospitals including 78,2% of the women on rural areas. Assistance to pregnant women has significantly increased reaching a rate of 86% coverage in 1996. Actions to reduce maternal mortality are an absolute priority. Work is also being done to facilitate access by women to birth control methods, distributed free of charge at UHS units. Diseases that affect specifically women have been an important issue. Gynecologic cancer represents 43% of malign neoplasms among women. Therefore, the Ministry of Health and the National Council for Women's Rights have been working together to identify and provide best treatment for women affected, undertaking 7 million tests annually. Other actions towards women's health encompass protection and treatment for pregnant women contaminated by HIV to avoid transmission to their infants and reduction of congenital syphilis to less than 5 per 1,000 births, rate attained in December 1997. Many efforts have been undertaken on health promotion and child nutrition that resulted on reduction of child mortality and malnutrition in every Brazilian region. Special strategy involving children under 5 years of age, promotes integral assistance shifting from the focus on specific pathologies to a modality of assistance that follows the child along his/her own process of growth and development. The promotion of oral re-hydrating has been one of the most important tools to fight against dehydration that has proved to be one of the main causes of death of children suffering from diarrhea. Total frequency of diarrhea on children under 5 was expressively reduced. Older children and teenager's health receive special attention as to their growth and development, sexuality, mental health, reproductive health, accident prevention and violence, each related to the specific age group affected. In 1999, the Ministry of Health developed a sub-system, which is currently being implemented, under the UHS for indigenous health. This sub-system is being implemented taking particularly into account culture, tradition and the specific way of life of each of the indigenous communities within the country. Disease control and prevention is undertaken by the Federal Agency for Disease Prevention and Control, which is now being shaped according to the experience of the previous National Health Foundation. Besides the collection of statistical data on diseases and other health problems to subsidize public health policies and interventions, the Agency provides guidance to authorities and citizens about prevention and control actions, monitors health conditions, implements water and sanitation actions for poor populations, assesses quality of drinking water, air, ground, environmental contaminants, natural disasters, vectors, hosts, reservoirs and poisonous animals. Safety and efficacy of medicine and other substances that may affect human health such as food, cosmetics, pesticides, and chemical substances are the responsibility of the National Agency for Health Surveillance, which is also in charge of fiscal actions related to all activities involving these areas as well as their import into the country. Average mortality rate in Brazil amounts to 5,7 per 1.000 inhabitants. In relation to mortality causes, 5,83 % is due to infectious and parasitic diseases, 14,51% to neoplasms, 32,27% to circulatory problems, 11,18 to respiratory problems 4,36 to problems originated on peri-natal phase, 14,67% to external causes and 16,91% to other identified causes. The Unified Health System counted on 6.508 hospitals in 2001, encompassing 483.206 beds. Hospitalization in 2001 added up to 11.776.076. Day care assistance was responsible, in the same year for 278.608.883 basic medical actions. Although positive results have been achieved, strategies are continuously assessed and remodeled to provide better use of available resources, from vaccines to transplantation programs. Decentralization under a unified system has proved to be an efficient mechanism to bring health services closer to the population and to provide better guidance to health authorities. Investing on health promotion and prevention has been another important tool.

**Capacity-Building, Education, Training and Awareness-Raising:** Education for health personnel is provided by public and private educational system oat graduation and post-graduation levels. Capacity building and training is regularly offered within the educational or UHS according to identified needs. There are schools for collective health management within academic institutions or state or municipal health systems. Specific Programs may undertake special training activities connected to their own needs. Other organizations such as professional councils or associations provide continuous education programs to their members. When necessary, the Ministry of Health engages in educational activities through association with academic institutions or training facilities, when the need

of certain professional profile is not met by usual educational and training systems. Awareness raising is a necessary activity on a huge country and is usually done through specific programs or through general campaigns not only about issues that affect human health, but about how to access adequate health care. The Ministry of Health maintains a free access consultation by phone or internet, available to all citizens on health issues.

**Information:** The Unified Health System regularly collects and makes available information and data on national health conditions, mostly through printed material and through the internet. The National Health Information Network is being implemented, allowing citizens and health authorities to access information they may need for decision making.

**Research and Technologies:** The morbidity/mortality profile of the Brazilian population shows epidemiological characteristics of cardiovascular diseases, neoplasms, external causes, infectious and parasitic diseases altogether with a raise on life expectancy and population ageing. Research is acknowledged as a powerful tool for health, and social and economic development on a fair and equitable basis. The acknowledgement of the need to invest on R&D in priority areas to stimulate the improvement of knowledge and technologies to address crucial national problems on health sector constitutes, therefore, an imperative. The Brazilian Federal Constitution establishes the State responsible for the promotion and incentive of scientific development, research and technological capacity building. It is part of the UHS “the enhancement of scientific and technological development and the assessment of the impact of technology on human health”, assigning to the Ministry of Health the task of “formulating, evaluating, and establishing adequate regulations, and participating in the implementation of the national policies for the production of substances, devices, equipment and materials of major importance for human health, in harmony with other Government sectors. Brazil has built capacity in terms of human resources, educational and research institutions for health matters as well as norms and regulations for research ethics, biosafety and intellectual property. A National Policy for Health Research and Development is being formulated, including a National Agenda of Priorities for Health R&D. These initiatives are aimed at the implementation of public policies to enhance health and life quality.

**Financing:** The Government, at its three levels – Federal, State and Municipal – is in charge of financing the UHS. Private funding is also available through direct purchase of services or through Insurance Health Plans.

**Cooperation:** Brazilian Health sector is actively involved in technical and scientific cooperation both with developing and developed countries, and under bilateral or multilateral mechanisms. Any request for cooperation receives great consideration and will find good possibilities for further implementation, depending only on available resources. The International Affairs Office at the Ministry of Health is prepared to channel proposals to the most convenient areas or institutions and to help making formal arrangements when needed. Cooperation may be implemented through exchange of information and experts, training, joint research, technology transfer and joint ventures on a pre-competitive basis.

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## CHAPTER 7: PROMOTING SUSTAINABLE HUMAN SETTLEMENT DEVELOPMENT

**Decision-Making:** A Bill providing for the establishment of National Council on Urban Policy (CNPU), having as member's representatives from federal, state and municipal governments, as well as from civil society on a parity basis, was submitted to Congress in 1995. CNPU has Permanent Chambers as subsidiary bodies, to address respectively issues on Urban Management, Housing, Sanitation and Urban Environment and Urban Transportation. The Secretariat for Urban Policy of the Ministry of Planning and Budget is responsible for housing and sanitation issues at the federal level, with the assistance of other Ministries, such as Health, Transport, and Environment, Water Resources and the Amazon. The National Urban Policy Council will have a systematic and decentralized approach to the basic issues concerning human settlements, with emphasis on decisions at the local level. Main targets concern the quality of life in urban areas, especially in metropolitan regions, and a better distribution of the population throughout the country.

**Programmes and Projects:** See under **Financing**.

**Status:** About 10,000 urban settlements were located in 5,131 municipalities distributed throughout 26 States in 1991. Some 25.5% of the municipalities had fewer than 10,000 inhabitants, and 3.6% more than 100,000. The nine metropolitan regions accounted for nearly 30% of the total population in the country. There were approximately 39.8 million households in 1995, 32.1 million of which were urban and 7.7 million rural. Estimates as to the number of inadequate dwellings, either improvised or overcrowded, varied from 6.0 to 8.0 million, and do not include those lacking in one or more regular basic services (water supply, sewerage and waste collection), which may run to another 7.4 to 10.6 million. Of the total urban population 14% lived in sub-standard dwellings (favelas), 75% of which are in the nine metropolitan regions, mostly in Rio de Janeiro and São Paulo.

**Capacity-Building, Education, Training and Awareness-Raising:** No information available.

**Information:** No information available.

**Research and Technologies:** No information available.

**Financing:** General expansion and improvement in urban areas would include two million housing units and water and sanitation services to over 8 million, involving almost US\$ 45 billion. From 3.4 to 6.0 million new homes, in addition to those that require improvement, would have to be built in urban areas, to cope with this deficit, largely in the Southeastern region. In addition, the annual demand increment for urban housing presently stands at about 1.3 million. About 514 thousand units were financed by credit institutions from 1990 to 1994, and most of new construction is self-financed. Shortages of adequate rural housing, not considering those with insufficient basic services, has remained stationary at about 1.6 to 2.0 million, predominantly in the Northeast. Several ongoing public-sponsored programmes, ranging from mortgage and credit to rental and low-cost public programs, may provide 2 million new housing units from 1996 to 1999. However, average monthly family income, for approximately 70% of the target population, is under 2 minimum wages (about US\$ 210). Provisions from the federal budget, savings accounts and the compulsory Employee's Guaranteed Savings Fund (FGTS) are estimated at US\$ 26 billion. Additional resources would normally include those from state and municipal governments, multilateral financial institutions, pension funds, and private investment.

**Cooperation:** No information available.

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## CHAPTER 8: INTEGRATING ENVIRONMENT AND DEVELOPMENT IN DECISION-MAKING

**Decision-Making:** The National Commission for Sustainable Development Policies and Agenda 21 which was established in February 1997, is the national coordination mechanism in charge of proposing strategies for sustainable development and coordinating, developing and monitoring the follow-up of the implementation of Agenda 21 in Brazil. The membership of the Commission includes the Ministries of Environment, Water Resources and the Legal Amazon, of Planning and Budget, of Science and Technology, of External Relations, the Secretariat for Strategic Affairs and the Social Policies Chamber. Other participants include the Brazilian Business Council for Sustainable Development, the Federal University of Minas Gerais, the "Reis Veloso" Institute of Higher Studies, the Brazilian Forum of NGOs and Social Movements for Environment and Development and the "Onda Azul" Foundation. Secretariat services are provided to the Commission by the Ministry of Environment, Water Resources and the Legal Amazon. Approximately 20% of federal guidelines have been updated and reviewed since UNCED. States have been more active than the federal government in enacting new environmental legislation, such as environmental audits. With the exception of tradeable permits, there are examples of practically all other forms of economic instruments being adopted, such as subsidized credits and incentives, taxes on solid wastes, pollution, natural resource use, eco-labelling and container deposit-return schemes.

**Programmes and Projects:** No information available.

**Status:** Although there are studies under way, there is not as yet official action on integrating environmental and national accounting. Cost studies undertaken by the Applied Economics Research Institute (IPEA) have covered the depletion or degradation of mineral, water and forest resources, as well as the impact on health of water and air pollution. Institutional reform is moving the country toward decentralization, privatization, better coordination and a clearer responsibility among the three levels of government, improved political, fiscal and public management practices, and a more stable social security system. Gradual improvement in all these sectors is an essential feature for a better performance in the environment area, which has led the way in setting up decentralized systems and practices and in pursuing a broader participation of society in enacting policy and in decision-making through appropriate mechanisms. Progress has been achieved in recent years in terms of public awareness and through federal/state and public/private partnerships, although actual enforcement of environmental legislation, use of control instruments and environmental education activities have not had so far a decisive effect in ensuring a widespread conservationist attitude. As in other fields, much remains to be accomplished, regarding the availability and access to adequate information, the use of economic instruments and the dissemination of sound practices that would stimulate a sense of responsible stewardship, in order to involve all citizens in the protection of valuable habitats and species, and to rationally utilize the country's ample and diversified natural resources.

**Capacity-Building, Education, Training and Awareness-Raising:** No information available.

**Information:** No information available.

**Research and Technologies:** No information available.

**Financing:** No information available.

**Cooperation:** No information available.

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## CHAPTER 9: PROTECTION OF THE ATMOSPHERE

**Decision-Making:** At the federal level, the Ministries of the Environment, Science and Technology, and Industry, Trade and Tourism, are responsible for protection of the atmosphere, as members of the National Commission on Sustainable Development Policies and National Agenda 21. National legislation is comprehensive, relatively advanced, and complemented by State and Municipal regulations. Recent instruments, as well as an ongoing review and update of the licensing system for polluting activities established in 1981, include: Law no. 8723, of 1993, enacting the Control of Air Pollution by Automotive Vehicle Program, determining emission limits for pollutants (CO<sub>2</sub>, NO<sub>x</sub>, hydrocarbons, sulphur, particulates); Resolution no. 267 of the National Environmental Council, of 2000, establishing compulsory registration of all producers, importers and exporters, dealers and users of ozone depleting substances, and a schedule for phasing out these substances. NGOs and the private sector have participated in activities related to the prevention of stratospheric ozone depletion and transboundary air pollution.

**Programmes and Projects:** A relevant aspect of terrestrial resource management of interest to protecting the atmosphere is to control deforestation, and to implement the National System to Prevent and Combat Forest Fires and Burning. The Ministries of Environment and of Science and Technology and State environmental agencies have continued to cooperate on this matter, despite the limited resources available. A comprehensive program on electric power conservation has been operational for several years, with encouraging results.

**Status:** No information available.

**Capacity-Building, Education, Training and Awareness-Raising:** Energy conservation courses are taught at schools, and over 1 million students and 20,000 teachers are to be trained by 1997.

**Information:** A "National Communication" was drafted which deals with an inventory of anthropic emissions by source and removal by sinks, and measures taken to reduce the concentrations of these gases in the atmosphere. It was prepared by several institutions under the coordination of the Ministry of Science and Technology and was submitted to the Climate Change Secretariat in June 1999. An Inter-American Weather Forecasting and Climate Studies Center was established in Sao Paulo in 1995, aiming at improving the existing national early detection system and capacity to perform observations and assessments. Monitoring concentrations of green house gases has so far had precedence over the identification of threshold levels.

**Research and Technologies:** Capacity for assessment, observation, research, information and training in the area of transboundary air pollution is rated good. Air quality monitoring grids have been set up in eight metropolitan areas, comprising 30% of the country's population, and in several other cities, but their effectiveness has not been judged adequate. The replacement of lead in gasoline by anhydrous alcohol had benefit mostly the urban environment and also eliminated bromide and chlorine emissions.

**Financing:** See under **Cooperation**.

**Cooperation:** Brazil signed the Montreal Protocol in 1990 and the London Amendment in 1991. It ratified the United Nations Framework Convention on Climate Change in 1994. Brazil is active in the various Commissions of the MERCOSUL (South American Common Market) and in regional agreements regarding transportation and environment. The Jaguarão agreement, signed in 1990 with Uruguay, for instance, provides for exchanges and initiatives on monitoring, training and information on the possibility of transboundary impacts caused by coal-fired power generation in Southern Brazil. The target is to postpone the installation of an additional 24 thousand MW by the year 2015, for savings of about US\$34 billion in new investment. Brazil's contribution to the Vienna Convention Trust Fund and the Montreal Protocol was about US\$340,000 in 2000, while the Multilateral Fund of the Montreal Protocol has financially assisted projects of over US\$ 51.5 million.

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## CHAPTER 10: INTEGRATED APPROACH TO THE PLANNING AND MANAGEMENT OF LAND RESOURCES

**Decision-Making:** The President's Secretariat for Strategic Planning (SAE) is responsible for carrying out the Ecological and Economic Zoning of the National Territory (ZEE), and chairs a Coordinating Commission of 12 federal Ministries. The 26 States and Federal District are to establish their own ZEE Commissions. At this stage, major groups involved are State and local authorities, as well as the academic and scientific community. Referring to the issue of fresh water resources, the Federal Law known as Waters' Law provides the Water Resource Plan, as an instrument to establish and orientate the implementation of the National Policy of Water Resources and the management of water resources in a given water basin. The most relevant initiative in the field of planning and management of land resources is the Ecological and Economic Zoning Project (ZEE), established in 1990 as an instrument for integrating basic geographical information and related public policies, for classifying territorial areas according to their vulnerability and potential, and for stimulating negotiation, conflict resolution and partnership amongst the various public and private actors in the process of development. Zee's three main products are thematic charts, at the 1:250,000 scales, on natural vulnerability, on social potential and on inputs for land management. Areas may be classified into productive, critical (conservation or rehabilitation) or special (preserved, restricted use or strategic). Priority in developing the ZEE Project was given to the Amazon region where all nine States have established their ZEE Commissions, and the Brazilian Institute of Geography and Statistics (IBGE) carried out an environmental diagnosis in 1995. Sub-regional work is under way for Western Amazonia and the Madeira river valley. Elsewhere, ten of the remaining 17 States and the Federal District have set up their ZEE Commissions, and an environmental diagnosis for the Northeast was completed in 1996. Flexibility in applying ZEE directives and broad participation of society in the zoning process are essential elements for the success of ZEE, which would also require greater efforts to enforce federal natural resource regulations and to promote inter-agency coordination, as well as to consolidate appropriate legislation and standards at State level, incorporating as a rule Municipal Land Use Plans.

**Programmes and Projects:** No information available.

**Status:** No information available.

**Capacity-Building, Education, Training and Awareness-Raising:** More than 100 specialists at the State level in the Amazon were trained by the Project on Methodologies for the Evaluation of Natural Vulnerability to Soil Erosion.

**Information:** With relation to hydrological data, the national hydro-meteorological network was created to attend the needs of the hydro-electrical sector. In order to fulfill water resources management purposes, it will be intensified, principally in terms of water quality data. The majority of the States also possess series of water's quantity and quality information.

**Research and Technologies:** No information available.

**Financing:** See under **Cooperation**.

**Cooperation:** The Pilot Program for the Conservation of Tropical Forests in Brazil, established by the G-7 countries, the European Union and the Netherlands with managerial assistance from the World Bank, as well as the Frontier Development Projects sponsored by the Organization of American States, involving Colombia, Venezuela, Peru and Brazil and the Special Commission on Environment of the Amazon Cooperation Treaty, chaired by Brazil, are examples of international cooperation. Resources allocated to the ZEE Project so far amount to about US\$ 90 million, including \$21.8 million from the G-7 Pilot Program.

## CHAPTER 11: COMBATING DEFORESTATION

**Decision-Making:** The Ministry of Environment, Water Resources and the Amazon is responsible for the forestry sector. It supervises the activities of the Brazilian Institute of Environment and Renewable Resources (IBAMA), chairs the National Council on the Environment (CONAMA) and takes part in the President's Chamber for Natural Resources Policies, which coordinates the various aspects related to forests and other issues. Since 1988, Brazil's 27 federative units (States and the Federal District) and over 5000 municipalities share the responsibility for enacting and enforcing complementary legislation within their territories. NGOs and the private sector are represented in CONAMA and may participate in Task Forces of the President's Chamber. Major international and Brazilian NGOs are engaged in forest protection activities, at various levels and aspects, especially in the Atlantic and Amazon regions.

**Programmes and Projects:** In January 1998, the Brazilian Government, through the Ministry of Environment, Water Resources and the Legal Amazon, announced a set of measure to control deforestation. These include: definition of rural credit and environmental criteria for the National Programme to Strengthen Family Farming (PRONAF), aimed at financing agroforestry activities, recovery of degraded areas and sustainable forest management; decree regulating the control and management of burnings, regulating the criteria and possible situation for use and management of burning for agricultural cultivation, reforming of pastures and elimination of wastes from forest exploitation; readaptation of environmental criteria to classify properties for purposes of expropriation; agreement between IBAMA and INCRA for joint actions, with a view to increasing cooperation between both institutions so as to minimize the contradiction existing between environmental and land policies; bill creating the regimen for Forest Concessions that is the concession and permission of access and exploitation of natural resources, for production of goods and services, of National, State and Municipal Forests (Public Forests); creation of 7 National Forests and a decree establishing a National Forest Programme; extension of legally protected areas to at least 105 of the Amazon territory by the year 2000; implementation of the programme for training and capacity-building of human resources for the forest sector; decree regulating Sustainable Management in the Amazon; regulation of community forest management for wood based and non-wood based projects; agricultural development plan to reconvert degraded areas in the Amazon; and, reorientation of land settlements for already converted areas. A National Programme of Native Plant Seeds is also being implemented. It includes a scheme to diversify forest products in rubber extraction reserves, studies related to the rational exploitation of 14 million hectares of forested public land and equipping three specialized laboratories for testing and research.

**Status:** Native tropical forests around the world covered approximately 19 million km<sup>2</sup> in the late eighties, 26% of which were in Brazil. Out of this total, 396,000 km<sup>2</sup>, or 8%, were in protected areas in Brazil, not including Indian lands, which accounted for 11% of the total for the country. Planted forests, mostly of eucalyptus and pinus, represented about 102,000 km<sup>2</sup>. Forests are defined, in Brazil, as any biomass with multiple environmental linkages, natural or planted, with variable economic, social and genetic uses for present and future generations. Deforestation of native forests has continued since UNCED, in spite of Government efforts, frequently as a function of the demand for wood products in association with land clearing for agricultural purposes. Consequently, recent measures have included a moratorium on the exploitation and sale of threatened species, such as mahogany, and have limited the size of farming areas in rural properties in the Amazon region. However, most endangered of all is the Atlantic rainforest that has dwindled to less than 5% of its initial coverage under continuous pressure from human activity along the coastline.

**Capacity-Building, Education, Training and Awareness-Raising:** No information available.

**Information:** No information available.

**Research and Technologies:** No information available.

**Financing:** No information available.

**Cooperation:** The most relevant example of international cooperation is the Pilot Programme for the Protection of Tropical Forests in Brazil, with the support of the G-7 countries and the Netherlands, the European Union, and IBRD, supplemented by bilateral arrangements with Germany, United Kingdom, Japan and others. The Amazon Cooperation Treaty, from the 1960s, brings together the eight countries of the Amazon region on a broad range of subjects.

