Ministry of Science, Technology, and Environment

National Environmental Strategy
2007-2010

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Note on Translation of Acronyms
For this translation of the National Environmental Strategy,
the original Spanish acronyms are used throughout.

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Chapter I. PRINCIPLES AND CONCEPTS

1.1 Introduction

The creation of the Ministry of Science, Technology, and Environment (CITMA) in 1994 provided an important impetus for environmental policy and management on the national scale. Along with this transcendental institutional change came the need to revise national environmental strategies and regulatory frameworks.

In order to meet these new demands, the National Environmental Strategy (EAN) was designed. The development process began in 1995 and lasted until mid-1997, at which point the Government approved the EAN.

The EAN constituted the foundation for the development of the Provincial Environmental Strategy - today in existence throughout the country – as well as the Sectoral Environmental Strategy, which exists today in all the production and service sectors bearing an impact on or a significant relationship to the environment.

Seven years after the EAN's approval and ongoing implementation, it is clear that the strategy has constituted a key tool in national environmental protection efforts, by introducing the environmental dimension to all relevant arenas and deepening the interrelation between the economy, society, and the environment. As the principal document of country's environmental policy, the EAN has produced favorable results which have exceeded expectations in several areas of the EAN projections.

Simultaneously, profound changes have occurred in the socio-economic reality of the country, which, in harmony with the processes that have been in place since the beginning of the 1990s, have had a marked influence on national environmental policy.

Coordination between the sectors dedicated to research, scientific knowledge, technological innovation, environmental protection and sustainable use of natural resources has also strengthened during this period.

As far as the environment and sustainable development are concerned, the international dynamic has been equally intense. To this effect, Cuba has a series of environmental commitments that must be carried out by 2010.

The interrelationship between all these factors creates a panorama characterized, among others, by the following elements:

- Important transformations in key sectors of the Cuban economy, outstanding among them:
    - Necessary restructuring of the sugar industry in order to achieve two fundamental objectives: 1) production of sugar cane and food through freeing up productive land, and 2) diversification of agricultural production as a means to provide sustenance to the population.
    - Profound changes in the National Energy Program, via savings in energy carriers, use of renewable energy, and use of energy efficient equipment and devices among other actions designed to bring about an authentic Energy Revolution.
    - An increase in the production and use of petroleum and gas.
    - Development of mining.
    - Promotion of sustainable agriculture.
    - Expansion of health services, both nationally and internationally.
    - Promotion of aquaculture, mariculture, and shrimp farming, among others, within the context of the economic centralization process.
- Sustained development of tourism, paired with the sector's positive tendency toward a better identification of its inter-relationships with the environment and its promotion of nature tourism in recent years.
- Promotion of information and communications.
- Improvement of environmental monitoring networks, including meteorological, seismic, and atmospheric conditions.
- Increasing participation in society and its organizations - including NGOs – in order to construct and develop environmental protection of the country.

- Restructuring the approach of work in mountainous regions, marked by a decisive focus on the environmental value of these ecosystems, particularly those related to forests and water.

- Process of gradually strengthening the integrated management of the coastal zone, and its links with economic and social development and environmental protection.

- Process of "struggle of ideas," which has had significant impact on new educational, cultural, and social programs and on Cubans' perceptions of the environment, paralleled with advances achieved in environmental education.

- Permanent institutional improvement of CITMA, focusing on the fortification of its state-wide mission to all the national territory of Cuba, in the interest of formulating and guaranteeing the adequate implementation of Cuban environmental policy.

- Evolution of national environmental policy and management, which has in many cases surpassed the strategic goals set by the EAN.

- Degree of implementation of the Environmental Law – Law 81, dated July 11, 1997 – as a basis for the national legal framework and for the approval and gradual implementation of its complementary regulations.

- Growing social consciousness concerning environmental problems, and as a result, greater citizen demand for strict compliance with environmental legislation.

- Results achieved by the National Council of Watersheds (CNCH) in the environmental management of watersheds of national interest, considering the watershed as a unit of environmental management for sustainable development, with the approval of an important number of programs linked to the increase in quality of life of the population and the protection of natural resources.

- Advances in international environmental policy, reflected in new binding instruments regulating chemical products, biosafety, and climate change, among others.

These, and many other tangible realities, impose a necessary review process of the 1997 National Environmental Strategy, in which the core of its principal elements are conserved, while responding to the present demands of national and international environmental policy. This process is motivated by many elements, several worth mentioning here include:

- Experiences with the application of the 1997 EAN and the System of Territorial and Sectoral Environmental Strategies.

- Development of other specific strategic frameworks, such as the National Strategy for Environmental Education, the National Strategy for Biological Diversity, the Action Plan against Desertification and Drought, and the Plan for a National System of Protected Areas.

- Cuban environmental assessments conducted during the period of 1998-2005.