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## CHAPTER 12: MANAGING FRAGILE ECOSYSTEMS: COMBATING DESERTIFICATION AND DROUGHT

**Decision-Making:** The Ministry of Environment, Water Resources and the Amazon is the main federal institution responsible for the sustainable development of the semi-arid region in Northeastern Brazil. Two agencies under the Ministry, namely the Brazilian Institute of Environment and Renewable Resources (IBAMA) and the National Department for Public Works against the Droughts (DNOCS) as well the Superintendence for the Development of the Northeast and Governments of the nine States included in the semi-arid region are also involved in the process. Provisions to combat desertification and drought are included in the basic environmental, water resources and agricultural legislation. After UNCED, a working group was formed to formulate a National Plan to Combat Desertification. It was intended to address among other basic aspects, alternative employment opportunities for the poor and environmental refugee programs. The Aridas Project, sponsored by the Ministry of Planning and the Esquel/Brazil Foundation, drafted a sustainable development strategy for the region. In December 1997, the National Policy to Control Desertification, which is a framework document for actions to address this issue, was approved. In addition an information and documentation network REDESERT which brings together several institutions and researchers, was also implemented. Meanwhile, the following issues have been addressed, along with field work in the region: dissemination of early warning information to decision makers and land users, drought preparedness and relief schemes, intensive soil conservation, afforestation and reforestation schemes, and food deficiency strategies. NGOs, women and youth are full participants at the grass-roots level; at the middle national levels, their contribution is provided on an ad hoc basis.

**Programmes and Projects:** No information available.

**Status:** Within an area of about 900,000 km<sup>2</sup> in Northeastern Brazil, about 10,000 km<sup>2</sup> have been identified as desert or of no value, and 223,000 km<sup>2</sup> as in danger of desertification, as of 1995. Another 486,000 km<sup>2</sup> were in cultivation, and overgrazing, fuelwood collection, improper farming and land use were considered as predominant factors in the process of desertification.

**Capacity-Building, Education, Training and Awareness-Raising:** There are noticeable shortages in terms of trained personnel for "early warning" extension and research, as well as limitations regarding management, planning and implementation skills. Present staff at central and other levels numbers 63 persons, of which only one third is considered adequate.

**Information:** The existing network of 622 meteorological and hydrological monitoring stations was assessed as adequate, while the three soils and land degradation-data collection stations were judged insufficient.

**Research and Technologies:** No information available.

**Financing:** Financial resources required proceeding with the National Plan to Combat Desertification and the Aridas Project are estimated at US\$30 million to the year 2000. Some post-Rio funding has been provided by multilateral organizations.

**Cooperation:** Brazil signed the International Convention to Combat Desertification in Countries Experiencing Drought and/or Desertification, Particularly in Africa in 1994, and it was submitted to Congress for ratification in 1996. The FAO, UNEP, the University of Chile and the Esquel/Brazil Foundation have been active in developing Indicators for Desertification in Brazil.

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## **CHAPTER 13: MANAGING FRAGILE ECOSYSTEMS: SUSTAINABLE MOUNTAIN DEVELOPMENT**

No information available.

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## CHAPTER 14: PROMOTING SUSTAINABLE AGRICULTURE AND RURAL DEVELOPMENT

**Decision-Making:** The Ministry of Agriculture and Food Supplies is the main federal body responsible for agricultural matters. Its subsidiary agency, the Brazilian Agricultural Research Corporation (EMBRAPA), heads the main research, rural extension and information networks, involving state, academic and other scientific and professional organizations. Instrumental in rural credit policies and operations are the Central Bank and the Bank of Brazil. Agriculture in Brazil is undergoing a transition from a closed and protected sector to an open market and competitive activity. A thorough review and updating of agricultural policies was proposed in 1996 by the Ministry of Agriculture and Food Supplies, and is presently under way through the establishment of a National Forum on Agriculture. The multiple use of Water constitutes a fundamental point of Waters' Law. With relation to agriculture, it is within the sphere of competence of the National Policy of Irrigation and drainage, established in 1998. Government departments at federal and state levels, farmers, rural workers, organizations, trading companies, exchange markets and financial institutions, research centers and rural extension agencies are participants in the process of revising the agricultural policy, which comprises about 20 task forces. There is a growing trend on the part of certain NGOs as well as government and scientific representatives, to consider family farming and organic agriculture as essential elements for a complete restructuring of agricultural and cattle-raising activities aiming at a condition of sustainable development.

**Programmes and Projects:** Agro-ecological zoning studies for the Southern and Southeastern regions, coordinated by the Ministry of Agriculture, however, have been effective in increasing security and productivity of rice, beans, corn, soybean, cotton and wheat crops. Financing and insurance charges and interest rates have gone down, and the impact on soil and living resources has diminished in these areas in view of stricter selection of soils for agriculture.

**Status:** Although productivity has increased, inadequate zoning and farming practices and the widespread use of fertilizers and agrochemicals, mechanization and deforestation have nonetheless continued to be responsible for considerable environmental impact on living, land and water resources. In many areas, soil erosion has reached levels well above the permissible 10 t/ha per year. Land tenure remains a critical issue, for various reasons. One is the abnormal concentration of large farming units in relatively few hands. Limits on the expansion of the agricultural frontier, and urban and rural unemployment, caused by layoffs in industry and increased mechanization in agriculture have heightened land reform expectations in the last two years. Action by the so-called Landless Farmers' Movement scaled up in 1995/96 and has prompted the federal government to set up a Ministry for Agrarian Reform with the responsibility for settling 160 thousand families in 1997/98.

**Capacity-Building, Education, Training and Awareness-Raising:** No information available.

**Information:** No information available.

**Research and Technologies:** No information available.

**Financing:** No information available.

**Cooperation:** Most relevant foreign assistance projects have been promoted by the World Bank, and on a bilateral basis by Germany and Japan. Also active, as regional organizations, are the Inter-American Development Bank and the Inter-American Agrarian Sciences Institute.

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## CHAPTER 15: CONSERVATION OF BIOLOGICAL DIVERSITY

**Decision-Making:** The Ministry of Environment is primarily responsible for Biodiversity and Genetic Resources, at the federal level, and is fully involved in national planning and decision-making with regard to natural resource use and development. Relevant legislation enacted since 1992 has established the following: National Biological Diversity Program (PRONABIO - 1994); Biosafety Law (1995); National Council for the Amazon Region (1993); National Integrated Policy for the Amazon Region (1994); National Policy on Ecotourism (1994); Presidents Chamber for Natural Resources Policy (1996); Provisional Act on Access to Genetic Resources and Associated Traditional Knowledge (2000). Local participation in the conservation of biological and genetic resources is increasing, while NGOs, executives and scientists are active in supervisory bodies.

**Programmes and Projects:** The Conservation and Sustainable Use of Brazilian Biodiversity Project – PROBIO is the result of an agreement signed by the Brazilian Government and the Global Environment Facility – GEF and the International Bank for Reconstruction and Development (IBRD) in June 1996. National Treasury funding amounted to US\$ 10 million along with concessionary resources from the GEF, also to the value of US\$ 10 million. Following PRONABIO's guidelines, thematic public calls were advanced focusing special subjects concerning biodiversity conservation and sustainable use, as follows: (i) Ecosystem Fragmentation; (ii) Basic Studies for the Selection of Conservation Units; (iii) Biodiversity Sustainable Use on the Surroundings of Existing Conservation Units; (iv) Managing Plans for Threatened and Endangered Plant Species and Invasive Species; (v) Biological Inventory on Poorly Known and Highly Promising Areas. A total of 60 subprojects were financially supported and some of them were concluded already. Another strong action line was devoted to the Evaluation and Selection of Priority Areas for Biodiversity Conservation on Brazilian Biomes. Five workshops were conducted covering the following biomes: (i) Cerrado and Pantanal; (ii) Atlantic Forest and Southern Grasslands; (iii) Amazon Rain Forest; (iv) Caatinga; and (v) Coastal and Marine Zone. The Brazilian Biodiversity Fund – FUNBIO was conceived from the need to an efficient, clear cut and long-term mechanism to fund priority projects for the conservation and sustainable use of biodiversity in Brazil. It began as a result of negotiations between the Brazilian Government and The World Bank/Global Environment Facility to create a fund, outside the government sphere, capable of attracting the private sector. The aim was to support initiatives directed towards the implementation of commitments undertaken by Brazil in the Convention of Biological Diversity, in accordance with the guidelines established by the competent government organs. FUNBIO is the largest fund for biodiversity projects established in any country with resources from GEF (US\$ 20 million). It is also the first biodiversity fund to formally include the private sector in the broadest sense. Its mission is to foster and support associations between governmental and non governmental agencies, academic institutions and private enterprise for the conservation and use of biodiversity in the country. Several projects are currently implemented and their outcome will be used as basic information for the formulation of public conservation policies.

**Status:** Biodiversity protection is a very high priority in Brazil among Agenda 21 items. Most relevant threats to biodiversity remain habitat destruction, over-harvesting and monoculture, and pollution, while undue introduction of exotic plants and animals is not relevant. Over 100 private protected areas have been established. There are approximately 500 public protected areas; not including Indian lands, totaling about 4.5% of the country's territory. States and Municipalities manage Seventy percent of those.

**Capacity-Building, Education, Training and Awareness-Raising:** There were about 50.000 scientists engaged in biodiversity research, as of the early 90s, as well as 306 courses at the Master degree level, and 158 at the Doctoral level, which have enhanced capacity building in assessment, systematic observation, evaluation and biodiversity protection enforcement.

**Information:** Surveys of threatened and endangered species are currently being carried out on a nation wide basis as well as at state level. Genetic plant resources for agriculture are preserved in 70 public gene banks. There are 75 zoos, 25 botanical gardens and 40 sites for the collection of microorganisms.

**Research and Technologies:** Research lines were established according to the following priorities: (i) Biodiversity Conservation on Brazilian Biomes and Specific Ecosystems; (ii) Sustainable Use of its components; (iii) Access to Genetic Resources and Benefit Sharing arising out of its utilization; (iv) Traditional Knowledge Associated to Genetic Resources; (v) Threatened and Invasive Species; and (vi) the Effect of Global Climate Change on the Brazilian Ecosystems.

**Financing:** Main financial resources have been channeled through federal and state budgets of environmental agencies, in addition to the funding from GEF and the World Bank.

**Cooperation:** Brazil signed the Convention on Biological Diversity in June 1992 and ratified it in February 1994. It ratified the Convention on International Trade in Endangered Species of Wild Flora and Fauna in August 1975. Multilateral initiatives include agreements with IBRD, IDB, UNDP and GEF, and bilateral arrangements have involved Germany, USA, Japan and the UK. Noteworthy are the IBRD-financed National Environmental Program, the Pilot Program to Protect Tropical Forests, supported by the G-7, Netherlands and IBRD, and the GEF/IBRD-backed Conservation and Sustainable Use of Biodiversity Project.

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## CHAPTERS 16 AND 34: ENVIRONMENTALLY SOUND MANAGEMENT OF BIOTECHNOLOGY AND TRANSFER OF ENVIRONMENTALLY SOUND TECHNOLOGY, COOPERATION AND CAPACITY-BUILDING

### Decision-Making:

*Technologies:* The PPA-Multiannual Plan for Science and Technology-96/99 included Management of Ecosystems and Natural Resources as the national policy for the promotion of innovation in the area of Environmentally Sound Technologies (ESTs). This plan was formulated by the Ministry of Science and Technology - MCT, which reports to the Ministry of Environment, Water Resources and the Legal Amazon on those Science and Technology programs related to the environment; to the National Science and Technology Council -CCT; to the Ministry of Mines and Energy in matters related to the use of renewable energy sources, and together with SEAIN (International Affairs Secretariat of the Ministry of Planning and Budget) follows the projects financed by GEF in the areas of energy and environment. It foresaw the establishment and consolidation of 50 centers of excellence, technology centers and incubators; the implementation of 40 thematic R&D networks and the provision of support to 200 research centers. The National Center of Clean Technologies (CNTL) created by UNIDO and UNEP at the SENAI in Rio Grande do Sul, is an instrument to facilitate the establishment and dissemination of the concept of clean technologies in all sectors. The CNTL develops programs for environmental conservation in companies; promote professional capacity building; assess companies in approaching financial and environmental institutions to draft projects; and to develop systems for treating and disposal of solid wastes. Brazilian universities are also important centers for technology development. Within the National Confederation of Industries (CNI), the Euvaldo Lodi Institute works within the University-Business interaction to develop new technologies. The Ministry of Environment, Water Resources and the Amazon cooperates closely with the Ministry of Science and Technology in the proposal and implementation of policies and programs. The National Technical Council on Biosafety, a subsidiary body of the National Council on Science and Technology, under the Ministry of Science and Technology, was established in April 1996 and is responsible for regulating all activities and projects related to the engineering, cultivation, management, use, transportation, storage, trade, consumption, licensing and disposal of genetically-modified organisms. Business corporations, Scientists and NGOs participate.

*Biotechnologies:* No information available.

### Programmes and Projects:

*Technologies:* Under the coordination of MCT/SEDEC - Scientific Development Secretariat, the programs implemented by CNPq, by FINEP and by other institutions include: Science and Technology component of the Pilot Program to Conserve the Brazilian Rain Forests (PPG-7) -FINEP (Note: PPG-7 as a whole is a project coordinated by the MMA); Projects financed by GEF: CHESF (the S o Francisco Hydroelectric Company) - generation of electrical energy based on gasification of wood and COPERSUCAR (Cooperative of Sugar Mill) - generation of electrical energy based on sugar cane bagasse; Use of renewable energy sources (reference centers) – MME; PTU (Program of the Humid Tropics) - research on the Amazon Ecosystem - EMBRAPA/MMA; Plants of the Northeast (CNPq) - use of biodiversity of the Semi-Arid; Environmental component of the Program for Capacity Building in Strategic Activities (RHAE)- CNPq; Marine Sciences Program, implemented by CNPq in partnership with the Ministry of Navy and the Ministry of Environment; Programme to combat desertification - MMA; FINEP-GREEN Program in partnership with industry; PROSAB - Basic Sanitation Program - FINEP; LBA - Amazon Biosphere-Atmosphere; The Program to Support the Management of Collection and Disposal of Solid Wastes - PROGEST - developed by SEPURB aims to define guidelines for the solid wastes sector based on the national sanitation policy. SEPURB develops agreements with universities to gather information, namely: ISAM - Catholic University of Parana - Technical, Economic and Social Assessment of Selective Collection Systems for Solid Wastes existing in the country; IPH - Federal University of Rio Grande do Sul - Diagnosis and Technical and Economic Assessment of the Public Cleaning Services in Brazil; and FINATEC - University of Brasilia - Proposition of Strategies for the Minimization of Solid Wastes in Productive Processes. The main components of these programs of action are as follows: The Science and Technology Subprogram of the Pilot Program to Conserve the Brazilian Rain Forest - PPG-7 The MCT, through FINEP, participates in the execution of the Science and Technology Subprogram, which consists of a group of integrated activities to promote the generation and

dissemination of scientific and technological knowledge on the conservation of tropical rain forests and on the sustainable development of the Amazon region. Marine Sciences Pilot Programme aims to promote research to make the sustainable use of the potentialities of the Brazilian maritime zone feasible, even under the Intergovernmental Oceanographic Commission Program and by means of international cooperation projects. Assessment of the Sustainable Potential of the Living Resources of the Exclusive Economic Zone - REVIZEE The Program to Assess the Sustainable Potential of the Living Resources of the Exclusive Economic Zone (REVIZEE) is intended to make an inventory of the living resources in the EEZ and of the environmental characteristics of their occurrence. The Brazilian Antarctic Program - PROANTAR Brazil has undertaken scientific activities in Antarctica since 1982, through the Brazilian Antarctic Program - PROANTAR, in order to understand the phenomena that occur there and their influence on the Brazilian Territory. Besides the programs that support research development and environmentally sound technology transfer, the fiscal incentives awarded to Planning and Development activities (Law No. 8661) executed by companies also include the development of environmentally sound technologies. The Government, in cooperation with business associations, has promoted actions to encourage companies to certify themselves according to environmental standards NBR ISO 14000. Twenty industrial units have already had the environmental management systems certified and five organisms have been accredited to provide certification in this area. LBA - Biosphere-Atmosphere Experiment in the Amazon is a large-scale experiment on the Brazilian biosphere, headed by Brazil (INPE/MCT) to generate the knowledge necessary to understand the operation and interactions between the Amazon and the planet's biogeological system. The projects with the biggest priority are mainly concentrated in the following areas/sectors: Refrigeration and Combustion, Management of Electric Energy Demand, Energy Accumulators and Hybrid Systems, Energy Conservation, Alternative Energies, Biomass and Artificial Intelligence (neural networks) applied to the operation of Energy Substations. Among others, the most significant results are: RONDOPAR - Lead and Lead Products; CEPTEL - Electrical Research Center; The CTM - Navy Technological Center; PROCEL/ELETRONOR has implemented The National Energy Conservation; UFSC/DEM/NVRA - Federal University of Santa Catarina/Department of Mechanical Engineering/ Refrigeration, Ventilation and Air Conditioning Center; MULTIBRÁS Eletrodomésticos (Household appliances); NEGAWATT Ltda; UNICAMP/IF - University of Campinas/Physics Institute; UFPA - Federal University of Par; UFSC/NPC - Federal University of Santa Catarina / Research and Construction Center. In the area of Renewable Energy Sources among the most relevant activities are: consolidation of the National Reference Center for Hydropower Efficiency in Small Scale Plants, created in 1996 with support from the MCT in cooperation with the Ministries of Mines and Energy; Industry, Commerce and Tourism; and Environment; Minas Gerais Science and Technology Secretariat, Brazilian Electricity Headquarters promoting and disseminating programs, projects and results of research on the use of Small Hydroelectric Plants; follow-up of work on: Biomass, Wind Energy and Solar Energy; feasibility study of projects related to the use of sugar cane for energetic purposes, to make better use of the bagasse, straw and leaves to generate electric energy; and monitoring of the project undergoing implementation by COPERSUCAR and by DEDINI to develop the process for producing alcohol based on bagasse and sugar cane tips. Besides the programs coordinated by SEDEC/MCT, there is the environmental component of PADCT - Program to Support Scientific and Technological Development (Environmental Sciences Subprogram - (CIAMB) and the Center for Technological Development (CDT). FINEP-GREEN is another program that gives subsidized loans to companies to projects for the development of clean technologies.

*Biotechnologies:* Main programs include the National Support Program for the Development of Science and Technology (PADCT), and the research and Development Program on Agricultural Biotechnology, involving several hundred researchers and projects. The Brazilian Bioinformatics Resource Center and the Brazilian Molecular Biology and Technology Network, with a Biosafety database and discussion list are regular information exchange mechanisms.

#### **Status:**

*Technologies:* ESTs are most urgently needed in the following areas: In the primary sector: management of renewable natural resources, particularly in desertification processes; agriculture; herd raising; fisheries: catch technologies for fishing resources that have a lesser impact on stocks and the environment, substituting large driftnets used in catching large pelagic fish by long line or drop line trawling in fishing of demersal resources by traps; In the secondary sector: transformation industry, forest and mineral extractive industry, production of

hydroelectric energy, atmospheric and sound pollution; In industry in general: technologies for the prevention and minimization of contamination of air, water and soil.

*Biotechnologies:* No information available.

### **Capacity-Building, Education, Training and Awareness-Raising:**

*Technologies:* Capacity building actions are carried out through courses for personnel from IBAMA and state and local environment bodies, using traditional tools and mechanisms and qualified instructors or through continuous and correspondence education, using technology in education. To ensure improvement and expansion of human resources needed for research and development, 50,023 scholarships-year were awarded by the National Council of Scientific and Technological Development – CNPq.

*Biotechnologies:* No information available.

### **Information:**

*Technologies:* No information available.

*Biotechnologies:* The results obtained by the Environment (RHAE) Support research projects have been of great relevance to the priority issues in the environmental area: UFAC/PZ - Acre Federal University: interaction among researchers and rubber tapper communities introduction of new densified planting of rubber trees; new methods of agroforestry systems with small rural producers; rubber tappers and Indians; data bank for floristic analysis; modern extractive techniques; and studies on market profile for non-wood forest based products; mapping and quantification of living biomass above the soil in areas of secondary forests; production of manuals and primers on mapping techniques; and collection of botanical material. The initiative has the technological support of INPE; UFC - Federal University of Ceara: development of appropriate technologies to treat effluents from the cashew nut industries through an aerobic biological process; UFPA/POEMA - Federal University of Par /Program Poverty in the Environment: implementation of data bank on sustainable development projects, cultivation aspects, processing and commercialization of Amazon region products and transmission of these techniques for communities of small rural producers; technical assistance and installation of 15 microsystems for drinking water supply in rural communities; organization of self-management sanitation systems; management of cut-over land for agroforestry system formation; implementation and dissemination of techniques for cultivating medicinal plants; development and dissemination of storage techniques for agroforestry system products; development of techniques for implementing mixed farming to decrease the malnutrition of needy populations and to decrease environmental degradation; USP/CENA - University of São Paulo / Nuclear Energy in Agriculture Center: zoning of floodable areas in the city of Piracicaba (SP), with transfer of knowledge to local government, local legislature and civil defense; CNEN/IRD - National Nuclear Energy Commission / Institute for Radioprotection and Dosimetry: development of methods to study environmental impacts and environmental management in areas contaminated by transport and storage of radioactive material rejects; UNB - University of Brasilia, Physics Department: development of an active filter that transforms 95% of toxic gases generated in motor combustion into harmless substances; Program for Monitoring Weather, Climate and Water Resources, coordinated by the secretariat of the MCT: (supported by the RHAE since 1992); PONSÁ S.A.: introduction of special technological processes to treat paper scrap - soaking power - which has permitted energy savings of 30 to 40% of that consumed in conventional processes.