- National strategic revision process Rio + 10, carried out in 2002, and its recommendations.

- Actions toward the strategic integration of science, technological innovation, and the environment, which at the same time have stimulated updates of varying degrees to their respective strategic frameworks.

- Results that have surfaced from the diverse environmental-themed research studies conducted during the period 1997-2005, including studies of environmental perception among Cubans.

- Results related to signs of climate variability and climate change obtained in Cuba, and adaptation and mitigation policies, as well as their social, economic, and environmental repercussions.

- Experiences obtained via the implementation of multiple projects within the sphere of the environment and sustainable development.

- Experiences obtained via the implementation of an Environmental Impact Assessment process.

1.2 A New Cycle in the National Environmental Strategy

Mission

The National Environmental Strategy (2007-2010) is the guiding document of Cuban environmental policy, establishing the principles upon which the national environmental efforts are based. The strategy characterizes the main environmental problems in Cuba and proposes avenues and instruments to prevent, solve, or minimize these problems, with the aim of improving environmental protection and the rational use of natural resources in the interest of meeting sustainable social and economic development goals.

Vision

To reach a higher level of environmental protection and the rational use of natural resources, efficiently using financial resources and available materials in Cuba.

The general strategic objectives are:

- Set the stage and design the actions that will lead to the preservation and further development of the environmental achievements made by the Revolution.

- Contribute to the prevention and solution of the country's main environmental problems, including the gradual eradication of deficiencies detected during the implementation of Cuban environmental policy and management.

- Establish priorities and action plans for the country that serve as a foundation for the environmental work and projections in various sectors, organisms, territories, and institutions and entities, as well as in the general citizenry.

1.3 Principles of Cuban Environmental Management and Policy

1. Contribute to economic and social development on a sustainable basis.
2. Recognition of the citizen's right to a healthy environment, wherein the

constant improvement in quality of life for the citizenry constitutes the core of national environmental efforts.
3. Establishment of social responsibility for environmental protection.
4. Concentration of efforts around solving the country's main environmental problems, without overlooking local problems and their respective priorities.
5. Improvement of economic-financial mechanisms that provide the opportunity to confront the main environmental problems.
6. Agreement over actions related to the Ministry of Science, Technology and Environment, in its capacity as the lead Agency of the national environmental policy.
7. Active participation by all social actors - at a centralized level and a local level – based upon coordinated actions founded on cooperation and joint responsibility.
8. Development of Cuban science and technology in order to contribute to the solution of the country's main environmental problems.
9. Development of technological innovations geared toward engendering environmentally sound management that would enhance the international competitiveness of our products based on a positive relationship with the environment.
10. Comprehensive application of the "Cleaner Production" concept in order to increase efficiency and productivity, minimize waste and emissions, and to lead to the appropriate management of waste products - including for potential economic opportunities – promote savings in water and energy resources, as well as adequate sanitation.
11. Deepen the national environmental consciousness, with an emphasis on educational activities and the dissemination of environmental information.
12. Improve environmental legislation and aim to comply with this legislation in a real, efficient, and systematic manner in order to achieve more effective control mechanisms.
13. Improve current environmental management instruments and develop new instruments that would be required as support for decision-making in different venues.
14. Support for environmental work, with a cross-sector focus on agreement, cooperation, and coordination among environmental authorities, social organizations, NGOs, as well as different bodies and their enterprises in the territories.
15. Consideration of territoriality and decentralization as core axes of national environmental management.
16. Application of the principles of integrated watershed management as a key

element in Cuban environmental management, with an emphasis on integrating the coastal zone into an ecosystem-based approach that provides solutions to environmental problems while taking into account the character of Cuba as an archipelago.

17. Development of an active international environmental policy incorporating effective levels of cooperation and agreement.

CUBAN INTERNATIONAL ENVIRONMENTAL POLICY AND ITS GENERAL PRINCIPLES

Because in today's world, countries' efforts to preserve the environment are highly valued, international environmental policy has become a very helpful means of defending the Revolution. It has become necessary to continue actively developing Cuba's international environmental policy, in order to defend the majority positions of developing countries in this field, particularly Latin American and Caribbean countries. This is a logical consequence of the internal policies enacted by the Revolution in which the defense of sovereignty and equity and the struggle to ensure that development occurs in harmony with nature are inherent.

Environmental issues are a source of intense international debate. In moving toward the common goal of achieving a healthier environment for our planet, underdeveloped countries seek to ensure that new and dangerous forms of dependency will not be added to those already existing, and also that developed countries will truly assume the weight of responsibility that corresponds to them. When participating in international environmental forums, Cuban delegations should constantly highlight themes of sovereignty in defense of natural resources and sustainable development as a conceptual platform, and should project Cuba as a sovereign nation that defends its resources and makes efforts to enforce adequate protections of the environment.

Cuba has ratified the main International Environmental Agreements and has expressed the political will to contribute to environmental improvement on the national, regional, and global level. This has translated into the national observance of internationally contracted commitments. In addition, Cuba effectively participates in the activities of the United National Environmental Program (UNEP) as well as other UN programs actively involved with environmental issues.

1.4 Considerations Relating to Sustainable Economic and Social Development in the Cuban Context

Achieving sustainability in developing countries is a challenge that requires significant political, economic, and social transformations. In the case of Cuba, these transformations were, in fact, realized many years ago. The Cuban Environmental Strategy represents an important contribution to sustainable development, and is in essence, a strategy of continuity. The idea of sustainability is intrinsic to the socialist principles that uphold our revolutionary model.

For this reason, elements that distinguish and characterize Cuba's vision on this issue are the advantages of a socialist system in helping to define effective environmental policy. This is true especially in so far as the decisive role that is played by the State, and the advantages of a planned economy that has the capacity to harmoniously project long-term use of resources. Socialism has positive repercussions for environmental protection and sustainable use of natural resources, due to its ethical-social identity, the social solidarity that it engenders the benefits of social property, and the conceptual unity inherent to socialist governments.

The eradication of extreme poverty is an achievement rooted in the very foundations of the revolutionary process. Achieving this is essential to the pursuit of environmental sustainability, first and foremost because extreme poverty cannot coexist with a healthy environment. The solution to this challenge is one of the principal achievements that Cuba can effectively show to the world.

The Cuban State has declared national sovereignty over its natural resources and has actively promoted their restoration and protection. At the center of this process is mankind and its complete integrated fulfillment of material, spiritual, educational, cultural, and aesthetic needs, as well as the incorporation of society as a whole in attending to and solving our environmental problems.

The difficult economic situation the country has experienced in recent years has, without a doubt, resulted in greater exploitation of natural resources and has also hindered the launching of necessary actions for environmental protection.

Nonetheless, inherent in our process is our capacity to learn and gain experience from difficult circumstances. Thus, rather than weakening the ideal of sustainability, we have achieved greater awareness and new capacities to use our resources wisely and develop instruments and actions to promote their protection.

Among current examples of making the needs of development compatible with the requirements of sustainability are: the search for greater efficiency in production processes, the gradual introduction of Cleaner Production practices, the exploration of alternative energy sources, the use of biological products in agriculture, and the agricultural sector's tendency toward sustainable agriculture. These were achieved on the basis of the technical and scientific skills of the people.

Collective access, without exclusions, to fundamental social services guarantees equity, which is inherent to sustainability. These services continue to function as a strong pillar of revolutionary achievement, and contribute toward the establishment of a solid social base for the achievement of sustainable development goals.

Nonetheless, a Cuban sustainable development strategy cannot ignore that our pursuit of economic development faces great difficulties, and an increasingly globalized and hegemonic world imposes great hurdles in overcoming these challenges.

Furthermore, the increase in hurricane activity, the severity of drought periods, and the accumulation of dangerous chemical waste make it necessary to adopt disaster reduction measures to lessen the impact such disasters have on socio-economic development and the environment.

Today's reality demands a holistic view of sustainable development, understood as the interweaving of demands for environmental protection and sustainable use of resources, with policies of economic, scientific-technological, and fiscal development, higher quality of life, and increases in trade, energy, agriculture, industry, national defense, and other factors, all within the framework of social justice and equity.

During this strategic period, the concept of sustainable development needs to become even more central to national policy, reinforcing the integration of environmental considerations with social and economic development, all designed to highlight the viability of the Cuban model, based on socialism, and to establish itself an authentically sustainable society.

The institutional framework for the development and implementation of environmental policies geared toward sustainable development must be continually improved, keeping in tune with the increasing demands of national environmental policy and management and international trends.

At the same time, it is necessary to deepen our understanding of the traits that

characterize today's environmental management. These traits include: comprehensiveness, systematization, harmonization and cohesiveness, inter and intra-institutional cooperation, decentralization of environmental efforts, and bolstering of potential synergies – emphasizing provincial links – and social participation that is based on links between the community and solutions to their environmental issues and participatory environmental management that seeks to relate with the community's own cultural character. Other traits include environmental education around sustainable development, access to environmental information, and the growing importance of the international dimension and participation in negotiation processes on environment and development.

It is also necessary to continue to develop the national Cuban tendency towards integrated natural resource management, commercial environmental management, and urban environmental management, as fundamental traits of Cuban environmental management. All of these characteristics should effectively contribute to the construction of our sustainable development model.

1.5 Principal Actors and Avenues for Cooperation

Article 27 of the Constitution of the Republic

"The State protects the nation's environment and natural resources and recognizes their close relationship with sustainable economic and social development to make human life more rational and to ensure the survival, well being and security of present and future generations. It is the responsibility of proper governmental agencies to apply this policy. It is the duty of the citizens to contribute to the protection of the water, atmosphere, and the conservation of the soil, wild flora and fauna and all the rich potential of nature."