### **Research and Technologies:**

*Technologies:* Research activities are organized according to the following priorities: Amazon ecosystems, technologies for sustainable development, infrastructure and improved living conditions. As to the support for centers of excellence, the following activities may be highlighted: research in comparative biology, tropical biology and ecology, use of natural resources, development of rural production systems, climatology and water resources. It is expected that this subprogram will go far in institutional strengthening and development, including the recovery and improvement of research infrastructure, capacity building of human resources and dissemination of scientific information.

*Biotechnologies:* No information available.

**Financing:**

*Technologies:* The projects in the area of Renewable Energy Sources have the support of UNDP and GEF funds, as well as counterpart funds to be provided by COPERSUCAR to the amount of US\$ 3.5 million; and monitoring of technological development projects to generate electrical energy based on the gasification of wood, carried out with support from MCT and a consortium made up of ELETROBRAS, CHESF and Shell.

*Biotechnologies:* Federal budget allocations by the government to universities, to the Brazilian Agricultural Research Corporation (EMBRAPA) and the Osvaldo Cruz Foundation (FIOCRUZ), and to other institutions, for training and research on biotechnology, have exceeded US \$40 million annually.

**Cooperation:**

*Technologies:* No information available.

*Biotechnologies:* Bilateral initiatives on biotechnology in agriculture include agreements with Argentina, France (African Oil Palm), Germany, Belgium (Bean Methane), as well as the UK (Fermentation Yeast) and several U.S. Universities (Cornell, Texas A&M, and other). Multilateral support has been channeled through IDB and the IBRD.

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## **CHAPTER 17: PROTECTION OF THE OCEANS, ALL KINDS OF SEAS, INCLUDING ENCLOSED AND SEMI-ENCLOSED SEAS, AND COASTAL AREAS AND THE PROTECTION, RATIONAL USE AND DEVELOPMENT OF THEIR LIVING RESOURCES**

**Decision-Making:** The Ministry of Environment has a responsibility for the coordination of the decision-making process in all three of the issues areas covered in this Chapter. In addition, the Brazilian Navy has a responsibility with respect to the protection and control of pollution from sea-based activities, in particular that from ships and offshore platforms, and the Ministry of Agriculture and Food Supply shares responsibility for sustainable use and conservation of marine living resources. There are two main mechanisms to facilitate coordination among the organizations responsible for coastal and marine environmental issues. The first is the Interministerial Commission for Marine Resources (CIRM), created in 1974 to coordinate the implementation of the National Marine Resources Policy (PNRM). CIRM, whose Coordinator is the Commandant of the Navy, has representatives from the Brazilian Navy (which is also the Secretariat of the Commission), the Ministry of Environment, the Ministry of External Relations, the Ministry of Transport, the Ministry of Education, the Ministry of Development, Industry and Foreign Trade, the Ministry of Planning and Budget, the Ministry of Mines and Energy, the Ministry of Science and Technology, the Ministry of Agriculture and Food Supply and the Ministry of Sports and Tourism. The second mechanism is the National Environment Council (CONAMA), presided by the Minister of Environment. The Ministry of Environment is the Secretariat of the Council. CONAMA has representatives from Ministries, State Governments, Local Governments, NGOs, and trade associations from industry, commerce and agriculture. In this context, CIRM supervises the implementation of the National Coastal Zone Management Plan. This Plan recently underwent revision, which included the creation of a Coastal Zone Management Integration Group (GI-GERCO), a forum to provide technical support for CIRM decisions on coastal zone management. This Group has representatives from the federal sectors most active in the coastal zone, as well as from the Brazilian Association of Environmental Entities (ABEMA) - which congregates the state environment agencies; from the National Association of Municipalities and Environment (ANAMMA) - which congregates local government environment bodies; and also representatives of NGOs that represent the four coastal regions in CONAMA. This Group is coordinated by the Ministry of Environment, which is also its Executive Secretariat. Major Groups are involved in decision-making in this area in the following ways. With the establishment of the legal base, and in particular Law No. 6938/81, the participation of NGOs in the National Environment Council (CONAMA) grew, bringing together regional and local interests, including those related to oceans and seas. This structure is repeated at state level (State Environment Councils) and local level (Municipal Environment Councils). In the CONAMA, all groups indicated in Agenda 21 are represented, and they participate in all studies, assessments and drafting of environmental legislation. More specifically, "management groups" are being set up as a result of the drafting of Coastal Zone Management Plans, with the participation of the various actors involved in the actions which are prioritized according to these Plans. These groups, once consolidated, may come to exert a relevant role in translating the interests of stakeholders, facilitating decision-making of programmed actions. These groups have been put together at local, sectoral (involving a group of municipalities) or state level, depending on the scope of the Management Plan. As to the technological and scientific community involved with oceans and seas, a significant effort exists to integrate a growing amount of information produced in this sector during decision making. This effort has been characterized by an important renewal of academic work to support the recovery of Brazilian development planning, on a more sustainable and participatory basis. This process has been induced in all fora under the guidance of CIRM (subcommissions, working groups and executive committees). With respect to fisheries, including fishing and aquaculture, the participation of "interest groups or agents" in decision-making has been carried out throughout the years by means of formal or informal trade associations, such as fishermen federations, shipping unions or fishing trade unions, as well as the various aquaculture associations (national, regional or sectoral). This participation is particularly evident in the discussion and formulation of regulatory instruments inherent to the management of fishing activities, especially with respect to the definition of moratoria, permitted devices and forbidden fishing areas. Lately, on the initiative of the Brazilian Institute for the Environment and Renewable Natural Resources - IBAMA, the creation of State Fishing Committees has been encouraged, made up of representatives of these entities, as well as from other NGOs and government agencies. These Committees

participate in the formulation of Management Plans for the most important fisheries, as well as in the definition of criteria for use of public coastal waters for mariculture.

**Programmes and Projects:** Brazil has the 1980 National Marine Resources Policy (PNRM), today under revision and updating, which aims at promoting the integration of the territorial sea, the exclusive economic zone and the continental shelf to the Brazilian territory, and the rational exploitation and sustainable use of marine resources, including living, mineral and energetic resources from the water column, seabed and subsoil, of interest to the social and economic development of the country, as well as to ecological sustainability. The PNRM, whose implementation is coordinated by CIRM, is made up of multi-year and yearly Plans and Programs, through which it strives to meet its objectives. Currently, these instruments are: Sectoral Plan for Marine Resources (PSRM); National Coastal Zone Management Plan (PNGC); The Brazilian Continental Shelf Survey Plan (LEPLAC); Brazilian Antarctic Program (PROANTAR). In addition, there is the 1994 National Maritime Policy which aims to "direct the development of the country's maritime activities, in an integrated and harmonious manner, aiming at the effective, rational and full use of the seas". Its implementation is the responsibility of the National Maritime Commission (COMANA), created in 1983, and presided by the Commandant of the Navy. Also relevant in this context are the laws that established the National Environment Policy (1981), the Fishing Code (1967); The National Coastal Zone Management Plan (1988); the law dealing with the Brazilian Territorial Sea, the Contiguous Zone, the Exclusive Economic Zone and the Continental Shelf (1993); the National Water Resources Policy and the National Water Resources Management System (1997); Waterway Traffic Safety in Waters under National Jurisdiction (1997); Environmental Crimes Law (1998), dealing with sanctions and penalties for actions that are harmful to the environment; and all the instruments of International Law to which Brazil is a Party which provide guidelines to achieve the common aim of sustainable use of marine resources. As a consequence of the PNGC and the work carried out by GERCO, notably in the necessary coordination of federal actions for the Brazilian coastal zone, a Federal Plan of Action for the Coastal Zone was drafted by the GI-GERCO, and approved by CIRM. The Plan establishes a basic agenda of management priorities for the main problems of national scope. At the same time, in September 1998 a meeting was held in Brasilia, promoted by UNEP and organized by the Ministry of Environment, with the participation of Brazil, Uruguay and Argentina. This meeting aimed at initial understandings for the implementation of the Global Program of Action for the Protection of the Marine Environment from Land-Based Activities in the Southwest Atlantic, identifying priorities for action and establishment of general guidelines to draft a Regional Program of Action. In this context, in October 2000 the Ministry of Environment of Brazil and the United Nations Environment Programme (UNEP) / GPA Coordination Office signed a Memorandum of Understanding (MOU) with the purpose of facilitating the development of a National Programme of Action for the Brazilian Upper Southwest Atlantic, in the framework of the Regional Programme of Action for the Protection of the Marine Environment from Land-Based Activities in the region. With financial support provided under the terms of this MOU, Brazil prepared, in 2001, its National Programme of Action for the Protection of the Marine Environment from Land-Based Activities in the Brazilian Portion of the Upper Southwest Atlantic (NPA – Brazil) and is beginning its implementation. As to the coral reefs, there is at the moment no national policy that ensures their protection. A national workshop was held on the issue in 1997, the international year of coral reefs. As a strategy to implement the guidelines resulting from this workshop a project was negotiated with the IDB. The project is for the Conservation of the Coral Reefs of the Region from Tamandare (southern coast of Pernambuco) to Paripueira (northern coast of Alagoas), one of the regions with the most potential for tourism of the Brazilian coastline. With IDB resources, a federal Environmental Protection Area was implemented, where the main goal is to preserve the reef environments, based on an integrated management of the coastal and marine environments that influence them, thus enabling the control of land-based impacts on the reefs and the sustainable use of fishing and tourism activities. This may be considered a pilot project, whose results will provide input for a national policy. In addition, IBAMA has recently established a Brazilian Program to Monitor Coral Resources. *Major Programmes:* *National Coastal Zone Management Program (GERCO)*, to implement the National Coastal Zone Management Plan (PNGC) aiming at planning and managing, in an integrated, decentralized and participatory manner, the socioeconomic activities of the Coastal Zone, so as to ensure its sustainable use through measures to control, protect, preserve and recover natural resources and coastal zone ecosystems. *Program to Assess the Sustainable Yield of the Living Resources of the Exclusive Economic Zone (EEZ)*, aims at carrying out a survey of the

sustainable catch yield of the living resources of the EEZ, with the following goals: inventory the EEZ living resources and their environmental characteristics, determine their biomass and establish sustainable catch yield. *Program of Action for the Protection of the Marine Environment from Land-Based Activities in the Southwest Atlantic (PASO)*, an initiative for the regional implementation of the Global Program of Action for the Protection of the Marine Environment from Land-Based Activities, associated to UNEP, with the Ministry of Environment as focal point in Brazil. In this context, as mentioned, Brazil recently prepared its National Programme of Action for the Protection of the Marine Environment from Land-Based Activities in the Brazilian Portion of the Upper Southwest Atlantic (NPA – Brazil). *National Program for Biological Diversity (PRONABIO)*, under the Ministry of Environment, aims at gathering and disseminating information on biodiversity, identifying degradation processes and opportunities and priority actions for the sustainable use of biological resources. *Global Ocean Observation Program/Brasil (GOOS/BRASIL)*, aims at implementing, systematizing and operating the gathering, analysis and transmission of data related to oceanic and coastal areas, generating products with a socioeconomic and environmental applicability. Programs, projects and initiatives to protect ecosystems and endangered marine species, under the Ministry of Environment/IBAMA, such as the Marine Turtle Project (TAMAR), Project for the Management and Conservation of Sirenia, Project for the Protection of the Humpback Whale, Conservation and Management of Sea Birds, among others. Program to Consolidate the System of Protected Areas of the Ministry of Environment/IBAMA, aiming at the planning and management of natural protected areas, to carry out corresponding national conservation objectives. Program to Assess the Mineral Yield of the Brazilian Continental Shelf (REMPLOC), aiming at the systematic basic geological-geophysical inventory of the Brazilian continental shelf, as defined by art. 76 of UNCLOS, and of other areas of environmental geo-economic interest. Train-Sea-Coast Program, the implementation in the country of the global network for training human resources by the UN / DOALOS to improve already existing capacities, both of institutions and individuals responsible for coastal zone and oceanic development. *Legislation, regulations and policy instruments:* The main legal instruments with respect both to integrated coastal zone management and marine environmental protection are: Law No. 4771, dated 15/Sep/1965, institutes the Forest Code; Decree-Law No. 227, dated 28/Feb/1967, institutes the Mining Code; Law No. 6938, dated 31/Ago/81, deals with the National Environment Policy, its objectives and mechanisms for formulation and application; Decree No. 96,000, dated 2/May/1988, establishes norms for research and scientific investigation in the continental shelf and waters under Brazilian jurisdiction; Law No. 7661, dated 16/May/1988, institutes the National Coastal Zone management Plan; Law No. 9433, dated 8/Jan/1997, deals with the National Water Resources Policy; Law No. 9537, dated 11/Dec/1997, deals with Waterways Traffic Security in waters under national jurisdiction; Law No. 9605, dated 12/Feb/1998, deals with environmental crimes; Law No. 9636, dated 15/May/1998, deals with the management of national heritage areas; Law No. 9.966, dated 28/Apr/2000 (“Oil Law”), establishes the principles to be complied with the transportation of oil and other harmful substances in Brazilian national waters; Resolutions of the National Environment Council. With respect to the sustainable use and conservation of marine living resources the following apply: Decree-Law No. 221, dated 28/Feb/1967, institutes the Fishing Code; Law No. 8617, dated 4/Jan/1993, deals with the Brazilian territorial sea, contiguous zone, exclusive economic zone and the continental shelf; Decree No. 1265, dated 11/Oct/1994, approves the National Maritime Policy; Legislation that promulgates international environmental agreements. Most of the instruments (codes, standards or guidelines) are mandatory. The voluntary instruments are restricted to ISO standards, which are being adopted in several sectors of the economy. The regulations currently in force for fishing, which determine moratoria, permitted devices and means, minimum species size, etc., are established by the Government (IBAMA), that is, it is mandatory and even provided for in the new Environmental Crimes Law. In the specific case of coastal and marine living resources, the Environmental Guidelines for the Fishing Sector were established by the Ministry of Environment and distributed to all the State Environmental and Fishing Agencies, as suggested voluntary guidelines. At the same time, the Ministry has been participating in the discussions on the application of the FAO Code of Conduct for Responsible Fisheries, which is also voluntary.

**Status:** The major current uses of the coastal areas are: Urban development, since five of the Brazilian metropolitan regions and thirteen capitals of the seventeen coastal states are on the coast. The total population of the coastal zone has nearly 25% of the country’s population (around 36.5 million in 2000), with an average density of 90 inhabitants/km<sup>2</sup>, five times higher than the national average (18 inhabitants/km<sup>2</sup>). Of these, 87.7% resided in urban

coastal areas; Industrial development, which is concentrated in specific areas, generally on the outskirts of capitals and highly populated areas, specially those sectors that depend on external inputs and those strongly tied to marine shipping (import of inputs or export of production). Processing of minerals, grains and cellulose paste, for example, are typically coastal industries. Among these, we can highlight the following because of their high level of impact: chemical, metal-mechanic, agroindustrial, cellulose, paper and printing industries. Industrial activity in Brazil was responsible for 40% of the GDP in 1980 (whereas in 1950, it was only 24% of the GDP); The Brazilian port system, which is part of what is known as "Strategic Development Corridors", is a system that processes more than 90% of all foreign trade, and is undergoing expansion and modernization. Recently, an "Environmental Agenda for Ports" was drafted by a sub-working group of GI-GERCO, proposing practical actions for inserting the environmental variable in the modernization process; The tourism sector, responsible for increased use of the coastal zone over the last two decades in both highly populated and scantily populated areas. It has various impacts: it is a sector within urban structuring; it promotes establishment of second homes, generally of a high standard; it revitalizes cities with stagnated economies; and it induces occupation of new areas. At the moment, with the increase of both domestic and foreign tourism in the Brazilian coastal areas, this is the activity that most grows in the coastal area, with exponential speed and a similar potential for impact; Fishing activity, in spite of its limited relevance in terms of economic benefits, has enormous social importance. While estimates of the Brazilian potential fishing resources indicated more than 1.5 million tones/year, the actual amount has consistently remained under 700 thousand tones/year. Although this potential may be overestimated, it is not possible to deny the limited nature, both as to the scope of the fishing effort and as to the actual knowledge of the resources of the Brazilian coast. Moreover, this activity generates some 800 thousand jobs, representing 4 million people that are directly or indirectly dependent on the sector, as well as being an important source of animal protein for the population; Oil exploitation and shipping in the coastal zones, although on a lesser scale than oil and gas offshore activities, have a significant impact on coastal ecosystems, specially with oil spills. To control this type of pollution, in mid 1998, a National Contingency Plan to Combat Oil Spills was drafted, currently under consolidation. Brazil is continuing to study the incorporation of economic incentives to environmental policies. Some initiatives have already been or are being introduced in the country, such as: financing for pollution control equipment (PRONACOP, PROCOP, Green Protocol); differentiated distribution of local tax income because of Protected Areas (Municipal Compensation Law); differentiated financing for pollution control and management projects supported by the Brazilian Social and Economic Development Bank/Ministry of Planning and Budget (Green Protocol). Some States are beginning to adopt an ecological merchandise tax, to favor environmentally sound economic alternatives, such as ecotourism, to replace those practices that degrade the environment, including traditional fisheries currently overexploited. Other incentives are being studied under the new Fisheries and Aquaculture Department of the Ministry of Agriculture and Food Supply, responsible for fostering and development of the fishing sector. These incentives should be in agreement with new concepts being applied based on modern perspectives, whereby the fishing activity is seen as a management instrument for the sustainable use of resources. The impact of shipping, be it for cargo or leisure, on coastal zones is quite significant. These impacts are related to the construction of structures to anchor vessels, store cargo, to the permanence of vessels in piers and mooring or to accidents involving oil spills and discharges of noxious and hazardous substances. The impacts of these activities may be thus described: a) dredging and disposal of dredged materials; b) construction of piers, breakwaters, and other maritime structures (new structures or expansion/substitution of existing ones); c) alteration in maritime traffic patterns in ports and harbors; d) discharges from ships (oily ballast; stowage water, sewage water, and ballast water); e) spills of oil, oil by-products, noxious and hazardous substances, even if residual; f) discharges from industries which are alongside water bodies - sanitary and non- sanitary (port-industrial complexes); g) sanitary discharges from vessels; h) excavation/mining for embankment (rocks or aggregate); i) damage to wetlands due to filling for the construction of terminals or other structures; j) loss of use capacity of dry areas for expansion of industrial areas; k) noise from port-industry complexes; l) effects of dust and other airborne emissions; m) projection of cargo traffic; n) disposal of solid wastes generated both in the port and by ships (garbage); o) use of toxic substances to waterproof hulls or dock structures in contact with water (pillars), such as anti-fouling paints; p) drainage of warehoused raw materials; q) drainage of water bodies; r) introduction of alien species contained in the ballast water of vessels; s) liquid industrial wastes not discharged in port/harbor; t) visual impact of its localization (aesthetics); u) gases, smoke and vapors; and changes introduced in the cultural, ethnic, historic and religious aspects, including consequences of modernization and

industrialization. Shipping can also be extremely impacting on a permanent scale when accidents involving plutonium or other radioactive materials occur. Sinking of decommissioned ships can also lead to disturbances in the sustainable management of the coastal zone. On the other hand, intentional dumping of wastes and other matter in the sea are a significant source for the coastal zone since they often include heavy metals, which return to the coastal environment due to the hydrodynamics of water bodies, or they are organic, leading to blooming. In regard to control of pollution caused by ships, to be highlighted is the methodology of diluting tanker ballast waters developed by Petrobras, which enables renewal of 90% of the used ballast, significantly reducing the introduction of alien marine species. This methodology, consolidated after an in-situ test in 1998, was presented to and approved by the IMO Environment Protection Committee in November 1998. Its inclusion in the forthcoming Annex VII of the MARPOL 73/78 Convention should be recommended. The main impacting activities from industrial processes are listed below, together with the impacted areas or with potential risk, according to the Macrodiagnosis of the Brazilian Coastal Zone (1996).

I - Petrochemical Sector: Petrochemical activity mainly affects the South, Southeast regions as well as parts of the Northeast region, where there are oil terminals, oil duct networks with adjacent petrochemical complex. Coastal regions of low altitude, subject to flooding, are particularly vulnerable to oil spills. Besides the dockside activities of the oil sector, we should highlight the existence of oil extraction platforms in the South, Southeast and Northeast regions. Petrochemical centers close to oil refineries near the coastal zone have high environmental risk indicators, associated to the vulnerability of natural systems.

II - Chemical Sector: The activities of the chemical sector are concentrated in the south of the country, in the State of Paraná, where fertilizers are produced; in the Southeast region, particularly in Rio de Janeiro and Sao Paulo; and in some Northeastern States. The cities of Cubatão, Guarujá and Santos, in the State of Sao Paulo, have admittedly serious environmental problems. In the State of Rio de Janeiro, where the most important bays are to be found in the country, the natural conditions, allied to high levels of urban concentration and equipment from the chemical industry center make the region vulnerable to flooding and landslides, thus increasing the environmental risk situation of these bays. In the Northeast the environmental risk situation is worsened by the lack of basic services.