It is incumbent on the Cuban State to exercise sovereign rights over the country's environment and natural resources. Stemming from that State responsibility and through the use of government agencies, the State lays out its environmental policy and management.

In its capacity as the agency of the Central State Administration responsible for

environmental policy, the Ministry of Science, Technology, and Environment (CITMA) is responsible for developing strategy, coordinating efforts aimed at maintaining the environmental achievements of our revolutionary process, and contributing to overcoming current deficiencies. It must also ensure that environmental issues are taken into account at all levels of development policy, programs, and plans.

CITMA's powers and functions are carried out in coordination with and without detriment to the functions of other agencies and bodies.

Bodies that conduct activities on a global level should assist the environmental authorities through the design of global measures within their competency relating to environmental and natural resource protection. At the same time, those bodies in charge of specific components of the environment are obliged to carry out policies designed for the adequate protection and sustainable use of those resources.

Such actions include: the conservation and adequate management of natural resources, the systemic fight against the root causes of and conditions leading to contamination, harm or prejudice to these resources, the implementation of preventive measures and rehabilitation to affected resources when applicable, the application of Cleaner Production strategies, effective treatment and reuse of waste products, and adequate environmental sanitation.

These obligations are not the exclusive domain of the previously mentioned bodies, but rather, to varying degrees, are relevant to all the Bodies of the Central State Administration (OACEs), their enterprises, and other domestic or international commercial entities.

At the same time, environmental governance should continue along a process of constant improvement. To achieve this goal, there must be the most harmonious integration possible amongst all the structures and institutions bearing responsibility over defining environmental policy and controlling the rational use of natural resources, including the spatial and temporal planning of this use.

Since the territories are the primary arena in which environmental policy and management materializes, the provincial and municipal Popular Power Bodies, in close coordination with local environmental authorities, corresponding representatives from different OACEs and national agencies, as well as with the communities under their jurisdiction, must ensure the implementation of national environmental

management and establish adjustments and priorities that correspond to the primary characteristics and principal needs of each territory.

Beyond the governmental action plan outlined herein, and in keeping with the previously cited requirements of constitutional law, environmental protection and sustainable use of natural resources is a right and duty of each citizen. These obligations are carried out through individual action and through diverse and legally recognized means of organizing and partnering.

CHAPTER II. ENVIRONMENTAL SCENARIOS AND TRENDS IN CUBA UNDERLYING THE DEVELOPMENT OF THE STRATEGY.

We live in a complex world where we are subject to a multitude of threats, among which the environmental ones emerge with particular strength. Although the reality of globalization processes has been acknowledged, and their environmental impacts are under discussion, the harmful effects of the neo-liberal model have been clearly recognized and stated. As a result, the 21st century has begun to unfold amidst a level of natural resource degradation unparalleled in human history.

In Cuba's particular case, these global circumstances are compounded by the financial, economic, and commercial blockade imposed by the United States of America for over four decades. This blockade prevents Cuba from acting with the necessary speed to achieve all of the actions previously outlined and endorsed by the political will of the country.

Consequently, the financial support for Cuban programs for environmental protection comes basically from: state funds, project funds from organizations within the United Nations System, and bilateral cooperation between NGOs and governments.

If the country's experience with extreme natural disasters - especially hurricanes – is added to the aforementioned factors, it is clear that the issue of vulnerability and the dangerous risks to which the country is exposed in the present circumstances cannot be underestimated.

Repeated and harmful periods of drought, combined with high rates of evaporation have caused soil depletion and reductions in subterranean water reserves. From time to time, the strong pressure mounting on vegetation and the climate in general aggravates much worse such as when drought is interrupted by periods of torrential rains that cause extreme soil erosion.

The phenomenon of drought, which by itself, adversely impacts many socio-economic activities and negatively affects public health, when combined with other anthropogenic processes that lead to soil erosion, coastal erosion, a decrease in water quality due to overexploitation, and the obvious impacts of climate change in our country contribute to the fact that our coastal zones and dry regions are experiencing real symptoms of the desertification process, particularly on the eastern side of the island. Analysis using aridity indexes in Cuba have proven the existence of semi-arid nuclei in the southern portion of Santiago de Cuba and Guantánamo, (where prized

conservation areas of natural semi-desert are also located); while the sub-humid dry zones comprise a large portion of the eastern region, Camaguey coasts, and other isolated areas that are climatically prone to suffer from desertification processes.

In order to reconcile the complexities of the international situation with the external challenges placed on domestic development - while simultaneously protecting the environment and ensuring the sustainable use of resources - it is necessary to go forward in the 21st century with a special sensibility, with which we can extract the best from global environmental thinking and adjust it to the Cuban context.

The vision of Cuban environmental policy is to focus on sustainable economic and social development, based on the three well recognized principal pillars: social equity, economic growth, and environmental protection. In addition, as part of the national environmental effort, it is increasingly important to develop a general integrated culture of environmental awareness that the country aspires to. In order to achieve this vision, we must first consider important challenges presented by both internal and external realities.

Likewise, Cuba does not escape the effects of inappropriate patterns of capitalist development that mar the environment on a global scale. The primary prospective future goal of Cuban environmental policy is quite complex. It consists of avoiding the errors of inadequate processes of industrial development committed by the present "First World," such that a standard of economic growth is promoted that moves as directly as possible toward an environmentally compatible development model. This should be carried out based on the principles noted herein and through the use of appropriate tools.

It is understood that the inappropriate production and consumption patterns of the industrialized world are primarily responsible for the poor environmental health of the planet.

At the same time, it is recognized that the underdeveloped world cannot aspire to "develop" itself repeating these same wasteful and consumer-based models, because to do so would require several planets such as ours. Therefore, the key to this issue is not to renounce economic growth, but to make that growth harmonious, thereby enabling the developing world to create an authentically sustainable society.

For this reason, it is essential that Cuba maintain and defend its socialist model of development, which will enable the country to construct a society that is economically

prosperous, socially just, and environmentally sustainable.

These trends, which will all shape Cuba by the year 2010, have been taken into account both in the identification of the main environmental problems that follow and in the development of tools to address these problems.

CHAPTER III. CHARACTERIZATION AND DIAGNOSIS

3.1 Definitions of Main Environmental Problems

The environmental challenges with the greatest impact and that occur most widely throughout the country have been taken into consideration in the process of defining the country's main environmental problems. The following factors were considered, among others:

- Affecting large or significant areas of the country,
- Impact produced by or affecting densely populated zones,
- Changes in health and quality of life,
- Effects of global changes[1], especially climate change,
- Economic consequences, and
- Effects on ecosystems and biological resources

The main environmental problems that follow are identified based on an analysis of these factors. These problems interact in a complex and dynamic manner amongst themselves, affecting the quality and quantity of our natural resources, which in turn links directly to economic and social development. Therefore, there is no hierarchy of importance to the order of the following problems.

CUBA: MAIN ENVIRONMENTAL PROBLEMS

- **SOIL DEGRADATION**
- **IMPACTS ON FOREST COVER**
- **POLLUTION**

[1] According to the Inter American Institute for the Investigation of Global Change (IAI) global change is understood as "interactions of biological, physical, or chemical processes that regulate changes in the functioning of land systems, including the particular forms in which said changes are influenced by human activity."

- **LOSS OF BIOLOGICAL DIVERSITY**
- **WATER SHORTAGES**

3.1.1 Characterization of the Main Environmental Problems

SOIL DEGRADATION

The area of Cuban land dedicated to agriculture is 60.56% of the total landmass, or 6,654.5 Mha. 54.02% of agricultural lands are currently under cultivation.

Regions with permanent crops constitute the most significant portion of those lands (2,396.7 Mha) with sugar cane production dominating the majority of the land, or 69.72%. The harm caused by permanent crops to these lands is primarily due to a lack of crop rotation causing soil depletion, poor agro-technical management and insufficient fertility protection measures. Among seasonal crops, rice production (which occupies 207.4 thousand hectares) receives significant attention due to the hydromorphic conditions in which it is grown and the significance of poor management and the low quality of irrigation water.

At least 60% of the country's land surface is affected by one or more of the following factors, all of which can lead to desertification processes: erosion (2.5 million hectares), high grade acidity (3.4 million hectares), elevated rates of salinity and sodicity (1 million hectares), soil compaction (2.5 million hectares), and drainage problems (2.7 million hectares).

These areas are impacted by natural and anthropogenic factors accumulated over the course of many years. Human induced factors are largely to blame, though in recent years there has been an intensification of natural processes such as drought and hurricanes, with their concomitant floods, soil runoff and mass movements of land cover resulting in soil deterioration.

Due to the challenging economic circumstances Cuba has experienced since instituting the Special Period, the vast majority of mitigation efforts for these problems have been simple in nature. In many cases what is really needed are more complex mitigation measures that would allow for soil conservation and/or restoration, which generally requires greater financial resources.

Despite the efforts spent and resources designated by Cuba to this effort, according to the goals set by the National Program of Soil Improvement and Conservation passed in 2000 by the National Council of Watersheds (CNCH by its Spanish initials), only modest gains have been made in the last four years.

IMPACTS ON FOREST COVER

Although the forest cover has increased constantly in the recent years - in the last 43 years increasing to a total coverage of 2, 696, 587.89 hectares, bringing us to a forested index of 24.54% in 2005 - after-effects still persist from years of irrational exploitation of Cuban forests which practically eradicated our most valuable woodland resources.