III - Metal-Mechanic Industry Activities: The impact areas of the metal-mechanic industry coincide with those that are impacted by other industries, such as the chemical one, given the high level of industrial concentration in certain parts of the country, as is the case of Rio de Janeiro and Sao Paulo. Espírito Santo, Pernambuco, Maranhão and Pará are also affected by these activities. One of the largest alumina processing units of the southern hemisphere is to be found in the coastal zone of the State of Maranhão.

IV. Paper and Cellulose Industry : The activities of this industry have impact in the States of Rio Grande do Sul, Espírito Santo and Bahia, where some of the productive equipment of the sector is to be found.

V. Sugar-Alcohol Activity: In the coastal zone, the impacts of this activity affect the Northeast region of Brazil, notably the States of Alagoas, Pernambuco and Paraíba, where plantations, processing plants and distilleries are situated.

VI. Port Activity: The states most affected by dock activities are: Rio Grande do Sul, with the Port of Rio Grande; Paraná, with the Paranaguá Port - the main export corridor for grains from the South; São Paulo, with Santos and São Sebastião Harbors; Rio de Janeiro, with Guanabara and Sepetiba Bay Harbor Complexes; Pernambuco, with the Suape Industrial Port Complex; and Maranhão, with the Itaqui terminal, ran by the Rio Doce Company to export iron and manganese ore from the Serra de Carajás. According to the results of studies carried out under the National Coastal Zone Management Program, the primary sources of land-based pollution of the marine environment are: inappropriate discharge of urban liquid effluents; contamination produced by industrial effluents; contamination and degradation of environment associated to inadequate agricultural, herd raising and forestry practices; degradation of coastal and marine ecosystems due to advancing urban and tourism frontier; improper final disposal of urban solid wastes; and degradation caused by transport and disposal of oil and its by-products. The primary sources of sea-based pollution are related to the maritime transportation activities and the offshore exploitation of oil and gas, which impact the marine environment through the following ways: oil spills; gas emissions; produced water, with dissolved organic compounds, chemicals, trace metals, radioactive materials and inorganic salts; ducts and installation of infrastructure to receive material produced in the platforms; threat to biodiversity in the marine areas affected by the activity. Research shows the existence of environmental impact generated by water produced by the offshore platform in Bacia de Campos, in Rio de Janeiro. Brazil implements several projects and activities related to mangroves, coral reefs, and to the regional implementation of the Global Program of Action (GPA), to the Federal Plan of Action for the Coastal Zone, to the operation of an environmental

agenda for the Brazilian ports, among others. Also relevant is the drafting of a National Contingency Plan to Combat Oil Spills.

**Capacity-Building, Education, Training and Awareness-Raising:** There are ongoing efforts in all coastal states to draft and implement Local Agenda 21s. For example, the State of Espírito Santo, where some actions have already been initiated, in particular those dealing with Chapter 17 - on the protection and sustainable use of oceans. GERCO efforts have enabled the training, over the last six years, of some thousand technical personnel of state staff governments and other involved segments in more than 10 regional courses. GERCO also published the teaching material. The Train-Sea Coast Brasil Program, associated to the UN Train-X capacity building network has already held some training courses since its implementation in Brazil, for technical personnel, researchers, managers and decision makers. UN's Train Sea Coast Programme, coordinated by the Division of Ocean Affairs and the Law of the Sea (DOALOS / UN), offers training and capacity building to decision-makers regarding the integrated management of the coastal zone and its interfaces. The Brazilian TSC unit is supported by the Interministerial Commission for Marine Resources (CIRM) and is part of a global network and has been offering regular training courses, both at the host institution, Rio Grande Federal University Foundation – *Fundação Universidade Federal do Rio Grande (FURG)*, and in other states. A pioneering initiative in this type of capacity-building, the Brazilian TSC has recently started developing a number of courses associated with the National Programme for Port-related Capacity-Building (*Programa Nacional de Capacitação Portuária – PNCAP*) under the Port Environment Agenda. In turn, the agenda's goals are to gather and divulge knowledge for the planning and taking of actions toward environmental protection and control in port activities. The target audience is environmental control bodies and managing and operating port staff. The intended field of action goes beyond the offer of different training courses and includes sector-related meetings and events as routine activities to discuss the subject. In 1997, CIRM created the Marine Mentality Program (PROMAR) whose objective is to "stimulate, through planned, objective and systematic actions, the development of a marine mentality in the Brazilian population, consonant with national interests and geared towards a greater knowledge of the sea, its resources, its importance for Brazil, the responsibility of its rational and sustainable development and the need to preserve it". The Program is made up of 12 projects: a) Publications on the sea; b) Video tapes on the sea; c) Marine Philately; d) Professionals of the Sea; e) Youth and the Sea; f) Marine photographs and paintings; g) Sea Week and Ocean Day; h) Support for Sea Boy-Scouts Groups; i) Naval modeling; j) Support to Sailing Associations; k) Itinerant Exhibition on the Sea; l) Support to Marine Museums. Besides this, IBAMA is developing several environmental education initiatives, where the value of the marine and coastal zones are emphasized, as well as the need to apply the concept of sustainable development to oceans. With respect to the International Year of the Ocean, Brazil had two representatives at the Independent Global Commission on Oceans, created by the UN General Secretariat and the UNESCO as one of the initiatives to commemorate the International Year of the Ocean. One of the Brazilian representatives was one of the Vice-Chairs of the Commission. Furthermore, the country set up an Independent National Commission on Oceans, which provided detailed contributions to the Global Commission. Activities to commemorate the International Year of the Ocean (1998), aiming at awareness raising on the sustainable management of oceans: EXPOMAR exhibition - Brazil And The Sea: Science, Technology And Sustainable Development, held in the context of the EXPO-98, at the Lisbon Science Museum, from June 12- July 31, 1998. The Ministry of Environment and IBAMA put together the exhibit "Integrated Management of Marine and Coastal Zones", with panels and leaflets of the Program to Assess the Sustainable Potential of the Living Resources of the Exclusive Economic Zone (REVIZEE), the National Coastal Zone Management Program (GERCO), the National Program for Biological Diversity (PRONABIO) and the Project for the Protection of Sea Turtles (TAMAR), Conservation and Management of Sirenia (Manatees), Protection of the Humpback Whale and the Coastal and Marine Protected Areas System, besides exhibiting the environmental aspects of the Brazilian Antarctic Program; National student contest on the topic "The Importance of the Sea for Brazil", open to elementary school, high-school and university students, with the objective of raising awareness of citizens, especially children and youth, on the importance of the sea for Brazil and Brazilians, and to make the students aware of the challenges encountered in the preservation and rational exploitation of the sea; Issue of a series of commemorative stamps and postcards, in 1998, on the International Year of the Ocean; Issue of a series of commemorative stamps and postcards, in 1999, on the Environmental Protection Area of Arquipelago de São Pedro e São Paulo and the PROARQUIPELAGO

(Program for Research and Occupation of the Arquipelago de São Pedro e São Paulo) and the REVIZEE Program; Workshop held in April 1998, and subsequent meetings of the Coastal Zone Management Integration Group (GI-GERCO), under CIRM, to develop a Federal Plan of Action for the Coastal Zone, to harmonize policies and actions of the federal bodies that are active in the coastal zone, and to set up a Short Term National Agenda for immediate implementation. defining responsibilities, sectoral tasks and direct executors; Dissemination of material on the International Year of the Ocean and marine and coastal zone programs in the internal information sheets of the Ministry of Environment and associated entities; Inauguration, in Environment Week, commemorated on May 31-June 6, 1998, of the Marine Organisms Production Center in Guaratuba (PR) and initiatives for the cleanup of the Guaratuba Bay, both supported by the Ministry of Environment and the Government of the State of Paraná; Distribution of publicity material and information on the coastal zone and marine programs of the Ministry of Environment and associated bodies to magazines and periodicals of mass circulation and television networks as input to reports on the International Year of the Ocean; Permanent advisory and collaboration with the work of the Independent National Commission on Oceans in the preparation of its National Report to the Global Commission.

*Constraints:* In spite of the implementation stages already achieved, the full operation of the Integrated Coastal Management in Brazil, as well as of the other policies and programs related to the sustainable development of oceans, further efforts are still needed to overcome a set of difficulties, such as: lack of financial, scientific, technical and technological resources; insufficient generation of knowledge to guide the sustainable use of marine resources; non-existence of up-to-date data, associated to gaps in knowledge on environmental dynamics and the occupation process; lack of consistent statistics for diagnosis and regulation of fishing activity; lack of activities in environmental education, ecological mobilization and associativism; lack of a prepared work force to develop the national fisheries sector, either on an artisanal or an industrial scale; lack of mechanisms for processing and commercialization of fishing products; insufficient number of vessels and laboratories for marine sciences, required to develop oceanic research activities; complexity of zoning actions with respect to speed of occupation; inadequate profile of technical capacity to apply instruments as well as institutional and political fragility to administer conflicts, including use of products/results generated under GERCO, particularly in the coordination of licensing and supervision activities; lack of harmonization and implementation of policies based on information produced under GERCO; fragility of federal planning and general guidelines as to the priorities, responsibilities and strategy to complement the action of the various sectors and levels of government; lack of regulation of legal instruments and existence of inefficient or conflicting regulations; deficiencies in enforcement of legislation and in applying penalties due to the precarious supervision and control conditions; existence of legal conflicts of responsibilities.

**Information:** National information is available to assist both decision-makers and planners working in coastal areas related to sustainable management of fishery resources, as follows: Information from the Program to Assess the Sustainable Potential of the Living Resources of the Exclusive Economic Zone (REVIZEE); Information from the Program for the Management and Conservation of Marine Natural Resources, under the responsibility of IBAMA research and training centers. This program aims at the systematic collection of basic parameters and information to enable drafting of diagnoses on the major fisheries and ecosystems; Meteorological and oceanographic data from the National Oceanographic Data Bank (BNDO), under the responsibility of the Brazilian Navy; Information from the Global Ocean Observing System (GOOS), with five main modules; climate assessment, prediction and monitoring; assessment and monitoring of marine living resources; monitoring and management of coastal seas; assessment and prediction of the health of the ocean; and marine meteorological and oceanographic operational services. Among the largest problems in appropriate decision making for the sustainable management of fishery resources are the discontinuity in statistical data, and that there has been no consolidation of all the initiatives in this area. With the aim of solving these problems, the National System for Fishing and Aquaculture Information was created in 1995, coordinated by the Ministry of Environment. The system is a knowledge bank to provide input for planning in the fisheries sector, and it aims to collect, process, analyze and make available information on fisheries. It is currently undergoing testing for data entry on continental fishing, only lacking the incorporation of the marine fishing statistics system, currently being developed by IBAMA. Information on marine pollution in Brazil is concentrated in the following: Federal, state and some local bodies, responsible for environmental monitoring and control, and for sanitation. Data on fecal coliforms and other basic indicators for programs on quality of bathing waters, rivers, coastal lagoons and beaches, often distributed in daily bulletins to the

media; Agencies involved in research of marine and coastal environments, with surveys on specific contaminants, including heavy metals; Agencies responsible for basic planning and statistical information (water supply, garbage collection and sewage treatment); and large scale companies which, because of the volume of their activities and demands associated to environmental licensing, need to develop their own research, often with scientific institutions. Given the concentration of monitoring institutions in the South-Southeast region, this region has a much larger volume of data than other Brazilian regions. Brazil, like most countries of the region, still did not have an inventory of sources associated to contaminants, an essential environmental management instrument. However, in the context of Brazil's PNA, already mentioned, the Ministry of Environment prepared, in 2000, an Inventory of Sources and Contaminants Affecting the Coastal Zone, currently under refining. Information on Mineral resources is as follows: Information derived from the Program to Assess the Mineral Potential of the Continental Shelf (REMPAC) and the Plan to Survey the Brazilian Continental Shelf; Information derived from research on oil in the sea carried out by Petrobras and other companies; Information on living resources other than fish is derived from the National Biological Diversity Program (PRONABIO) and Information from projects for the protection, management and conservation of endangered marine species, such as TAMAR, Sirenia, Cetaceans and other marine mammals and sea birds. Information on critical uncertainties (for example, climate change, El Niño La Niña, sea level change) is available from the following sources: Information arising from oceanographic and meteorological study and monitoring programs on a global scale in which Brazil participates such as the Global Ocean Observing System (GOOS); the Global Investigation of Pollution in the Marine Environment (GIPME); Ocean Science in Relation to Non-Living Resources (OSNLR); Training, Education and Mutual Assistance (TEMA), Global Sea-Level Observation System (GLOSS); World Climate Research Programme (IGBP); Land-Ocean Interactions in the Coastal Zone (LOICZ); Global Ocean Ecosystem Dynamics (GLOBEC); Inter-American Institute for Global Change Research (IAI); Regional Program for the Upper Eastern South Atlantic Ocean (ASOS); Ocean Science in Relation to Living Resources (OSLR); Harmful Algal Blooms (HAB); Climate Variability and Predictability (CLIVAR); Tropical Ocean Global Atmosphere (TOGA); World Ocean Circulation Experiment (WOCE); The Scientific Committee on Oceanic Research (SCOR) and Pilot Moored Array in the Tropical Atlantic (PIRATA). Geographic Information Systems are used for environmental monitoring in Brazil. Several research centers have geoprocessing laboratories. The most used geoprocessing applications in Brazil are: ARC/INFO, SPANS, MGE/INTERGRAPH, SITIM/SGI and SPRING, and the integration systems SPANS/VIEW and ARC/VIEW. IBAMA uses satellite images and airborne sensors in supervision and monitoring. Information on different aspects of management of coastal zone and marine environments are available in different formats, such as maps and charts, technical reports, socio-environmental diagnoses, descriptive memorials, specific publications, electronic files, and relational and georeferenced databases. There are several Internet sites where executing institutions may be contacted for information on the National Coastal Zone Management Plan, land use and management, or environmental problems of the Brazilian coastal zone. Addresses of these institutions may be found at the [Ministry of Environment's web site](http://www.mma.gov.br) (www.mma.gov.br). At the same site, information is also available on the Program to Assess the Sustainable Potential of the Living Resources of the Exclusive Economic Zone (REVIZEE). Also at the Ministry's site, and at [IBAMA's web site](http://www.ibama.gov.br) (www.ibama.gov.br), is information on the management of fishery resources, with frequently updated information on ongoing activities. When the Fisheries Information System is concluded, it will have its own site, with links to areas of interest (Ministry of Industry, Commerce and Tourism, FAO, INFOPESCA, etc.). IBAMA is developing a System to Monitor Biodiversity in Federal Protected Areas - SIMBIO, aiming, with the use of indicators, to monitor and detect significant alterations in the environment which may place the safety of the areas at risk as to the conservation of biodiversity. It will also produce and make available information on the state of the art of trends in biological diversity in these protected areas. The Ministry of Environment is developing an Integrated Environmental Monitoring System based on partnerships, using the National Environment Information System, involving the Ministry, IBAMA, state and local environment bodies, government sectoral bodies, scientific community, private sector and non-governmental organizations. In this system, existing monitoring systems will be used and integrated. A specific subcomponent for marine and coastal zones is foreseen. From a methodological point of view, among the first stages are the selection of indicators, the bringing together of existing knowledge and the promotion of discussions on the issue. Universities, research centers and companies such as Petrobras have started work in this field, although basically to meet demands. In

IPEA and other institutions of the economic area, important studies are being carried out with respect to the development indicators which will be used in these ongoing actions.

**Research and Technologies:** To increase the insertion of Brazilian products in international markets, the business sector has sought, voluntarily, to incorporate ISO standards, based on an understanding of the benefits incurred by the sustainable management of production mechanisms. There are several initiatives for technological enhancement along the coastal zone, which have proved to be viable alternatives to solve conflicts between socio-economic needs and the environment. These alternatives are mainly concentrated in the association of the traditional extractivism to new sustainable economic activities such as aquaculture, management of agroforestry systems, renewed value of handicrafts, tourism and ecotourism. The capacity to compare, study, systematically observe and evaluate biological diversity must be strengthened throughout the country and elsewhere by adopting efficient actions and enhanced international cooperation. Remote sensing techniques are being successfully employed by the fishing sector. In the area of fishing technology, it is necessary to improve methods for handling, conservation and processing, both on board and on land, and to reduce losses. Introduction of new catch technologies, impact studies on the ecosystems and market studies would enable improved use of products by the market, more competitive prices, more efficient management systems, reduction of operational costs as well as better management of marine biological diversity. Mariculture is an alternative capable of bringing an important contribution to increment domestic fishing production. However, development of techniques in natural settings requires work on the autecology of the species and populations, to identify the optimum conditions for reproduction, feeding and growth. Collection of oceanographic data for extensive areas and with a high temporal repetitiveness present enormous logistic difficulties as well as high cost. The various satellite systems permit collection of oceanic data on a regional or global scale. Through this technology it is possible today to collect meteorological and surface oceanic data in real time. The recent launching of satellites that operate in the microwave band enabled the collection of data on wave fields, oceanic winds, sea level and the detection of oil pollution under practically any meteorological conditions. Brazil still lacks an assessment and registry of the numerous successful experiences in sustainable management and use of natural resources, several of which have been on the coastal zone. These experiences have often been community-based with innovative technologies, in partnership with independent consultants and research institutions. With respect to combating oil spills, there are a series of techniques used for cleanup in place. They are divided into four categories: chemical treatment (dispersants, emulsifiers), in situ burning (not well accepted in Brazil), mechanical recovery (booms, skimmers, water-oil separators, adsorbents) and bioremediation (including chemical). To these may be added technologies which use mathematical models for diffusion and dispersion in water bodies. Use of multiple use response technologies requires a rapid and scientific decision-making structure, based on an integrated system. This structure is defined in the National Contingency Plans to combat accidents, for both oil spills and hazardous and noxious substances. To this end, Brazil held a workshop in 1998, with the support of the Canadian Coastal Guard. At that time, the first version of this plan was drafted, currently being reviewed and consolidated. Studies are also being made of the need to create a fund to make the plan self-supporting. With the exception of the oil and gas terminals of companies such as Petrobras, Shell and Esso, the Brazilian port subsector is generally lacking a managerial and physical structure to manage liquid effluents and wastes. The MARPOL 73/78 Convention on the Prevention of Pollution from Ships was promulgated in Brazil in 1998. This Convention requires that the State Parties ensure appropriate facilities to receive wastes which do not cause unnecessary delays to ships, where these facilities should meet the needs of users and of the environment. However, each port should determine which type of facility it should provide. With respect to the prevention, control and combat of marine pollution by oil, Petrobras has taken charge of and maintains the Model Centers for the Prevention, Control and Combat to Marine Pollution by Oil - CENPOL, to reduce the effects of oil accidents in terminals. These centers, installed in terminals, train "anti-spill brigades" who attend courses and practical lessons and are always close to terminals, ready for action. Furthermore, Petrobras carries out marine and coastal environmental monitoring in the Bacia de Campos, where around 80% of the oil produced in Brazil comes from. Several universities are involved in this monitoring project, whose research covers an area greater than 60,000 sq. km., and requires the work of more than 200 people. One of the major problems of deep sea oil production technology, of which Brazil is a pioneer and leader, besides the huge water pressure on equipment and the wasting of materials, is the accumulation of paraffin or wax on the walls of the ducts that carry the oil from the

well to the surface platform, due to the extremely low temperatures, thereby leading to risk of blockage or breakage/spills. The Petrobras Research Center developed a chemical solution, SGN - Nitrogen Generating System - that when injected in the obstructed part of the duct causes a chemical reaction that generates nitrogen and gives off heat, melting the paraffin and unblocking the duct. Besides being cheap, SGN is also ecologically correct: in addition to nitrogen and heat, the only byproducts of the reaction are common salt and pure water. This technology is being considered a definitive solution to the problem. In international fora on the issue, developing countries have reaffirmed the need for new and efficient technologies to increase their capacity to achieve sustainable development, without which the implementation of alternative economic policies becomes difficult. Thus, the role of financial support and partnership arrangements with donor countries, agencies and the private sector is essential. However, it has also been stated that this transfer process cannot be a factor of further debt for developing countries, thus the transfer of environmentally sound technologies must be carried out under favorable, mutually agreed conditions, including concessional and preferential terms. These technologies should also be economically feasible and socially acceptable. As a rule, it may be stated that when choosing technologies the major factors are: efficiency with respect to specific objectives; competitiveness of costs; ease of access; availability of required information; ease of operation; availability of training and capacity building, among others. Specifically in the case of combating oil spills or discharges of hazardous substances some of these factors are: type of material or substance spilled; means of spreading the pollution; the response action defined in contingency plans; threat to sensitive marine and coastal ecosystems; possibility of contaminating water bodies used by the population and industries; presence of endangered species; and control of situations considered to be critical, whether political, social, economic or environmental.

**Financing:** For Coastal Zone Management, besides federal budgetary resources, about 80% of the allocated funds over the past six years has been from a loan agreement between the Brazilian Government and the World Bank, through a specific subcomponent in the National Environment Program. Currently there are other sources for specific actions, such as GEF resources for a global project on ballast water, and a specific project on the Sao Francisco River estuary, and IDB resources for the project to implement the protected area of the Tamandare-Paripueira coral reefs, and actions linked to the National Environment Fund. These experiences may enable expansion of new sources, based on broader programs. The basic financing source for study and research of marine living resources is the federal budget. However, new partnerships and additional financing sources, both domestic and foreign (GEF, IDB, World Bank and PPG-7), are being sought.

**Cooperation:** Brazil is a Party to the following: United Nations Convention on the Law of the Sea (UNCLOS), signed by Brazil in 1982, ratified in 1988 and in force since 1994; Agreement on the Implementation of Part XI of UNCLOS, in force since 1996 (under ratification in the Brazilian Congress); Agenda 21, adopted at the United Nations Conference on Environment and Development (UNCED) in 1992 (Rio-92); UN Convention on Biological Diversity, ratified by Brazil and in force since 1994; FAO Code of Conduct for Responsible Fisheries, 1995; Agreement on Implementation of UNCLOS Provisions on Straddling Stocks and Highly Migratory Fish Stocks, signed by Brazil in 1997; International Convention for the Prevention of Pollution by Ships, 1973, and its Protocol, 1978, and its 1984 amendments, and its Optional Annexes III, IV and V (MARPOL 73/78), in force for Brazil since 1998; Convention on Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention, 1972); International Convention on Oil Pollution Preparedness, Response and Cooperation, 1990 (OPRC 90); International Convention on Civil Liability for Oil Pollution Damage (CLC-69); Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention); Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), ratified by Brazil in 1992; United Nations Convention on Climate Change, in force since 1994; International Convention for the Regulation of Whaling and Additional Protocol; Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water, 1963; International Convention for the Conservation of Atlantic Tunas (ICCAT), in force for Brazil since 1969; Protocol to ICCAT, 1984; Antarctic Treaty, ratified by Brazil in 1975; Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea Bed and the Ocean Floor and in the Subsoil thereof ratified by Brazil in 1988; Convention on the Conservation of Antarctic Seals, ratified by Brazil in 1991; Convention on the Conservation of Antarctic Marine Living Resources, in force

for Brazil since 1986; Protocol to the Antarctic Treaty on the Protection of the Environment, ratified by Brazil in 1995. Other related agreements, particularly regional and sea-specific agreements, to which Brazil is a Party include: Agreement for the Conservation of Natural Resources of the South Atlantic between Brazil and Argentina, in force for Brazil since 1969; Fisheries Agreement between Brazil and Argentina, in force for Brazil since 1969; Agreement on Fisheries and Preservation of Living Resources between Brazil and Uruguay, in force for Brazil since 1969. Brazil proposed and also participates in the Agreement on the Zone of Peace and Cooperation of the South Atlantic (includes provisions related to the sustainable development and use of marine resources); and the Southern Common Market - MERCOSUL - Sub-Working Group on Environment.

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## CHAPTER 18: PROTECTION OF THE QUALITY AND SUPPLY OF FRESHWATER RESOURCES: APPLICATION OF INTEGRATED APPROACHES TO THE DEVELOPMENT, MANAGEMENT AND USE OF WATER RESOURCES

**Decision-Making:** The Brazilian Constitution, dated October 1988, modified many aspects concerning property, use and management of freshwater in Brazil. Water resources became, since then, public domain. Rivers, lakes, or underground water are either of federal domain (all rivers and lakes that cross state boundaries or serve as boundaries between states or a neighboring country or that come from a neighboring country are of federal domain) or state domain (water bodies running entirely in the territory of a single state). In January 1997, the Law 9.433, also known as the “Water Resources Act” was adopted. Inspired on the French legal framework concerning the management of water resources, this law defines the *Waters Resources National Policy*, which organizes the planning and management of water resources sector at the national range. It recognizes – as it was previously done by the Brazilian Constitution – that water is a public property, and that: water is a limited natural resource and has an economic value; the management of water resources should always allow for multiple uses of water; in case of a shortage, priority in the use of water resources must be given to human consumption and the watering of animals. The main characteristics of this *National Policy* are, among others: the decentralization of the management of water resources and the participation of the Government, users and local communities in the definition and implementation of water management policies; The implementation of a *National System for the Management of Water Resources*, which coordinates integrated water management; decides about the conflicts related to water resources; implements the *Waters Resources National Policy*; plans, regulates and control the use, preservation and recovery of water resources; and establishes the water pricing system. The *National System for the Management of Water Resources* is formed by the *River Basin Committees*; Federal, State and local governmental authorities, whose competencies are related to water resources management, and by the Water Agencies. The governmental structure created for the management of water resources in Brazil is the following: the *Water Resources Secretariat*, part of the Ministry of Environment, responsible for planning and formulating the *Water Resources National Policy*; the *National Council for Water Resources*, responsible, among others, for coordinating the *Water Resources National Policy*; approving proposals for the creation of the River Basin Committees and establishing criteria for the award of rights to water use and for the fees to be charged. The *Water Resources National Agency/ANA*, created in July 2000, in charge both for the accomplishment of the *Water Resource National Policy* as for the implementation of the precepts and principles of Law 9.433/97. In order to ensure decentralization in the management of water resources, the *Water Resources National Agency/ANA* is concluding management agreements with local water agencies. Besides, the River Basin Committees will be in charge of defining when and how much to charge for the use of rivers. All matters referring to water use and management that can be solved locally will not be brought for the appreciation of the Federal government; The *River Basin Committees*, which are composed by representative of the Federal, State and local Governments, users of water resources (industries, agriculture, etc.) and the civil society. The *Committees* are in charge, among others, of approving the Water Resource Plan for the river basin and for establishing criteria and mechanisms for charging for water use; the *local Water Resources Agencies*, which shall act as executive secretariats of the river Basin Committees. Sanitation policy (which includes water supply and treatment, sewage collection and treatment, collection and final disposal of solid wastes and urban drainage) is under the responsibility of the Urban Policy Secretariat of the Ministry of Planning and Budget – SEPURB/MPO, and some specific programs are in charge of the Special Presidency Secretariat for Urban Development – SEDU/PR. There are also governmental bodies for coordination of water resource management, development and policy in all 27 States and in the Federal District. At the local level: the so-called Municipal Consortia defines actions, coordinates and promotes efforts with a view to improving the conditions of the basin, particularly concerning the quality, quantity and availability of the waters. At the river basin level, 66 Basin Committees have been established to date, 63 of these at state level and 3 in basins of rivers under Federal jurisdiction. Around 75% are found in the South East. These Committees make decisions on conflicts of use of water resources, approve the Steering Plans for Water Resources of the River Basins and follow-up their implementation. The general legislation and regulatory framework for water management includes the following: *Federal Decree N: 24.643*, dated July 10, 1934, also known as the Water Code (Código de Águas); *Federal Law N:*

6.938. dated August 31, 1981, establishes the National Environment Policy; *CONAMA* (National Environment Council) *Resolution N: 20, dated June 18, 1986*, which establishes criteria for the classification of water bodies; *Federal Constitution dated October 1988, Title VII - of the Social Order, Chapter VI - of the Environment, article 225*, according to which "all persons are entitled to an ecologically balanced environment, which is an asset for the people's common use, essential to healthy life, it being the duty of the Government and of the community to defend it and preserve it for present and future generations"; *Federal Law N: 9.433, dated January 8, 1997* - introduces the Water Resources National Policy and the Water Resources Management System; *Federal Law N: 9.605, dated February 12, 1998, regulated by Federal Decree N: 3.179* - introduces the *Environmental Criminal Law*; *Federal Law N: 9.984, of July 17, 2000* - creates the *Water Resources National Agency/ANA* for the implementation of the *Water Resources National Policy* and for the coordination of the *National System for Water Resources Management*; *Ministry of Health Regulation N: 1.469, dated December 29, 2000*, establishing criteria for drinking-water standards; *Water Resources National Agency Resolution N: 6, of March 20, 2001*: establishes the National Program for the Cleaning of Hydrographic Basins. The legislation which covers the use of water by agriculture includes: The National Irrigation Policy Law N: 6.662, dated June 25, 1967; Regulatory Framework for the Irrigation National Policy - Decree N: 89,496, dated March 29, 1984 and Decree N: 2,178, dated March 17, 1997. Legislation concerning for the use of water by industry includes, among others: *CONAMA Resolution N: 237, dated December 19, 1997*, establishes criteria for Environmental Licensing Process; *CONAMA Resolution N: 001/86 dated January 23, 1986* - defines environmental impacts and discusses the generic composition of environmental impact studies and reports (EIA/RIMA); *Federal Law N: 4,904, dated December 17, 1965*, establishes creates the *National Department of Water and Electricity (DNAEE)*; *Presidential Decree N: 2.335, dated October 6, 1997*, establishes the *National Electric Energy Agency*; *CONAMA Resolution N: 279, of June 27, 2001* - establishes procedures for simplified environmental licensing processes for Power Plants with a potentially small impact on the environment. For use by households: the Federal Constitution defines, under its article 21, that it is the responsibility of the Federal Government to "establish guidelines for urban development, including housing, basic sanitation and urban transportation" and, under its article 23, that it is the responsibility of Federal, State and Local Governments to "protect the environment and fight pollution in all its forms" and to "promote programs to build housing and improve housing conditions and basic sanitation". At the federal legislative level, a bill that deals with guidelines for granting authority and for defining the inter-relationship among Federal, State and Local Governments with respect to public sanitation services is being discussed. Within the Federal Government, the Ministry of Environment established the National Desertification Plan in order to propose actions to prevent degradation, to fight and control desertification as well as the effects of drought in the States affected by it. For decades, Brazil adopted policies to create jobs and water reservoirs in regions affected by drought, especially in Northeast region and the São Francisco River basin. The Irrigation and Drainage National Policy provides for public projects for farming families with areas of 4-10 ha, occupying up to fifty percent of the total project area. There are programs for capacity-building and technology transfer for these new farming families. With respect to the Sanitation Sector, social organizations had an active participation in the process of drafting the National Policy for Sanitation. Moreover, the prioritization and selection of projects for financing under the *Pro-Saneamento Program* is carried out in a decentralized manner by Councils existing in the 27 States and made up of representatives of State and Local Governments and organized civil society from housing and sanitation sectors. With regard to pricing policies, Law N: 9,433/97, in its article 5, paragraph IV and in articles 19 and 22, establishes that consumers shall be charged for the use of water resources. The recognition of the economic value of water resources is one of the main instruments of the *Water Resources National Policy*. Laws concerning *Water Resources State Policy* have been adopted in 21 out of the 27 States existing in Brazil and in the Federal District (Brasília). As for the tariffs for water and sewage services, both household and industrial, as well as for public irrigation, it is calculated in order to cover the full costs of exploitation, maintenance, operation, depreciation and remuneration for the use of water resources.

**Programmes and Projects:** *Improving water resources quality:* The *National Agency for Water Resources/ANA* is responsible for 5 programs to improve water resources quality in Brazil. For the implementation of these programs, the Federal Government allocated R\$ 202,018,996,00 (source: *ANA/Superintendence for Water Resources Planning-SPR*). These Programs are: The *Águas do Brasil* Program, which includes a wide range of projects aiming

the development of the furniture of good quality water in Brazil. This program is divided in 20 specific projects and activities which are being developed in order to implement management tools and the *Water Resources National System*; The *PROÁGUA-GESTÃO* Program, which main goal is to guarantee the development of the offering of a good quality water by promoting its rational use. It also aims to avoid that water resources relative scarcity may turn to an obstacle for a sustainable development; The *Programa Nacional de Despoluição de Bacias Hidrográficas* (National Program to Clean Up Hydrographic Basins) consists on the payment (by the Federal Government to Service holders) for the treatment of wastewater, in order to stimulate the implementation and operation of plants for treatment in hydrographic basins with a high level of water pollution. A specific contract has to be signed between the holder of the plant for treatment and the *Water Resources National Agency/ANA*, which is in charge of the execution of this Program. The plant for treatment has to certify that it really is removing pollution from water. The *Water Resources National Agency/ANA* will transfer part of the money corresponding to the fee for the right to use water resources to the *Clean Up Hydrographic Basins Program*. The main objectives of this Program are: to reduce the critical levels of water pollution in hydrographic basins in urban and industry high density areas; to stimulate the implementation of water resources management systems in these areas through the creation of *Hydrographic Basin Committees* and the respective local Water Agencies as well as to implement mechanisms to charge for the right to use water resources, according to Federal Law N: 9.433/97. In 2001, 104 proposals for building plants for water treatment were sent to the *Water Resources National Agency/ANA*, among which 17 were approved. This corresponds to the treatment of 51.253 kgBDO per day; The *Programa de Desenvolvimento de Recursos Hídricos para o Semi-Árido Brasileiro / PROÁGUA* ( Program to Develop Water Resources for the Brazilian Semi-Arid Region): this program is part of a main program created by the Brazilian Government included in the *Programa Brasil em Ação (Brazil in Action Program)*. Its main goal is to assure the development of the offer of water with good quality standards to the Brazilian Semi-arid region (this includes all Northeast States as well as the State of Minas Gerais). It has the task to implementation of new projects that, besides ensuring increased water availability, promote both improvement of the quality of life of the local population and the protection of the environment. It aims to: promote the rational and sustainable use of water resources as well as its management done together by users, Federal and local Governments; furnish water for domestic use, in a trustfully and sustainable way, giving priority to rural areas with a high concentration of poor families; establish, in a sustainable way, an administrative, operational and maintenance infrastructure capable to furnish water in rural areas, crowded with low income families; establish, in a sustainable way, a process for the administration, operation and maintenance of the infrastructures for water supply. This program will benefit 1,300,000 people, that is, more or less 260,000 families (source: *Proágua* internet site); The *Nossos Rios (Our Rives)* Programs, composed by a set of actions for the implementation of the integrated management concept in 3 main Brazilian hydrographic basins: the São Francisco; the Paraíba do Sul and the Araguaia-Tocantins river basins. *ANA* is also in charge for the implementation of a water resources management system in the Alto Rio Paraguai-Pantanal basin. For agricultural use the National Irrigation and Drainage Program, currently under execution, uses the strategy of applying cost recovery for all users, including the public sector, promoting the increase of the efficiency of water conveyance, distribution and application in irrigated cultures. Irrigation projects are expected to expand the irrigated area by about 25%, with the same amount of water being currently used. Public irrigation projects (around 6% of the total area, that is, 150,000 ha) completely recover investment costs according to Law N: 6,662/79. The private sector, responsible for about 94% of the irrigated land in Brazil (2,600,000 ha) will have to pay for the use of water, according to Law N: 9,433/97. The irrigation policy stimulates the efficient use of water; reduction of losses; and activities that avoid the degradation of water resources. It also presents guidelines for the use of drainage systems to prevent salinization and saturation of soils. Entities that implement public irrigation projects buy large areas of land and develop studies in order to transform these areas into systems that meet the needs of small and medium sized companies; and into smaller areas that meet the needs of farmers' families. The private sector continues to extend its participation in irrigated areas, stimulated by governmental projects and programs that promote systems of electrical support and hydraulic infrastructure. With respect to production of hydroelectric energy, the ongoing privatization program is transforming a sector mainly made up of public companies into a sector where the participation of private companies will tend to be predominant. At this time, the hydroelectric sector is required to pay for the use of impounded water for hydropower generation. Other industrial user sectors already pay for water with tariffs that cover the costs of investment and exploitation of water supply

systems, but they frequently do not cover the costs of sanitary sewerage systems. In the Sanitation and Water Supply Sector, the responsibility for defining service tariffs is exclusively that of the States in the case of common interest services, and of Counties, in all other situations. The tariff is made up of the following costs: exploitation, operation, maintenance, depreciation and remuneration. Thus, when the provisions of Law N: 9,433/97, are implemented, an amount corresponding to the costs of capture and consumption of gross water and disposal of effluents will be included. The participation of the private sector in providing sanitation services is still very limited in Brazil. However, one of the main strategies of the *Sanitation National Policy*, which intends to make water and sewerage services universal, is intervention to improve the level of efficiency of service providers and coordination of public and private efforts in order to promote the reorganization and modernization of the sector. From the point of view of the *Sanitation National Policy*, the basic objective is to make water supply and sewerage available to everyone. This is being done by expanding the water supply, and by improving its management, thus promoting conditions for the economic development of the country. Its intervention strategy encourages and conditions the efficiency of the sector, as part of the economy. The States and Counties are encouraged to establish specific goals to meet the needs of the poor, particularly in the cases of participation by the private sector, even seeking to define a principle of essential consumption. The *Sanitation National Policy* proposes the allotment of resources to subsidize the implementation of systems in the poorer Counties, as a means of providing services. In order to prevent pollution of freshwater supplies, several programs have been implemented by the States and the Federal Government. The programs listed below are being coordinated by the Federal Governmental, among which the *Secretaria Especial de Desenvolvimento Urbano da Presidência da República/SEDU* (Special Presidency Secretariat for Urban Development): The PQA (*Projeto Qualidade das Águas e Controle da Poluição Hídrica*) - Project for Water Quality and Control of Water Pollution aims to provide technical and financial support to the preparation of investment programs for the environmental sanitation of hydrographic water basins that are highly polluted, specially in areas of high urban density and intense productive dynamics. This Project considers: i) physical interventions, designed with a multidisciplinary and systemic perspective, capable of promoting the recovery and protection of environmental quality, and as a consequence, improving the living conditions of the populations that live in metropolitan regions or important urban agglomerations, according to equations of least cost and greatest environmental benefit; and ii) institutional arrangements, capable of providing sustained management of hydrographic water basins, including the development of economic environmental and natural resources management instruments. *PROGEST (Programa de Apoio à Gestão dos Sistemas de Coleta e Disposição de Resíduos Sólidos)* Program to Support the Management of Systems for Collecting and the Disposing of Solid Wastes. This program aims to support the establishment of a nationwide policy for the urban solid wastes sector, geared towards the solution of collection and final disposal problems. Its actions benefit, among others, counties located in the areas of source protection, thus contributing to prevent environmental pollution and, indirectly, improving the conservation of water bodies and in the increase of quality and quantity of water supply. *Pro-Saneamento (Pro-Sanitation)*- the objective of this program is to increase coverage of the following services: water supply, sanitary sewerage, urban drainage and urban solid wastes, as well as improving service efficiency. Within this program, the Sanitary Sewerage section is intended to increase the appropriate coverage and/or treatment and final disposal of effluents. The Solid Wastes section is intended to finance projects to increase the coverage of appropriate treatment and final disposal of urban solid wastes. Furthermore, within this program, there is an added incentive in the Sanitary Sewerage section, where the rate of interest is lower than that in other sections of the program. *Programa De Potabilidade Da Água* - Drinking-Water Standards Program. The Ministry of Health aims to assess and monitor the drinking-water standards of the public water supply systems in the country. The *PMSS - Projeto de Modernização do Setor de Saneamento* (Project to Modernize the Sanitation Sector)- is an instrument of the *Sanitation National Policy* aimed at reordering, improved efficiency and efficacy of sanitation services, by adopting a strategy that consists mainly in inducing the efficiency of public operators, and establishing and inducing the participation of private operators and businesses. These reordering actions would be basically represented by the technical assistance of the Federal Government, aiming at the creation of regulatory frameworks, management models and the improvement of the efficiency in provision of services. The regulatory frameworks will establish quality standards for water supply as well as for the quality of effluents discharged in the receiving bodies. The investment component acts through direct actions for rehabilitation, optimization and expansion of collection and treatment of sanitary sewage. The *PASS - Programa de Ação Social em Saneamento* (Social Action

Program for Sanitation) is directed towards the implementation of projects in water supply and sanitary sewerage; collection and disposal of solid wastes in the poorest areas in large cities and small and medium sized counties, in order to improve the population's health and living conditions. Through actions in sanitary sewerage and collection and disposal of solid wastes, the program acts directly in the control of water pollution and, indirectly, in the conservation of water bodies. The *PROSEGE - Programa de Ação Social em Saneamento* (Social Action Program for Sanitation) was conceived and structured to generate double benefits to the most vulnerable segments of the population of large and medium sized urban centers of the country. It enabled temporary solutions for critical unemployment problems, especially in construction, executing projects to implement/expand the sanitary sewerage system. It also increased the coverage of sanitation services, ensuing favorable effects on the health and living conditions of the targeted population. The program was developed in order to provide improved living conditions for lower income populations, by investment in basic sanitation, preferably in projects with assured environmental, technical, financial and socioeconomic feasibility. The *PROSANEAR* Program provides for integrated actions in sanitation, involving, among others, implementation and improvement of following services: water supply, sanitary sewerage, separation of solid wastes and micro drainage in degraded urban areas occupied by lower income populations, in cities with more than 50,000 inhabitants. Pollution prevention, and consequent conservation and increase in water supply in the sources of the region, is one of the effects of the program, as an appropriate disposal is made for both sewage and solid wastes. Improving Drinking Water: The regional strategic plan for Latin America and the Caribbean to improve drinking water, coordinated by PAHO and WHO, through technical cooperation, aims to develop strategies for the protection, conservation, quality and drinking-water standards to improve the environment and human health. One of the main objectives of the *The National Water Resources Policy* is to assure current and future generations the required availability of water, with quality standards appropriate to its respective uses. Many of the actions undertaken by the *Water Resources Secretariat* and other government agencies are directed to increase gross water supply in the water bodies in appropriate quantities and quality. Among the principal measures adopted by the Federal Government are the following: The *Projeto Água Boa* (Good Water Project) seeks to increase the availability of drinking water, especially for the communities of the Brazilian Semi-Arid Region. It intends to desalinate brackish waters from deep wells using the inverse osmosis process. The *Programa Nacional de Combate ao Desperdício de Água* (National Program to Fight Water Waste), aims to promote the wise use of water for public supply, to benefit public health, environmental sanitation, and efficiency of services. The program's strategy consists in identifying and implementing measures that revert the identified wasteful situation, based on actions and technological, regulatory, economic and institutional instruments, aiming at an effective saving of water. The major constraints faced by the Government in reaching its objectives in the area of integrated management of water resources include: - the short period of existence of the sector itself, institutionalized by Law N: 9433/97; - the insufficiency of financial resources; - lack of specialization and capacity building of human resources; - deficiencies in controlling the use of natural resources. In the case of sanitation, the greatest challenges faced are the restrictions of public debt, reducing the capacity of investment of the Public Sector; and the non-existence of regional regulatory frameworks that stimulate the efficiency and participation of the private sector. Other factors are the size and qualification of the deficit, the payment capacity of the Public Sector, the improvement required in the production of projects and managerial capacity. One of the general guidelines of the *Water Resources National Policy* is the integration of water resources management with environmental management, which is reflected in the Plans and Programs that the *Water Resources Secretariat* is developing. The *Water Resources National Policy* foresees not only the drafting of steering plans for water resources, by State and by River Basins, many of which have already been or are being developed, but also the formulation of a *Water Resources National Plan*. This *National Plan*, which will formulate the guidelines for integrating water management with management of land use and occupation, is undergoing development at the *Water Resources Secretariat*. The preparation of terms of reference for several irrigation development subprograms (for the *cerrados*, plains, green belts, semi-arid) which will be carried out in areas that do not engender environmental risks, can also be mentioned. The *Project for Water Quality and Control of Water Pollution - PQA*, is an important interface between the recovery and protection of the quality of the supply sources and the occupation and use of the land. It develops actions geared towards urban infrastructure, notably in shantytowns, for the resettlement of populations in risk areas, recomposing of vegetable cover, the establishment of parks and

environmental protection areas, among others. In Brazil, policies for flood prevention and flood warning, as well as to combat droughts, are today mainly implemented by States and Counties.