Forest fires are the cause of the largest present-day impacts to Cuban forests. The majority of fires in rural areas begins in pastures, sugar cane fields, and other agricultural zones, and later travels to and affects forested areas.

Problems persist with the quality of most native forests as a consequence of prior mismanagement and exploitation - particularly in the most important watersheds. Problems also exist in the nation's seedbed sources, which do not meet productivity or quality expectations. In addition, a lack of updated forest management plans, insufficient silviculture of forested areas, and insufficiencies and deficiencies in management plans continue to present challenges.

Despite having received more attention in recent years, significant efforts are still necessary in order to reforest the riparian buffers of rivers and reservoirs.

The survival of tree plantations and the success rate of trees reaching maturity have improved substantially. Nonetheless, the growth levels have been low and far from the desired results. The range of forest species used in forestry activities – including reforestation in protected areas - has also been insufficient.

The inefficient exploitation of forest biomass and the erosion resulting from this process constitute equally serious concerns.

Invasive plant species represent a problem in some forests, and thus work in that field should be increased.

POLLUTION

Various causes of pollution have resulted in the contamination of bodies of water, soil, and the atmosphere. The concentration of industrial facilities in urban areas stands out among the root causes, as it leads to the use of surface waters as receptacles for raw or partially treated waste, which frequently ends up in coastal regions and watersheds.

The use of obsolete technologies and lack of technological discipline, as well as the failures to introduce Cleaner Production practices, have all produced negative impacts on the environment. Even taking into account annual environmental investment plans, there are insufficient financial resources allotted to minimization, treatment, exploitation, and reuse of waste products resulting from agriculture, industry, tourism, hospitals, and domestic activities.

The state sewage networks, coverage of waste treatment and the current technical state of these systems are deficient. The classification of waste products and the management of solid waste, where there are serious problems with its disposal and exploitation, are also deficient.

Systematic evaluations carried out over the past five years indicate that a reduction has occurred in organic biodegradable pollution loads disposed in fresh water and coastal bodies of water, primarily in specific industrial sources. This achievement was made possible through the effective enforcement of the economic plan for the environment. These same evaluations also indicate that regions defined by urban centers, agriculture, industry, tourism, hospitals, domestic concentrations, and mixtures of these factors consistently deliver the largest loads of polluting waste and will require mitigation and solutions in the years to come.

The absence of mitigation measures for emissions, inadequate control measures on the levels of noise generated by different activities, scarce information about the harmful effects on health and social behavior, the poor technical state of transport, and a lack of standards for emissions are also present.

The lack of technical infrastructure, inadequate management of chemical products and hazardous waste, as well as the progressive accumulations of these waste products without a technical solution at-hand for their definitive disposal, have all given rise to pollution problems that carry risks for human health. Projected national development in relation to the rise of exploration and exploitation of hydrocarbons necessitates increased awareness of the impacts that hydrocarbons have on water, the atmosphere,

and soils.

No adequate monitoring system exists for tracking the quality of fresh and salt-water, emissions into the atmosphere, or soil quality and their relationship to the decision-making process in order to improve the quality of life of the population.

LOSS OF BIOLOGICAL DIVERSITY

Cuba's island characteristics have brought about the evolution of a particular type of biological diversity with a high degree of endemic species, while at the same time determining the fragility and vulnerability of many of our ecosystems. Paired with this vulnerability, many man-made processes have provoked a continual decrease in our biodiversity, the direst expression of which can be witnessed in such fragile ecosystems as coral reefs, mangroves, rainforests, and the remnants of the original forest cover of the Cuba.

The principal causes leading to biodiversity loss in Cuba are:

- Changes, fragmentation, or destruction of habitat/ecosystems/landscapes due primarily to changes in land use and inadequate practices employed in fishing, harvest, and agricultural soil preparation, among others.

- Overexploitation of resources, for example fishing and forestry resources.

- Degradation and contamination of soils, water, and the atmosphere.

- Introduction of exotic invasive species that displace or affect the functioning of ecosystems and native species.

- Insufficient regulatory and control mechanisms to prevent and punish illegal activities, including unlawful hunting and fishing, trade in threatened species and other natural resources.

- Climate change and the resulting intensification of dry periods, the incidence of torrential rains, temperature increase, sea level rise, in addition to the intensity and frequency of extreme natural disasters

such as hurricanes.

- Forest fires.

The process of Environmental Impact Assessment and the subsequent decisions on land use planning have not always taken into account the intrinsic value of biological diversity and its potential uses.

More effective indicators and monitoring tools and processes are necessary for their development.

In many cases, there are no adequate baselines to provide a starting point from which to measure the trends of biodiversity loss or to monitor recoveries achieved through the application of appropriate measures.

The legislative framework necessary to regulate the introduction, access, and use of genetic resources is lacking.