**Status:** The major constraints faced by the Government in reaching its objectives in the area of integrated management of water resources include: - the short period of existence of the sector itself, institutionalized by Law No. 9433/97; - insufficient financial resources; - fragile existing institutional framework; - lack of specialization and capacity building of human resources; - deficiencies in controlling the use of natural resources. In the case of sanitation, the greatest challenges faced are the restrictions of public debt, reducing the capacity of investment of the Public Sector; and the non-existence of regional regulatory frameworks that stimulate the efficiency and participation of the private sector. Other factors are the size and qualification of the deficit, the payment capacity of the Public Sector, the improvement required in the production of projects and managerial capacity.

**Capacity-Building, Education, Training and Awareness-Raising:** Capacity building actions in water resource management are carried out by the National Water Agency and aim at establishing an agenda for the education and training of water resources to act in the National Water Resources Management System, to ensure greater efficiency in the integrated and shared management of this natural resource. The objectives are as follows: a) promoting capacity building of human resources of the National Water Resources Management System, at the various levels, in management and the sustainable development of water (water resources councils, basin committees, water agencies, civil society organizations, user sectors); b) supporting the specialization of researchers and technical personnel in science, technology and innovation in the area of water resources; and c) promoting the capacity building of the technical staff of the National Water Agency. Furthermore, partnerships were developed between the Federal Government with State Foundations to Support Research to supplement capacity building actions, enabling the development of a line for training human resources and for specific research in water resources management in the states, strengthening hydrological research groups and supporting the organization and installation of institutional structures to support water resources management in the state. The area of water resources education – a process for informing and inducing behavioral changes that are desirable in the community-use of water resources-state equation – is still incipient. The attempts to develop awareness in the key population groups with regard to the use of water are still being developed and may be classified into three basic groups of activities: a) environmental education projects, as a rule implemented in the various basin bodies and geared mainly to children and youth, associated to the education system and its teachers; b) production and distribution of informative and dissemination material in the state bodies that manage water resources; and c) dissemination of water problems, particularly those related to droughts and floods, spontaneously through mass media.

**Information:** Information collection at the national level is carried out by the following: Water Resources Secretariat (SRH) and the *Water Resources National Agency/ANA* - collects general data on water resources; National Meteorology Institute (INMET) - collects meteorological data; National Space Research Institute (INPE) - collects meteorological data; National Electric Energy Agency (ANEEL) - collects data on water availability. At the state level: State Water Resources Secretariats or public water resources entities collect general data on water resources; State Environmental Secretariats and public environmental entities collect water quality data. The Ministry of Mines and Energy, through the *Brazilian Electricity Regulatory Agency* National Electric Energy Agency (*ANEEL*), used to operate a hydrometric network (about 5000 stations) mainly to regulate hydropower generation and also to provide data for new undertakings. Since January the 1<sup>st</sup>, this task has been transferred to the *Water Resources National Agency/ANA* which is now coordinating the *Sistema Nacional de Gerenciamento de Recursos Hídricos / SNIRH* (National System for the Management of Water Resources). *ANA* is coordinating, modernizing and expanding the hydrologic net in Brazil. An agreement signed with *INPE* (*National Space Research Institute*) will allow *ANA* to install 200 new platforms for collecting data. Another cooperation agreement, passed with the *Sistema de Vigilância da Amazônia/SIVAM*, the *Amazon Watching System*, will increase up to 1,500 the number of hydrometric stations with telemetric equipments. In the agricultural sector: The Ministry of Environment (MMA) and the Brazilian Geography and Statistics Institute (IBGE) collect data on land use (area, arable land, permanent crops, pastures, forest) and food production.; The MMA also collects data on irrigation areas (methods, water consumption). At the level of the household sector: In 1995, SEPURB published a volume

entitled *National Information System on Sanitation SNIS*. It is published annually with operational, economic, financial data as well as data on the main service providers of the country. For the industrial sector: IBGE collects data from the commercial and industrial sectors. There are also several private entities that collect data on this sector. ANEEL collects water gauge height data. Some of the information is available on the INTERNET. Most of the publications of public bodies are freely available, being provided upon request and regularly sent to sector agents. Among the main organizations publishing data are: IBGE (Statistical Yearbook); MAA (bulletins from the Agricultural Policy Secretariat); MMA (Water Resources Secretariat reports); ANA, ANEEL, INPE, INMET, EMBRAPA, SRH/MMA, SEPURB/MPO and MS. Most of the information is available electronically. Generally the information is available in electronic files, in word processing and spreadsheet documents.

**Research and Technologies:** The limits and conditions of water quality to be observed for gross water include physical, chemical and bacteriological parameters, and are contained in CONAMA Resolution N: 20/1986. The Public Water Supply Service and the appropriate State Authority regularly carry out control and monitoring of water quality, with the objective of achieving and maintaining the Drinking-Water Standards defined in Ministry of Health Regulation N: 1.469, dated December 29, 2000, which uses as reference the standards established by the World Health Organization. The drinking-water standards is the set of maximum permissible values of the physical-chemical characteristics of water intended for human consumption. This Regulation defines the physical-chemical and bacteriological parameters for monitoring water quality. The competent State Sanitary Authorities of the States may, considering local conditions, establish more restrictive parameters, as well as waiving certain specific analyses, once the non-existence of the chemical components in question has been ascertained through historic data and sanitary assessments. Currently, the main deficit of the Sanitation and Water Supply Sector is in the area of sanitary sewerage, more specifically in treatment of sanitary sewage. The main objective of the National Sanitation Policy is to universalize water access and sanitary sewerage with at least 80% of treatment by the year 2010. The current capacity for sewage treatment represents approximately 20% of the sewage produced daily in the country, taking into account the 27 State Basic Sanitation Companies and the 27 County Water and Sewerage Services for populations greater than 100,000 that are part of the SNIS/95 (15 County Water and Sewerage Services and 1300 County Water and Sewerage Services for populations smaller than 100,000 are not part of the SNIS/95). There is no data on recycling of waste water in Brazil. In Brazil, according to the National Research of Domestic Sampling - PNAD/96, 48.9% of the sewage produced is collected in public systems, 32% of which is treated, that is, 15.6% of the sewage produced in Brazil is treated. The main goal of the National Sanitation Policy - PNS is to make water supply universal, that is 100% of coverage by the year 2010. Sanitation Coverage (as a percent): For the year 2010, the goal of the PNS is to make collection services available to all, with treatment of at least 80% of the sanitary sewage collected in public systems. The technological needs to achieve those goals include: a) Recycling and reuse of waste waters; b) Sewage treatment. The development of technologies for recycling and reuse waste waters, both household and industrial, is essential to reduce the contamination, specially industrial, and waste, thus preserving water resources. In the Sanitation Sector there will always be a need for new technologies for treating water and sewage, since costs can be reduced and efficiency can be increased. Thus the resources available for investment may be used for both increasing coverage and for improving the quality of services. All water supplied to the population by service providers must conform to the minimum drinking water standard requirements established in the Ministry of Health Regulation N: 1.469/2000. However, the main objective of providing universal access is water quality. Based on the information provided by the SNIS (Diagnosis of Water and Sewage Services, 1995), 92.8% of the volume of water produced and distributed to the population is treated.

**Financing:** It is estimated that the investment necessary to eliminate the current deficit in water supply and sanitary sewage services is around R\$ 21.4 billion. If growth of the population by the year 2010 is considered, the required funds will be around R\$ 36 billion. The current flow of external resources into water resource management and development includes:

Technical cooperatio	(US\$ 1 = R\$ 1.17)
Foreign funds	US\$ 40.5 million (1995-1997)
Brazilian counterpart funds	US\$ 43.6 million

Total for Water Resources	US\$ 84.1 million
Grants:	
For projects under execution	US\$ 12.3 million
Loans:	
Projects under execution	Resources
Total Cost of Projects	US\$ 8,362.4 billion
Brazilian Counterpart	US\$ 3,656.4 billion
Total from External Sources	US\$ 4,695.0 billion
Multilateral Funds	US\$ 3,616.9 billion
Bilateral Funds	US\$ 1,078.1 billion
Private flows: data not available	

Within the Sanitation area, according to the Activities Report of the National Sanitation Policy, the programs carried out by the Federal Government from 1995 to 1997 were executed with 91.6% of its funds from the Federal Government Budget, the Severance Pay Fund (FGTS) and counterpart funds from States and Counties, and only 8.4% from external sources.

**Cooperation:** Brazil currently takes part in the following bilateral and regional agreements for the use of international watercourses, lakes or groundwater: At the Bilateral Level: Cooperation Agreement between Brazil and Uruguay for the Use of Natural Resources and Development of the Quaraí River Basin; Fishing Agreement between Brazil and Argentina; Agreement on Fishing and Preservation of Renewable Natural Resources between Brazil and Uruguay; Agreement between the Government of Brazil and the Government of Paraguay for the Conservation of Water Fowl in Bordering Rivers; Agreement of Amazon Cooperation between the Government of Brazil and the Government of Colombia; Treaty for the Use of Shared Water Resources of the Bordering Areas of the Uruguay River and its Tributary, the Pepiri-Guaçu, between Brazil and Argentina. At the Regional Level: Treaty of the Rio de la Plata, a cooperation agreement among Argentina, Bolivia, Brazil, Paraguay and Uruguay for, among others, flood warning. Information is exchanged daily and most of it is available on the Internet; Amazon Cooperation Treaty among Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Surinam and Venezuela; Guarany Aquifer Project, being developed among Brazil, Argentina, Paraguay and Uruguay that aims at the formulation of a legal and institutional framework for the management of the aquifer resources. It will contribute significantly to the advancement of the technical and scientific knowledge that will be the basis for the joint management model to be developed by the four countries; At the international level, Brazil actively participates in all relevant discussions regarding water resources management and directives.

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## **CHAPTER 19: ENVIRONMENTALLY SOUND MANAGEMENT OF TOXIC CHEMICALS, INCLUDING PREVENTION OF ILLEGAL INTERNATIONAL TRAFFIC IN TOXIC AND DANGEROUS PRODUCTS**

**Decision-Making:** Regulatory capacity at the federal level lies with the Ministry of Environment, either directly or through the National Council on Environment (CONAMA) or the Brazilian Institute on Environment and Renewable Resources (IBAMA). The Ministries of Health, Agriculture, Labor, and Transport oversee licensing and control of the manufacture, labeling, storage, transport, handling and use of toxic and other chemicals, particularly those harmful to human health, such as pesticides, wood preservatives, asbestos, mercury and cyanide. Additionally, the Ministry of Justice controls chemical inputs for the production of cocaine and other drugs. Brazil has legislation on environmental protection related to pesticides and specific substances; control and supervision norms on chemical products and inputs involved in the manufacture of cocaine and narcotics; legislation on procedures for licensing the use of metallic mercury and cyanide in gold prospective areas; regulations and norms for licensing, transport (rail, road, maritime, river and air), use and control of several toxic substances. Harmonized legislation on chemical substances for the South American Common Market (MERCOSUL) entered into force on January 1st 1998. Brazil participates actively in the Inter-governmental Forum on Chemical Safety (IFCS) and in the discussions related to issues such as Prior Informed Consent (PIC), the control of Persistent Organic Pollutants (POPs), risk reduction of toxic substances, risk evaluation systems and harmonized labeling. Procedures for importing and exporting of wastes have been defined taking into account the Basel Convention on the Transboundary Movement of Hazardous Wastes and their Disposal (CONAMA Resolution No. 23, dated 12 December 1996). The entrance into Brazil of wastes for final disposal and incineration is prohibited by the same Resolution.

**Programmes and Projects:** No information available.

**Status:** No information available.

**Capacity-Building, Education, Training and Awareness-Raising:** No information available.

**Information:** The Ministry of Environment has been developing studies to define environmental quality indicators under the MONITORE Programme. Current Programme activities are concentrating on a survey of the installed capacity in the country for a later proposal of studies on the most appropriate quality indicators for the various ecosystems. In this context, these quality indicators should include toxic substances.

**Research and Technologies:** No information available.

**Financing:** No information available.

**Cooperation:** Within MERCOSUL there is ongoing discussion on harmonizing legislation on chemicals, especially agrochemicals. According to a MERCOSUL resolution, as of this year, harmonized procedures for trade in agrochemicals should come into effect. Brazil participates in various intergovernmental fora and in the activities of several international protocols that aim at the discussion and definition of sustainable environmental policies related to toxic substances. Among them is the Intergovernmental Forum on Chemical Safety (IFCS), where Brazil takes part in discussions on Prior Informed Consent (PIC) and the Persistent Organic Pollutants (POP), defines programmes to reduce the risks of toxic substances as well as systems to assess risks and harmonize labeling. Currently, Brazil has an Interministerial Group to discuss IFCS issues.

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## CHAPTERS 20 TO 22: ENVIRONMENTALLY SOUND MANAGEMENT OF HAZARDOUS, SOLID AND RADIOACTIVE WASTES

### Decision-Making:

*Hazardous wastes:* All three levels of Government share the responsibility for enforcing general and specific legislation and regulations concerning the management and disposal of hazardous wastes. There is no specific policy concerning the issue, and whatever licensing and control exists in practice emanates from federal and state environmental bodies and agencies. The management of hazardous wastes has not as yet been regulated by a national policy that would encompass its many aspects as well as ensure coordinated action on the part of the three levels of Government. Nonetheless, the Ministry of Environment, Water Resources and the Amazon, through the National Council of Environment (CONAMA) has enacted, since 1988, a number of decisions on classification, licensing, handling, processing, storage, exports and imports of hazardous wastes, in accordance with Brazilian standards and with mechanisms contemplated in the Basel Convention. Otherwise, Presidential Decrees, interministerial bodies and directives from other Ministries and States have addressed issues on hazardous wastes such as transportation and recycling. Recent action on the subject has included a Task Force organized by CONAMA to propose a draft National Policy on Wastes, efforts by the environmental agencies of the States of Rio de Janeiro and São Paulo, among others, to prepare their Master Plans and Waste Management Plans, in accordance with CONAMA Resolution no. 05/93, and the two projects on international cooperation described below on waste management and technology data banks and on information networks and systems. Participation of Major Groups is envisaged in the proposed draft National Policy on Wastes.

*Solid wastes:* At this stage, decisions on solid wastes lie mostly at the municipal level, pending the enactment of a national policy to be proposed by the Secretariat of Urban Policy. The Secretariat for Urban Policy of the Ministry of Planning and Budget is responsible for federal directives on waste collection, treatment and disposal issues, with the assistance of other Ministries, such as Health, Transport, and Environment, Water Resources and the Amazon. Coordinated efforts among the three levels of government on solid wastes disposal began in 1966 with 10 solid waste management pilot projects and incentives for 5 waste-minimization projects, under the experimental PROGEST program. Priority is attributed to municipalities that require and are willing to implement integrated solid waste management systems, where inadequate disposal induces high-risk public health problems, pollutes freshwater sources, or depends on uncontrolled fills, and those where the production of hazardous wastes is significant.

*Radioactive wastes:* No information available.

### Programmes and Projects:

*Hazardous wastes:* No information available.

*Solid wastes:* In 1991, 49% of urban and 2% of rural households were served by sewerage systems and another 19% and 8%, respectively, had septic tanks. No more than 10% of the total sewage collected, however, went through treatment plants, mostly at primary level, and predominantly in the Southeast. If septic tanks are added to these totals, the average national percentage rises to 29%, with higher marks for the South and the North. Special efforts have been directed in the recent past to waste collection and sewerage services for the urban poor in densely population areas. Some experiments have been carried out for exchanging individually collected garbage for bus tickets or food supplies in low-income districts where services cannot be offered. Programs to organize groups of rag pickers into cooperatives and as micro entrepreneurs have also been moderately successful in a number of large cities. Innovative experiments on community sewage disposal units and lower cost treatment plants such as aerated ponds are being implemented with some success.

*Radioactive wastes:* All activities related to the management of radioactive wastes are licensed and controlled by a specialized department of the National Nuclear Energy Commission (CNEN), an agency supervised by the President's Secretariat for Strategic Affairs. International trade in radioactive wastes must be authorized by CNEN after prior consultation with the Brazilian Institute of Environment and Renewable Resources (IBAMA). The latter will notify the competent authorities in the country of destination of all exports of radioactive material originating in Brazil. Most contacts are carried out with the scientific community, especially within the framework of the National Radiological Event Monitoring System. Relevant legislation and regulations issued since 1992 include the

National Council of Environment (CONAMA) Resolution 24/1994, on international trade of radioactive wastes, Decree 96.044 concerning transportation of dangerous products, and preliminary criteria for the disposal of medium- and low-level radioactive wastes.

**Status:**

*Hazardous wastes:* No information available.

*Solid wastes:* Regular waste collection services in 1991 were provided to 80.0% of the urban and 5.6% of the rural population, for a total of 241,000 tons a day. These figures rose to 86.7% and 10.4% respectively in 1995. In 1991, 76.7% of the total waste collected was dumped in open pits, while 21.9% was disposed of in controlled or sanitary fills and 2.1% processed in composting plants, recycled or incinerated. Disposal in watercourses is not relevant and restricted to the Northern region, and the highest incidence of uncontrolled dumping occurs in the Northeast.

*Radioactive wastes:* Radioactive wastes and byproducts generated in the past 40 years in Brazil are stored in nuclear installations and other sites either owned or controlled by the National Nuclear Energy Commission (CNEN) located in four different states. They have originated from the operation of the Nuclear Power Plant in Angra dos Reis, the radiological accident in Goiania in the early 90s, from the processing of monazitic sands and from the use of radioisotopes in medicine, industry and research, and they represent a volume of approximately 5,440 m<sup>3</sup>.

**Capacity-Building, Education, Training and Awareness-Raising:**

*Hazardous wastes:* No information available.

*Solid wastes:* No information available.

*Radioactive wastes:* During the year 1996, 160 sanitary inspectors, as well as airline, airport and internal revenue personnel posted at port, airport and border facilities were trained in control procedures regarding radioactive materials.

**Information:** No information available.

**Research and Technologies:** No information available.

**Financing:** No information available.

**Cooperation:**

*Hazardous wastes:* Two relevant international/regional cooperation projects were initiated since 1992: one on Waste Management and Technologies, co-sponsored by the United Nations Development Programme (UNDP), the federal Ministries of Planning and the Environment as well as the Secretariats for Environment and Science and Technology, and their respective agencies; and the other on the establishment of an Environmentally Sound Waste Management Information Network, co-sponsored by the German Technical Cooperation Agency (GTZ), and the Pan American Health Organization (PAHO), representing the World Health Organization (WHO). The Brazilian Network (REBRAMAR) will be part of a larger Pan American Network project (REPAMAR), to which six Latin American countries have committed themselves to date.

*Solid wastes:* No information available.

*Radioactive wastes:* A programme was approved in November 1996 by the International Atomic Energy Agency (IAEA), involving CNEN and all its research institutes for capacity building in the areas of waste treatment, public acceptance and repository safety evaluation. Brazil participates in training programs in the areas of transportation of radioactive materials (with ARCAL) and implementation of a National Radiological Event Monitoring System (SINAER) for Latin America.