There are important taxonomic knowledge gaps, especially of our fauna, as well as with microorganisms, which result in an inability to implement necessary measures to conserve and utilize such biological resources in a sustainable manner.

Current mechanisms for granting permits authorizing the use of specially protected and exotic species are also insufficient.

Not all species of wild flora and fauna that are being subject to exploitation have management plans and studies evaluating their potential for sustainable utilization.

Delays in the approval process for areas that fall within the National System of Protected Areas has negatively influenced the fundamental objective of the System, that being the conservation of biological diversity.

WATER SHORTAGES

Despite the substantial Cuban hydrologic development works over the past 40 years - which have increased our reservoir capacity from 48 million to 9,600 million cubic meters and the infrastructure works that have opened access to underground water resources - water shortages remain high for meeting economic, social, and

environmental needs on the island. This fact is aggravated by natural disasters (prolonged droughts and changes in seasonal patterns), as well as man-made impacts, including saline intrusion, overexploitation, pollution, etcetera.

According to the Annual Statistical Report of 2004, the capacity of Cuban hydrologic development has reached an approximate level of 1,220 metric meters of water annually per person for all potential uses. This distribution level is truly insufficient and according to international standards, classifies as a system undergoing hydrologic stress. Network loss of water deliveries reaches up to 60% in some regions, and prolonged meteorological drought periods have severely affected water availability.

The deterioration of water quality and the scarcity and expense of providing the water resources for all necessary domestic uses influence other natural and man-made elements, as diverse and complex in their interrelationship as: pollution, insufficient forest cover, sometimes inadequate planning and use, salinization, use of outdated technologies, infrequent water reuse or recycling, poor condition of hydraulic distribution networks, and insufficient cultural awareness on conservation and rational use of this resource. These factors in combination have affected current water availability for agricultural, industrial, and domestic uses.

For these reasons, strategic planning of water resources is a high priority in our country. The entire drought process should be carefully studied, and we must adapt to and comply with necessary mitigation strategies. We must continue to explore and exploit other alternatives, including the gathering and harvesting rainwater, such that in the case of recurrent drought, we can readily apply these alternative technologies.

The availability and appropriate use of hydrologic resources is an issue of national interest that impacts the entire economy and society. It has a great impact on environmental protection, although manifested in different ways and on different levels depending on the region of the country.

3.2. Tools for Environmental Policy and Management[2]

Cuban environmental policy is carried out though the use of an integrated management policy utilizing the following instruments:

> **The National Environmental Strategy, National Program for Environment and Development, and other economic and social development programs, plans, and projects.**

The approved strategies, programs, and plans constitute a conceptual planning tool that allows for the progressive and organic construction of the Cuban environmental policy. At the same time, and according to the prescriptions of the Cuban Environmental Law, all economic and social development plans, programs, and projects – be they on a municipal, provincial, or national scale – should be carried out in accordance with the main principles of said law, and the environmental policies, strategies, and programs established by competent authorities and any regulations emerging from them.

LAW OF THE ENVIRONMENT

Article 18. - Cuban environmental policy is executed through proper management that utilizes the following instruments:

a) the National Environmental Strategy, the National Program of the Environment and Development and the other economic and social developmental programs, plans and projects;
b) this Law, its complimentary provisions, and the other legal regulations intended to protect the environment including technical standards for environmental protection;
c) environmental land-use planning;
d) the environmental license;
e) the Environmental Impact Assessment;
f) the Environmental Information System;
g) the State Environmental Inspection System;
h) environmental education;
i) scientific research and technological innovation;

[2]The nature of each environmental management and policy instrument is a reflection of the expected model for each of them as defined by Law 81 of the Environment.

j) economic regulation;
k) the National Environmental Fund; and
l) regimes of administrative, civil and penal liability.

The Law, its implementing legislation and other environmental protection regulations, including technical standards for environmental protection issues.

Legislation is a fundamental component for any environmental strategy. In order to perform this role adequately, legislation should be both efficient and effective and be open to a constant process of dynamic self-revision capable of addressing new needs that come up along the way, as well as accommodating the advances and shifts occurring in international environmental thought. This process covers the Framework Law, other legal regulations, and technical standards relating to environmental protection.

The legislation is effective when it appropriately regulates behaviors, that is, when its design is sufficient to ensure fulfillment of its proposed objectives. The legislation must entail not only an adequate level of legal-technical provisions, but also demonstrate real political will, and adequate levels of education, disclosure, and citizen participation to meet the objectives outlined. Legislation is effective when it is able to achieve an appropriate level of social acceptance.

Environmental legislation is both a source of environmental policy and an instrument for its implementation. This peculiarity necessitates a new focus for the legislation's design and implementation and the need to assure its efficiency, in so far as it portends to transform behaviors and practices that have negative impacts on the environment or encourage unsustainable use of natural resources.