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## CHAPTERS 24 TO 32: STRENGTHENING THE ROLE OF MAJOR GROUPS

**Women:** Decision-making: The existing institutional structure includes a National Council of Women's Rights, 11 State Councils and 38 Municipal Councils, as well as 115 NGOs, and over 3000 independent associations. An agreement was signed in 1996 between the Ministry of Justice, through the National Council on Women's Rights (CNDM) and the Ministry of Education to review curricula, school textbooks and teachers training with a view to promoting dissemination of gender-relevant knowledge. One hundred fifty-six bills related to women's rights were introduced in Congress, dealing principally with working conditions, violence, health and civil rights. Political parties must include at least 20% of women candidates at proportional elections. Status: Some statistics regarding the status of women in Brazil include: In 1995, women represented 50.9% of the total population of 152.4 million. Of the total economically active population of 74.1 million, in 1996, 40.4% were women, 92.7% of whom were actually employed. This figure rose 6.9% from 1993 to 1995, twice as much as the equivalent rate for men. The average wage for women, however, did not exceed 54.5% of that for men, in 1996; Women accounted for about 20% of all heads of households. The population living below the poverty line was estimated at about 42 million in 1994, and may have been reduced to approximately 30 million at the end of 1996, due to the implementation of the "Plano Real" and to the lowered annual inflation rate at the end of 1996. Women headed some 23% of those families; 22.8% of all women over the age of 5 were illiterate in 1994, but the percentage of those who had completed 11 years of schooling rose from 14.7% in 1992 to 16.4% in 1996. The maternal prenatal mortality rate varied from 3.0 per 1000 live births in the North to 1.1 per 1000 in the South. The fertility rate went down from 2.60 in 1993 to 2.52 in 1996, while the estimated annual population rate of growth was 1.4% in 1995, down from 1.6% in 1991. Life expectancy at birth for women in 1993 was 69; the percentage of women in government (Ministers and State Governors) in 1992 was 4% and in 1996, 2%. The percentage of women in parliament (Federal House and Senate) was 5% in 1992 and 7% in 1996. The percentage of women in government at the local level (Mayors) was 2% in 1992. Cooperation: The Convention on the Elimination of all Forms of Discrimination Against Women was signed on 31 March 1981 and ratified on 1 February 1984, with reservations. Congress canceled these reservations on 22 June 1994.

**Children and youth:** Decision-making: Possible participants at relevant fora are the National Student's Union (UNE), and the Brazilian Secondary School Students' Union (UBES), which respectively bring together all university and high school student organizations at state and local levels. Status: Relevant youth fora promoting dialogue between youth and government at all levels and mechanisms that permit youth access to information and opportunity to present their views on implementing Agenda 21 have not been established. Youth unemployment has been reduced from an estimated 27% in 1992 to 17% in 1996 (these data do not include those not previously employed). There is no target date for ensuring that more than 50% of youth, gender balanced, have access to appropriate secondary education or vocational training. In 1995, 28% of the population aged 20 and over had a secondary education. The target for 1999 of the National Professional Education Plan is to train or educate 20% of the Economically Active Population estimated at 15 million, including youth and adolescent. Infant mortality rates went down from 43% in 1992 to 40% in 1994, most significantly from 87% to 63% in the Northeast. Some 3% of children under 5 years of age were undernourished in 1995. Illiteracy in children between 10 and 14 went down from 14.4% in 1990 to 10% in 1995.

**Indigenous people:** Decision-making: A process is in place to empower indigenous people and their communities, through policies and legal instruments, and indigenous people actively participate in national policies on an ad-hoc basis. Indigenous people are partially involved in resource management strategies at the national and local level depending on their location and relative degree of awareness. Examples of Indian representation are the Council of the Program for the Protection of Indian Lands in the Amazon and the Committee on Demonstration Projects A, both part of the Pilot Program for the Protection of Tropical Forests. There are 109 registered Indian associations, with broad geographic, ethnic and gender representation. Status: The Indian population in Brazil was estimated, in 1995, at 325,652 individuals, 54% of who are in the Amazon Region. They are settled in 554 Indian reserves and areas, located in federal land, which amounted to 946,452 km<sup>2</sup>, or 11.1% of the country's territory. Of the 279

reserves yet to be demarcated, 136 are undergoing or have completed their regular process of identification. Indians have the exclusive rights to hold and exploit the natural resources in those reserves. There are in all 215 different ethnic groups, which speak 170 different languages, in every possible cultural situation and stage of development, and 70,000 Indian children who attend 785 bilingual schools.

**Non-governmental organizations:** Decision-making: They are represented in the national, state and local environment councils and are carrying out consultancies at several public institutions. Since 1997 they have been allowed to participate in the formulation, establishment and evaluation of official mechanisms to review Agenda 21 implementation. They are represented on the Commission for Sustainable Development Policies and National Agenda 21. Federal Constitution establishes the citizen's right to form an association, without formal authorization and free of governmental interference, as well as the right to information, of personal, collective or general interest, provided by government bodies and agencies in accordance with legislation regarding time frames and responsibilities. Specific legislation with respect to rights, incentives and duties of NGOs may be required to promote their participation in the decision-making process. NGOs have participated in various human rights and environmental councils, the discussions involving the structures and procedures of the Commission for Sustainable Development, and the organization of the Rio+5 event.

**Local authorities:** Decision-making: There are at least 10 local Agendas 21 being drafted, involving 18% of the population, all of which involve representation of women and youth. The Government, through the Federal Ministry of Environment, and some State Governments, supports Local Agenda 21 initiatives. A considerable number of municipalities across Brazil have joined the National Municipal Association for the Environment (ANAMA), and have had a seat in the National Council of the Environment since 1996. The Ministry of Environment has entered into an agreement with ANAMA to help implement local Agenda 21s in a few dozen municipalities, and is currently developing a database of good examples of sustainable local management with the Free University of the Environment in Curitiba. The Community Solidarity Program has also retained the Brazilian Municipal Institute (IBAM) to undertake a study on innovative solutions to the problem of providing urban services to the poor.

**Workers and trade unions:** Status: Workers (as organized labor) do not yet participate in National Agenda 21 discussions or implementation. Bipartite and tripartite mechanisms for health and safety are in place, but collective agreements on environment are not significant. The problematic occupational health situation, with 424,000 accidents among urban workers, of which approximately 4,000 were fatal, prompted the Government to launch a National Campaign to Combat Accidents at Work, to be subsequently upgraded to a National Program. Cooperation: Brazil has ratified ILO Conventions 155 and others (on health and safety). Pending Congressional approval are the ILO Conventions on child labor (138) and Indian population (169).

**Business and industry:** Decision-making: Government policies encourage increasing the efficiency of resource use, including reuse, recycling, and reduction of waste per unit of economic output but does not require recycling. To encourage the concept of stewardship in management and use of natural resources by entrepreneurs actions have been taken such as: The Green Protocol subscribed by federal financial institutions; Trade and Industry Federations, as well as sectoral organizations; Educational campaign aimed at small- and medium-sized enterprises sponsored by the Brazilian SME Support Service and others; Training and research promoted by the National Industry Services; The Chemical Industry's Responsible Care Program; The tripartite GANA organization (Government-Industry-NGO) participates in the discussion, formulation and implementation of ISO 14000 standards. Cooperation: Forty-eight companies and professional associations have subscribed to the International Chamber of Commerce's Business Charter for Sustainable Development and three large corporations are members of the World Business Council for Sustainable Development.

**Scientific and technological community:** Decision-making: The scientific community addresses the general public and deals with sustainable development matters in two ways: individually, through the professional contribution of hundreds of specialists to the Science and Technology Development agencies, and collectively by means of regular activities carried out by private technical and scientific societies, such as regular meetings and

publications, especially in the fields of physics, mathematics, engineering, biology and chemistry. In addition to the activities related elsewhere, post-graduate associations contribute effectively to the drafting of educational, science and technology policies, and a relevant role is played in those areas by the Brazilian Academy of Sciences and the Brazilian Society for the Progress of Science (SBPC), with a membership of over 5,000 scientists, technicians, and university students.

**Farmers: Decision-making:** The Brazilian Agricultural Research Corporation (EMBRAPA) and the State Rural Extension organizations (EMATER`s) have the responsibility for assisting farmers in their work and promoting and encouraging sustainable farming practices and technologies. The Green Protocol provides credit and specific incentives to that effect. The National Forum on Agriculture provides geographical and sectoral representation to enhance participation of organizations of farmers in design and implementation of sustainable development policies.

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## CHAPTER 33: FINANCIAL RESOURCES AND MECHANISMS

**Decision-Making:** The Presidency of the Republic launched the Green Protocol, through which public banks have been committing themselves not to finance environmentally aggressive undertakings and to provide support to sustainable productive systems, adapting, for this purpose, their procedures for analysis and concession of credit. Recently, measures were drawn up for forest regions to avoid that standing forests be taxed as unproductive for purposes of Rural Land Tax, thus avoiding a stimulus to the non use of goods and services that a native forest can provide. Considering that foreign investments receive the same treatment as domestic investments, the Green Protocol may contribute to guide foreign investments in the direction of sustainability. In Brazil initiatives, both state and private, are being implemented, so that foreign investments made in the country are for undertakings certified by the ISO 14000. A negotiation is also under way to internalize resources of European ethic funds, with the commitment for their exclusive use in environmentally sustainable projects. The most striking recent measure was the approval of the Environmental Crimes Law, in February 1988. This law provides environmental enforcement agencies with new instruments, to strengthen environmental impact preventive and mitigating measures and the use of natural resources in the various productive sectors. Official financing institutions are playing an important role in the observance of environmental policy, since as resource providers they also act in a preventive manner, from the initial analysis of a project to its effective implementation. Aside from the Green Protocol other such mechanisms in Brazil are: Brazilian Social and Economic Development Bank (BNDES) which has support lines for environmental projects in the Program to Conserve the Environmental and the Program to Support Quality and Productivity; Banco do Brasil the environmental variable permeates all roles that the institution undertakes as a commercial, sectoral or development bank. Environmental licensing is required in industrial financing. Internal norms are even more rigorous when commercialization of fish, wood, rubber and other extractive products is involved; Caixa Economica Federal a commercial bank, fostering popular housing, urban development and basic sanitation. It requires, like the other official banks, environmental licensing by the competent authorities. The environmental variable is particularly highlighted in basic sanitation operations with resources from the Severance Pay Fund (FGTS) and external loans from the World Bank and the Inter American Development Bank (IDB); National Environment Fund--FNMA as a financial instrument, it promotes decentralization and favors the participation of civil society in the solution of the country's environmental problems, promoting innovative initiatives of governmental and non-governmental entities aiming at the wise and sustainable use of natural resources. The Fund is made up of budget allocations from the Federal Government, grants, cash contributions, real estate and other assets, returns of any kind of investment, and other forms defined by law. It also has the support of the IDB and is administered by the MMA.

**Programmes and Projects:** No information available.

**Status:** In the seventies and eighties subsidies were created to correct interregional development inequalities which, in the Amazon region, implied deforestation to create agro-pastoral systems. Around ten years ago, these subsidies were eliminated.

**Capacity-Building, Education, Training and Awareness-Raising:** No information available.

**Information:** No information available.

**Research and Technologies:** No information available.

**Cooperation:** International technical cooperation is responsible for about \$706.5 million, distributed among 151 bilateral projects, which are under execution, negotiation or have been concluded in the last five years. See also under **Decision-Making**.

## CHAPTER 35: SCIENCE FOR SUSTAINABLE DEVELOPMENT

**Decision-Making:** A significant step taken since 1992 was the establishment of the National Council on Science and Technology (CCT), chaired by the President of the Republic and having distinguished scientists and leading businessmen as members, thereby bringing together research and market concerns. The new Council heads an institutional structure formed by research, educational as well as development agencies and organizations at federal, local and private levels, which include the National Research Council (CNPq), the Studies and Project Financing Agency (FINEP), the State Research and Development Foundations, the University-level Capacity Building Commission (CAPES), over one hundred universities and several dozen public and private research establishments. With regard to incorporating science into decision-making, the following may be highlighted: the actions of INPE - National Space Research Agency and INPA - National Institute for Amazon Research, with respect to deforestation, burning control, weather and climate, management of water resources and wise use of biodiversity. Agricultural activities have greatly benefited from the results of the Meteorology and Water Resources Management Programme, in particular with the research developed by EMBRAPA - Brazilian Agricultural Research Corporation. CETEM - Mineral Technology Center also contributes to the decision making process with respect to mineral exploitation. The Multiannual Plan - PPA, which guides the actions of the Federal Government, has been formulated with the participation of the MCT, whose positions incorporate contributions from science and technology, including in the implementation of the various activities developed under the "Brazil in Action" Project. The activities of directed research - of the PPG-7, as well as of the PTU - Humid Tropics Programme, are also developed to contribute with the sustainable development process of the Amazon. The IBAMA Research Directorate develops studies to identify environmentally sound technologies and disseminate the results of these studies through publications that provide input to decision making in various environmental areas.

**Programmes and Projects:** No information available.

**Status:** No information available.

**Capacity-Building, Education, Training And Awareness-Raising:** The number of undergraduate, master's and doctorate level courses increased from 168, 91 and 77, respectively, in 1992 to 1996 to new figures of 1775, 1159 and 616, in 1996.

**Information:** A greater emphasis on scientific achievement and a marked improvement in the access to information and means of data processing and communication have signaled continuous progress in this area since UNCED. Priorities include biological and computer sciences, automation, and fine chemistry. Relevant needs would point as well to marine and land resources, health and the social sciences.

**Research and Technologies:** No information available.

**Financing:** No information available.

**Cooperation:** No information available.

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## CHAPTER 36: PROMOTING EDUCATION, PUBLIC AWARENESS AND TRAINING

**Decision-Making:** Several Brazilian initiatives in education demonstrate, in practice, the concern and commitment to sustainable development. Some of these are: Legal instruments: Law No. 6938/81 - determines that Environmental Education should be provided by schools at all levels, regulated in practically all the Brazilian States; Article 255, Paragraph VI of the 1988 Federal Constitution; Ministry of Education Directive No. 678/91 - determines that school education should include environmental education, permeating the whole curriculum at all levels and modalities of teaching; Establishment of the National Environmental Programme (PRONEA) in 1994; Ministry of Education Directive No. 482 includes in the List of Professional Qualification, at secondary school level, Environmental Technician and Junior Environmental Technician; Creation of the Environmental Education Technical Chamber within the National Environment Council (CONAMA) in 1995; Inclusion of the dimension "Socialization and Ethics-Environment" in the National Curricula Parameters, throughout all subjects in elementary curricula in 1996; Law No. 9276/96 - Government Multiannual Plan 1996/1999 - defines the "promotion of Environmental Education, through the dissemination and use of knowledge of technologies for the sustainable management of natural resources"; Protocol of Intentions between the Ministry of Environment and the Ministry of Education (1996) for technical and institutional cooperation in the area of environmental education - establishes a formal channel so that both bodies develop joint actions with the responsibility of bringing in the participation of organized society in the development of projects and programs; Ministry of Environment Directive No. 353, dated 30/10/96, that creates the Environmental Education Working Group, under the Ministry of Environment; October 1997 - Taking into account the development of many actions in the business community, and the long time wishes of governmental and non-governmental institutions, the Federal Government brought together representatives of these sectors in a national conference, and drafted the Brasilia Declaration for Environmental Education. The Law of Basic Guidelines for Education (LDB), recently approved by the National Congress, enhances education for citizenship and for development with sustainability. The 1996 School Census proves that the educational performance of Brazil has improved over the last five years, decreasing the proportion of illiterate individuals with respect to the total Brazilian population and increasing the number of students at all educational levels. Some examples of the actions to improve the quality of education in Brazil: access to basic education as a right; progressive extension of compulsory and free education at secondary level; cost-free day-care and pre-schools from 0 to 6 years of age; democratic management in schools; community participation in school councils; progressive autonomy in pedagogic and administrative issues and financial administration; school food program; textbook distribution program; school maintenance program - funds from the Federal Government passed directly to schools; national school transportation program; indigenous school education program; educational grants and programs to improve education level, stimulating worker specialization. Education for all, as set forth in the National Policy on Basic Education, is both a constitutional requirement and an international commitment undertaken by Brazil at Jomtien, Thailand, in 1990. Priorities and targets set for education until the year 2000 include: reducing illiteracy from 18% in 1993 to less than 10%; increasing access to schooling for the 7 to 14 age group from 96% in 1994 to 100%; continuously raising pre-schooling figures for the 4 to 6-year age group, which have reached 48% in 1994, as compared to 29% in 1985. Most of the activities in Environmental Education are developed through partnerships among the various types of institutions: governmental, non-governmental, businesses, teaching and research, and others.

**Programmes and Projects:** The National Environmental Education Programme - PRONEA, signed by the Ministries of Environment, Education, Science and Technology, and Culture, and approved in 1994, outlines the actions for formal and non-formal environmental education. In accordance with these guidelines, the National Environmental Education Program is guided by two main goals: One geared to expanding and systematizing Environmental Education for current and future generations, using the school system as its instrument; Another directed towards sound environmental management, aimed at raising public awareness and producing appropriate information in the various sectors of society. In order to achieve this goal, a primary objective is to reach three sectors of society, which play a pivotal role in the expected success of the Program. These sectors are: Decision makers or those who have capacity to influence the decisions that affect the environment, such as public

administrators, congressmen, members of the Judiciary and the Office of the Public Interest Attorney, professionals, scientists, leaders of industry and social movements and the media in general, including the press, radio, television, cinema, theater, and other forms of expressing art and culture. The national survey of environmental education projects carried out in 1997 by the MMA, identified innovative punctual actions that contribute to raising environmental awareness in communities, families and traditional populations. Some of these are: Projeto Saude e Alegria (Health and Joy Project): an experimental project of integrated community development being undertaken in the Amazon since 1987 in more than 20 extractive communities on the margins of the Amazon, Tapajos and Arapiuns Rivers, in the counties of Santarem and Belterra. It has a population coverage target of 20 thousand inhabitants. Based on local realities, on the greatest needs and also on environmental education, the project includes programs in the areas of health, environment, agroforestry production, education, arts and culture, gender, popular communication and participatory research. The general objective is to achieve models adapted to the global community and sustainable development, managed by the population itself, interacting with public policies and capable of replication based on local dynamics and realities. The project has been funded by UNICEF, Konrad Adenauer Foundation and the Pilot Program to Conserve the Brazilian Rain Forest PPG-7; Moratorium of the Parnaiba River Project: Active in the counties of Guadalupe-PI and S o Jo o dos Patos-MA, at the margins of the Boa Esperança Dam, by the Parnaiba River. The Project is an integral part of the Environmental Education Program of the Boa Esperança Reservoir, carried out in schools, fishing associations and communities, to awaken the awareness of the need to preserve reproducers and matrices of the fish species of the region and avoid the predatory action of fishermen, that jeopardize the renewal of fishing stocks during the piracema (natural phenomenon arising when fish in large numbers go upstream to deposit their eggs, between the months of December and March). The project is undertaken in partnership with S o Francisco Hydroelectric Company - CHESF, IBAMA and State Environment Secretariats of the States of Piaui and Maranhao. It is hoped that this project may be expanded to other riverside communities. Environmental Education Centers Project - Part of the Espirito Santo State Program of Environmental Education, the project was developed to raise awareness and educate the population with respect to the environment, where the original cover of the Atlantic Forest was reduced from 98% to the current 8%. Several governmental and non-governmental organizations are involved in the project, some of them already active in environmental protection. These institutions were chosen as Centers, to encourage the formation of a new social awareness with a view to changing behavior towards nature. Since the program's inception, more than 190,500 people (8% of the state's population) have been trained or have acted in projects to recover ciliary forests and degraded areas; soil management techniques; seedling production; protection of sea turtles; development of fishing techniques; and cultivation of oysters and mussels among other activities. This project has been undertaken in conjunction with the MMA, Sustainable Development Secretariat of the Government of the State of Espirito Santo, Mello Leitao Biology Museum, Piuma Fishery School, Morro da Vargem Zen Buddhist Monastery, Alegre Federal School, Tamar Project/IBAMA.

**Status:** Although education is freely accessible at all levels in Brazil, according to 1990 statistics, the educational level of the overall population could be described as follows: Twenty-two percent were illiterates; Thirty-eight percent had the equivalent education of grade 5; Nineteen percent had completed grade school; Thirteen percent had finished high school; and eight percent had university and post-graduate degrees. Other relevant features indicate that: the Northeastern region has the lowest mean number of years of schooling, representing less than 60% of the national average, and about 37% of all illiterates in Brazil; the poor (families earning less than twice the minimum wage) are under-represented in pre-school and high school age groups (40% as compared to 80% for the others), and in grade school (75% as compared to 98%); of the 200,000 grade schools, about 30% were urban, containing about 82% of the students nation-wide; 14,000 high schools and 134 vocational schools were practically all urban, and 60% of the pupils took night courses; 55% of the students were over 17 years of age, down from 60% in 1985; repetition and evasion rates were comparable to grade school; the proportion of public to total number of schools is 90% at grade school, 75% at high school and 40% at university levels.

**Information:** No information available.

**Research and Technologies:** No information available.

**Financing:** No information available.

**Cooperation:** No information available.

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## **CHAPTER 37: NATIONAL MECHANISMS AND INTERNATIONAL COOPERATION FOR CAPACITY-BUILDING IN DEVELOPING COUNTRIES**

This issue has been covered either under Chapter 2 or under the heading **Cooperation** in the various chapters of this Profile.

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## **CHAPTER 38: INTERNATIONAL INSTITUTIONAL ARRANGEMENTS**

This issue deals mainly with activities undertaken by the UN System.

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## CHAPTER 39: INTERNATIONAL LEGAL INSTRUMENTS AND MECHANISMS

This issue has been covered under **Cooperation** in the various chapters of this Profile. However, you will find below a list of the main International Legal Instruments. Among agreements, conventions, and developments relevant to sustainable development not covered elsewhere are: The most significant international arrangements from the point of view of trading practices and regulations, with visible social and economic implications for Brazil, have taken place within the framework of MERCOSUL (South American Common Market), involving Argentina, Paraguay and Uruguay, and more recently Chile and Bolivia, and also in Brazil's relations with the world community, as a result of GATT's Uruguay Round. These developments have inevitably influenced the domestic situation at the regional, local and individual levels, and touched upon the issue of sustainability with regard to government institutions and the private sector; A common bilateral environmental agenda has been agreed upon in 1995/96 between Brazil and the United States, Germany, India, China and Canada, and a memorandum of understanding signed with Argentina.

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## **CHAPTER 40: INFORMATION FOR DECISION-MAKING**

**Decision-Making:** No information available.

**Programmes and Projects:** No information available.

**Status:** For databank on successful programmes in implementing Agenda 21, go to: [www.mma.gov.br](http://www.mma.gov.br) .

**Capacity-Building, Education, Training and Awareness-Raising:** No information available.

**Research and Technologies:** No information available.

**Financing:** No information available.

**Cooperation:** No information available.

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## CHAPTER: INDUSTRY

**Decision-Making:** The main legal instruments related to the industrial sector are: Law No. 6,938/81, National Environment Policy; CONAMA Resolution No. 001, dated 18/6/86, establishes basic criteria, definitions and general guidelines for the adoption and development of environmental impact assessments; CONAMA Resolution No. 20, dated 18/6/86, reformulates the classification system for waters (inland, estuarine, coastal) and the primary and secondary standards for liquid effluents; CONAMA Resolution No. 001, dated 6/3/86, establishes the mechanisms to control atmospheric pollution generated by automotive vehicles; CONAMA Resolution No. 003, dated 28/12/90, No. 5/89 and 08/90 reformulates the environmental air quality standards, introducing the concept of primary and secondary standards for air quality - National Programme to Control Air Quality - PRONAR. With regard to a national policy for ecologically sustainable industrial development, the Green Protocol was launched in 1996 by the Presidency of the Republic. Under this protocol which was signed by the federal public institutions related to the economic and environmental, one of the guidelines is the creation of special lines of credit and financing for undertakings with well known concern for environmental protection and preservation. Public banks have committed themselves not to finance environmentally aggressive undertakings and to provide support to sustainable production systems. To this end, the banks have adapted their procedures for analysis and concession of credit. In addition, the renewed investment in infrastructure, that now is being considered strategically, is a necessary condition for sustained economic development in Brazil. This strategy promotes economic and social development, as it increases the return on private investments, and above all, promotes employment. From the point of view of the private sector, the National Confederation of Industries (CNI) guides its activities and positions on issues related to the environment according to its "Industry Principles for Sustainable Development". Thus, it develops programs/projects with the purpose of strengthening the competitiveness of the Brazilian industry, bearing in mind the wise use of natural resources. These programs/projects have come together in a group of integrated activities of the CNI system of entities (CNI/SESI/SENAI/IEL), both in the field of business representation and in providing services to the Brazilian industry. As to providing services, the initiatives aim at stimulating and supporting the efforts of the domestic industry to improve competitiveness through better environmental management, development of clean technologies and capacity building.

**Programmes and Projects:** CNI has in its Work Plan, several projects to support its strategy such as the CNI Ecology Prize. Instituted in 1997, the awarding of this prize aims to encourage and recognize industries that adopt actions that result in improved environmental quality, and promote awareness of the need to integrate the various aspects related to the environment and industrial management processes. Another such project is Capacity Building of Human Resources in Environment in which it is expected that 200 companies will participate in 1998. Begun in 1994, the Program has already trained more than 650 technical personnel in all the CNI System Units, Industry Federations, Business Associations and industries. Given its multiplier effect, it is estimated that the Programme has trained some 1500 technicians at all levels, in environmental issues.

**Status:** In view of the growing expansion of the services sector and given that the share of the industrial sector in the Brazilian GDP was 31.4% in 1995, while that of the farming sector was 11.3%, it may well be said that the country is following the standard trend of the industrialized economies. Brazilian industry is widely diversified and increasingly decentralized, geographically speaking. It is estimated that the national market is more than US\$ 3.5 million. On the other hand, business success depends largely on both the sustainability of the environment, and social and economic sustainability, so that companies can become globally competitive. Over the last few years, the environmental initiatives and practices in the business world have launched a series of reforms and initiatives aiming at sustainability, since it is impossible to dispute the brutal environmental degradation caused in the world today by developing countries and, in particular, developed countries. In Brazil potentially polluting activities are to be found in the chemical, petrochemical, mining, paper and cellulose sectors, among others. According to technical research carried out by the Ministry of Labor, threats to human health associated with industrial activities, (specially without environmental control), are: Coal mining: respiratory diseases and damage to the environment; Exposure to dust/particulate containing silica or asbestos as in the gold mining and cement industries: prevalence of

pneumoconiosis and cancer; Exposure to chemicals through leakage of toxic gases (e.g. chlorine and ammonia); Exposure to lead (manufacture of batteries, ceramics and foundries); Exposure to mercury (chlorine/soda sector; gold prospecting); Exposure to chromium (leather industry, galvanoplasty); Exposure to organic solvents (chemical industry, shoes, paints and enamels, furniture); Exposure to benzene (steel, petrochemical and oil industries, anhydrous alcohol production); Damage to health related to these solvents would be: pulmonary, skin, neuropsychological, hematological diseases, and several types of cancer; Chemical and petrochemical industry: hydrocarbons; Steel industries: particulate material, sulphur and nitrogen compounds; Textile industry: organic matter, heavy metals; and Tanneries, slaughterhouses and refrigeration plants: organic matter, heavy metals. It is also important to highlight the activities of small and medium sized industries that, taken together, contribute on a large scale to the total emission of pollutants in Brazil. Examples are the metal-mechanical, leather and shoes, agroindustrial sectors.

**Capacity-Building, Education, Training and Awareness-Raising:** In 1997, six national seminars were held in different Brazilian states, in order to raise awareness of society, particularly Brazilian business, of the importance of environmental protection. The topics for the seminars were: Fuel Quality and Pollutant Emissions; Biodiversity; Recycling of Solid Wastes; Amazon and Planted Forests. A total of 710 people participated in the events. See also under **Programmes and Projects**.

**Information:** CNI also continuously disseminates information on the environment. The main products related to information dissemination are: Fax ISO 14000 - Environmental Management: information sheet, published every two weeks since February 1995, with the objective of disseminating information on the state of the work of drafting the ISO 14000 Series standards; CNI Information Sheet - Environment: to be published every two months, it aims at a wide range of information to assist in the integration of industrial development with environmental protection, thus contributing to improving competitiveness in the Brazilian industrial sector, in accordance with the principle of sustainable development in the age of globalization; Handbook for Implementation of ISO 14001: published on March 19, 1997, the handbook is intended to aid companies in the implementation of an environmental management system according to the requirements established in ISO 14001; Product Life Cycle Analysis - ISO 14000 Instrument : published on November 20, 1997, it fills a gap existing in the market, since there was little technical literature in Portuguese on this recent, rich and complex management instrument; and the ISO 14001 for Small Businesses: aims to aid small scale companies in implementing ISO 14001; and International and National Financial Instruments for the Environment: workshop, and publication, to be held in 1998.

**Research and Technologies:** National Technology Centers The CNI System has the following Technology Centers: CETSAM - National Environmental Technology Center in Curitiba, PR; CETIND - Industrial Technology Center; CNTL - National Clean Technology Center and SESI-LAB to provide services and guidance to industrial businesses with respect to the environment. In Brazil, the movement in the direction of green industries was consolidated with the creation of the Brazilian Business Council for Sustainable Development - CEBDS, which is part of the Latin American Council of the Business Council for Sustainable Development - BCDS. The CEBDS published a "Report on Business Sustainability" at the end of 1997, where it presents the results of 27 associated companies, with economic, social and above all environmental sustainability and ecoefficiency indicators. The Government, in cooperation with business entities (specially CNI and SEBRAE), has promoted actions to encourage certification of companies according to NBR-ISO 14000 environmental standards. Twenty industrial units have already had their environmental management systems certified, and five bodies were authorized to issue certification in this area. The certifying companies currently authorized are: Fundacao Carlos Alberto Vanzolini - FCAV; the American Bureau of Shipping Quality Evaluation - ABS-QE; the Bureau Veritas Quality International - BVQI; the Den Norske Veritas - DNV; and the DQS. Small companies are being encouraged to adopt measures to control and improve production processes, taking into account the environmental variable, through the Brazilian Service to Support Small Business - SEBRAE. The companies are thus seeking to set guidelines, based on reform elements, including various environmental norms, among them: environmental issues should be considered by decision makers within the company, at a political and strategic level; the objectives and targets should be long term; commitment to prevention and treatment of contamination, which includes the use of environmentally sound

technologies, classified into three categories. The first are called end-of-pipe control, used to reduce emissions or effluents; the second category includes process or product technology called preventive clean technologies or clean production; the third is the environmental management of the company, which includes the life cycle of the product, taking into account the impact on the environment derived from all the stages, from its market conception, its production, transport and consumption, until it is transformed into waste.

**Financing:** No information available.

**Cooperation:** No information available.

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## CHAPTER: SUSTAINABLE TOURISM

**Decision-Making:** In Brazil, the Ministry of Industry, Commerce and Tourism - MICT - and the Brazilian Tourism Institute - EMBRATUR - are responsible for decision-making on sustainable tourism at the national level. At the local level, the Municipal Tourism Departments or Secretariats are responsible. The regulation of Ecotourism is being discussed in the National Environment Council - CONAMA. The Brazilian System for Rating Lodgings seeks to implement quality standards in lodgings. Although joining the system is voluntary, it has been guiding the implementation and operation of lodgings throughout the country. The Brazilian System for Rating Lodgings was recently reformulated, although not yet fully implemented, and tourists are increasingly using the Consumer Protection Code as a means to solve problems in tourism, particularly misleading advertising. The National Tourism Policy comprises several actions, in particular the National Programme to Municipalize Tourism, whose area of action includes 1320 small and medium-sized municipalities. The National Integrated Legal Amazon Policy, through the Programme to Develop Ecotourism in the Legal Amazon - PROECOTUR - covers the nine states of the region. Issues covered by these Policies include the following: Capacity building in tourism planning, with emphasis on sustainable tourism, geared towards municipal agents, businesses and communities; Awareness raising and education for tourism; Use of sustainability criteria for establishing and operating tourism and related equipment; Capacity building program in ecotourism; and Environmental Education Actions. Among several government actions, the Guidelines for a National Ecotourism Policy can be highlighted; these were drafted in 1995 with an ample participation by the public and private sectors and organized society. The guiding principles of governmental and private actions are: make ecotourism activities compatible with conservation of natural areas; strengthen international cooperation; enable the effective participation of all those active in the sector; promote and stimulate capacity building of human resources; promote, encourage and stimulate the creation and improvement of infra-structure for ecotourism activities; and promote the use of ecotourism as a means of environmental education. The National Programme to Municipalize Tourism - PNMT, presumes a broad participation in the decisions on local tourism development. To do so, Municipal Tourism Councils were created with representatives from government, private sector and organized civil society. In the case of Ecotourism in the Amazon, the GTC-Amazonia is a body in which representatives of civil society; trade associations and all levels of government participate. For the indigenous populations, there is the Pilot Program for Ecotourism in Indigenous Lands, a project of the GTC-Amazonia. To define norms, procedures and principles for developing Ecotourism in these lands, a workshop was held in Goiás, in 1997, with representatives from the indigenous population, non-governmental organizations, from the official indigenous assistance body, FUNAI, and from the Ministry of Environment. Based on these principles, nine strategies for actions were developed: Regulation of ecotourism, Interinstitutional strengthening and interaction, Training and capacity building of human resources, Quality control of the ecotourism product, Information management, Incentive to ecotourism development, Implementation and adaptation of infra-structure, Tourist awareness raising and information, and Community participation. With respect to monitoring, there are, in addition to an annual survey on international and national tourism receptiveness, which supplies indicators on the degree of dissatisfaction of the tourist with several aspects of Brazilian tourism, no systematic procedures to monitor the development of sustainable tourism at a national level. The Brazilian System for Rating Lodgings established by the Brazilian Government through EMBRATUR determines environmental criteria that must be observed when operating rated lodgings, penalizing those that do not comply with the established procedures at any time. In the case of Ecotourism, controls and regulations are being discussed within the National Environment Council - CONAMA, the highest regulatory body for environmental issues in the country.

**Programmes and Projects:** Major programmes in effect to promote sustainable tourism include: National Programme to Municipalize Tourism – PNMT, Clean City Programme, Tourism Awareness Raising and Education Program, National Amateur Fishing Programme, Rural Tourism Programme, and Programme to Develop Ecotourism in the Legal Amazon – PROECOTUR. Based on these guidelines, a Technical Group to Coordinate Ecotourism in Amazonia was instituted in the Ministry of Environment. This Group coordinates the activities of developing, assessing and monitoring the Regional Ecotourism Policy and Programme, its sub-programmes and associated projects. It has representatives from the Ministry of Environment, through its Amazonian Affairs

Secretariat and the Brazilian Institute for Environment and Natural Renewable Resources - IBAMA; and from the Ministry of Industry, Commerce and Tourism, through the Brazilian Tourism Institute. Other entities also collaborate with the technical group, such as: national and regional bodies, related state bodies, tourism operators, trade associations, non-governmental organizations, industry and trade. The Ministry of Environment, in partnership with the Inter-American Development Bank, is drafting the Programme to Develop Ecotourism in Amazonia - PROECOTUR. The programme consists of two stages: a pre-investment stage at a cost of US\$10.025 million and with a 15-month implementation period, and the investment stage, estimated at US\$200 million, with a 3-year implementation period. Studies and surveys are being developed under the coordination of EMBRATUR on the conditions for implementation or development of ecotourism centers in other regions of the country.

**Status:** Since sustainable tourism is a recent concept, it has not yet been fully absorbed by most actors in the sector. Measures to revert these practices are being adopted, in order to observe principles of sustainability, environmental balance, social justice and cultural respect and recovery. These premises are intrinsic to the Brazilian concept of ecotourism, and thus essential to ensure and consolidate this tourism segment. Specific areas have been delimited for ecotourism, and priority areas were defined in Amazonia for its development, called Ecotourism Centers, in the nine states of the Region. It is one of PROECOTUR's strategies. For the other areas of the country, surveys and studies are being carried out to identify other Ecotourism Centers. RINTUR - Tourism Information Guide - is also identifying the municipalities where ecotourism should be developed. The Guide divides these municipalities into 2 groups: those where tourism is already consolidated and those with tourist potential. These include: Centers for Development of Ecotourism in the South and Mid-West Regions (being edited); Ecotourism in the Ribeira Valley (being edited); Indigenous Manual for Ecotourism; Ecotourism leaflet (annexed); and Various leaflets. Among major constraints are the following: the non-existence of indicators to assess impacts; the low awareness of public and private sectors, as well as local communities, of the concept and its applicability; insufficient resources to fund specific projects and lack of technical consistency so that they can be monitored; and non-internalization of technologies appropriate to environmentally sustainable practices for the various tourism activities.

**Capacity-Building, Education, Training and Awareness-Raising:** The Ministry of Labor, with funds from FAT (Worker Assistance Fund), runs the National Professional Tourism Education Programme. FAT resources have been used over the last three years by State Labor Secretariats to train around 300 thousand professionals in various tourism related activities. The National Programme to Municipalize Tourism has as its main target, besides the public and private sectors, the local communities. Its main partners are SEBRAE (Brazilian Service to Support Small Business), SENAC (National Commercial Training Service), and the banks Caixa Economica Federal and Banco do Brasil. There is a Programme to Raise Awareness and Education for Tourism, whose target audience is the local community, through elementary school children, with support from SENAC (National Commercial Training Service); Workshops for Raising Awareness on Ecotourism were held for populations of the extractive reserves of Chico Mendes and Auo Jurua in the State of Acre, Cajari in the State of Amapa, Rio Ouro Preto in Rondonia and Santarem and Lago Tucuruí in the State of Pará. In order to inform, disseminate and popularize Ecotourism, the GTC-Amazonia edited the Indigenous Manual for Ecotourism, with technical information, procedures and principles to be observed for its development, and the game "Amazonia Legal", an interactive game with information and questions on environment, health, ecotourism in the Amazon region, aimed at the communities of the region. The Programme Clean City, directed to tourists and local communities, encourages, through campaigns, concern for quality of life with respect to urban cleanliness. This Programme is developed mainly under the PNMT, and is thus supported by all the partners of that programme. As an example, every leisure or tourism boat that casts anchor in Abrolhos from July to November is visited by a technician or an intern of the local IBAMA project, who explains the ongoing work, highlighting the need to protect the humpback whales of the region. Each visitor receives a leaflet with the norms for watching cetaceans in Brazilian waters (IBAMA 1990 Directive No. 2306), as well as information related to the conservation and biology of these creatures. The following literature is also available to promote sustainable tourism: Sustainable Tourism and Development - Manual for Local Planners; technical publication of the World Tourism Organization, adapted by EMBRATUR for the PNMT; Guidelines for a National Ecotourism Policy Indigenous Manual for Ecotourism.

**Information:** Information is made available through the PNMT. Likewise, the Ecotourism Capacity Building Programme promotes dissemination of information on tourism planning and operation. Special mention should also be given to the development of specific studies and research, which aim at providing input for ecotourism planning and operation. Specific studies and research on Ecotourism management and planning are being developed and encouraged. In the Legal Amazon region, the Centers chosen for Ecotourism Development have detailed information on natural resources and characteristics of their ecosystems. Specific mapping is being developed for ecotourism in the other regions of the country. EMBRATUR, through RINTUR, is carrying out another mapping of the tourist potential of Brazilian municipalities, including an initial survey of natural resources. Information on <http://www.embratgr.gov.br> in Brazil is available on the Web, where there are also links to other information sources, although this site is still under construction. The Ministry of Environment is preparing a Web Site with specific information on Ecotourism. Relevant information can also be found at the Brazilian Ecotourism Association Ecobrasil Web Site: <http://www.ecobrasil.org.br>. Under PROECOTUR, a set of indicators is being developed to guide the development of ecotourism in the Amazon Region. RINTUR is another system that provides indicators for the development of sustainable development, and it also seeks to identify and follow-up the evolution of municipalities, which are a priority of tourism development.

**Research and Technologies:** Clean technologies are being adapted to ensure the sustainability of ecotourism products, and as a consequence, of its ecosystem. Discussions within the sector on the development and application of technologies to reduce negative impacts on the environment - with respect to transport, water supply, sewerage, disposal of solid wastes, and energy generation - have grown in the last few years; however, more significant results are expected only in the medium-term. Ecotourism activities are increasingly employing management plans for their operations, even though there is still no regulation or certification processes that make this practice mandatory or that provide incentives. However, hotels involved in ecotourism, if they want to adopt the classification established by EMBRATUR, are obliged to meet strict criteria for environmental, cultural social and economic sustainability parameters.

**Financing:** Financing of the Brazilian tourism sector is carried out by federal budgetary resources, complemented by fiscal incentives, Constitutional Funds and credit lines from development banks, as well as resources from the private sector. There is also foreign funding from financial agents such as the World Bank and IDB. With respect to the credit lines and financing sources for ecotourism. There is the Constitutional Financing Fund for the North, from the Banco da Amazonia, with the aim of contributing to the economic and social development of the Northern Region, by financing programs geared to the development of productive activities in the region. For ecotourism, activities may receive financing: if they are situated in forests or other natural beauty localities; if they are in places without urban characteristics; if they are totally integrated to the local landscape, without any interference to the environment; if they offer their users simple facilities, equipment and services, provided by themselves or third parties, for transport, lodging, food and programs for integration with the environment and its tourist use. The General Tourism Fund, from EMBRATUR, for the tourism municipalities defined by EMBRATUR Its financial agents are the Banco do Brasil and federal and state banks; its object is to increase tourism and provide resources to finance undertakings, works and services for tourism. The FINEP/SEAC - Customer Assistance Service of the Ministry of Science and Technology to finance projects related to science and technology. It provides financing to foster and support studies, research, projects and programs that aim at dissemination and use of knowledge. For tourism, the following products are available: ADTEN - technological development, AUSG - pre-investment, AGQ - quality management, FETEC - technological fairs and events, FINEP Verde - environmental management, and AMPEG - support to small and medium sized companies with a credit assurance fund. The Brazilian Social and Economic Development Bank - BNDES, aims at improving the quality of life of the Brazilian population, through investments that aim at strengthening the competitiveness of the Brazilian economy, generating more and better jobs, and attenuation of regional disparities. It offers several credit lines (BNDES Automatico, FINEM, FINAME, FINAME especial, FINAMIN and FINAME Construcao Naval) applicable to computer technology, hotel equipment, training, civil construction, materials and facilities, buses and mini-buses, acquisition of machines and equipment, acquisition of vessels for passenger transport.

**Cooperation:** Although still under implementation, the Centers for Ecotourism Development in the Legal Amazon will eventually become models for ecotourism, as will other Centers currently being identified in the other regions of the country. This is a result of the application of the actions proposed in the paper "Guidelines for a National Ecotourism Policy", which has been guiding the planning in all these areas. In the case of Amazonia these Centers are priority areas for PROECOTUR investments. Cooperation with public authorities, with the private sector and local communities is basically through technical and financial support required for implementing government programs, especially PROECOTUR, PNMT and the National Amateur Fishing Program. Practically all bilateral cooperation agreements include sustainable development principles. Multilateral actions developed under MERCOSUL, ALADI, COTASUR and the projects to be applied under FTAA, as well as Brazilian participation in specific programs coordinated by the World Tourism Organization should also be added. In the specific case of Ecotourism in the Northern Region, bilateral and multilateral cooperation is dealt with under the Treaty for Amazonian Cooperation, in the Special Environment Commission.

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