Environmental Land-Use Planning

Environmental Land-Use Planning includes an evaluation process designed to ensure that an environmental dimension is introduced into Development Plans and Programs. This process is intended to guarantee environmentally sustainable development of the land, based on a holistic analysis of its biotic and abiotic resources and their interaction with socio-economic factors.

Planning for the transformation of the land in economic, social, political, and

environmental terms has been a Revolutionary tradition since its first years. Within the overall national strategy of proportionally even development and social equity, the System of Physical Planning has developed Land-Use Planning schemes aimed at localizing state investment programs. Among the primary objectives of these schemes, in the context of a national strategy for proportionate development and social equity, is to guarantee rational use of natural resources, ensure optimal use of space, and prevent damages to the surrounding environment.

The Environmental License

The Environmental License is the official document granted by the Ministry of Science, Technology, and Environment, without prejudice for other licenses, permits, or authorizations that may have been granted by other bodies or State agencies in compliance with the legislation in force. The license allows due control of what is established by the legislation and contains the authorization for construction projects or activities.

The introduction of environmental licensing should result from a holistic and objective process that takes special care not to hinder the requirements of a national dynamic framed by an ever growing investment process.

Environmental Impact Assessment

The Environmental Impact Assessment is the procedure which aims to avoid or mitigate the generation of unwanted environmental impacts that could result from plans, programs, or construction projects or activities. This is done through an evaluation conducted prior to the environmental modifications that would result from the previously mentioned works and activities, and after which licenses would be denied or modified when necessary. This plan includes detailed information about the monitoring and controls system that will help ensure proper compliance, as well as mitigation measures that should be taken into consideration.

Environmental Information System

The Environmental Information System is an environmental policy tool with the prime objective of providing the State, Government, and society with the information

necessary for increasing awareness, conducting evaluations, and making environmentally-related decisions.

The Environmental Information System consists of two sub-systems: Environmental Indicators for Sustainable Development and the National System of Environmental Monitoring.

Both sub-systems provide governmental and non-governmental sectors with instruments to facilitate decision-making processes related to the design of policy, strategies, plans, programs, and projects.

The Environmental Indicators for Sustainable Development is an instrument designed to measure advances toward sustainability, support policy design and evaluation, facilitate decision making, and contribute to citizen participation in national development plans and programs.

The collective construction of a sustainable development model should go through a group of indicators capable of measuring the state of the environment, pressures to which natural resources are exposed, and the ability of Cuban society to effectively manage these impacts.

The National System of Environmental Management enables the evaluation of a selected set of environmental variables which are qualitative elements of the environment that could be measured or observed, stored, processed and assessed in order to offer a comparative view of the state of the national or local environment in a given period of time, while also evaluating the principal qualitative and quantitative trends in their behavior.

State Environmental Inspection System

The State System of Environmental Inspection is responsible for the control, oversight, and supervision of compliance with current regulations and leading legal norms relating to environmental protection and rational use of natural resources, aimed at evaluating and determining the adoption of pertinent measures to guarantee said compliance.

State Environmental Inspection should be understood as a system composed of State Inspection under the auspices of the Ministry of Science, Technology, and

Environment, with the participation of agencies and bodies brought together by the Ministry, and State Inspections developed by other state agencies and bodies whose activities have an impact on environmental protection.

Environmental Education

Environmental Education is considered a continual and on-going process that constitutes a dimension of the integral education of all citizens. Its purpose is to promote the reorientation of economic, social, and cultural processes toward sustainable development via the process of knowledge acquisition and the development of habits, skills, attitudes, and the shaping of values in an atmosphere of harmony with fellow human beings and with society at large and the natural world. The legal, regulatory, and economic instruments are insufficient for developing the necessary consciousness to safeguard and conserve the environment. The development of an environmental culture in the population is a premise to reach the objectives and goals of sustainable development.

Scientific Research and Technological Innovation

Since 1959, the Cuban revolutionary project has been oriented toward increasing the level and quality of life for the population. To this effect, a basic component of this project has been the application of new scientific knowledge and results in key areas of sustainable development. The contribution of science and technology to environmental protection and to the promotion of sustainable development is widely documented in the diverse economic sectors of our county.

As a result of a coherent policy promoting science, education, and culture in Cuba, our country's current technological-scientific human resource potential is represented by more than 73,000 workers participating in scientific and technological activities. At least 7,527 professionals have obtained a PhD degree and are actively participating in Cuba's scientific and technological development in all its diverse branches. These personnel members are highly professional, qualified, and experienced, and systematically contribute new results and knowledge that are then assimilated and applied to the service and productive sectors.

This collective intelligence forms an integral part of and service to our community, and has anticipated the knowledge of environmental problems resulting from human

activity and the global processes happening now on the planet and developed numerous and innovative alternatives for mitigating and solving local and national environmental problems. At the same time, it has contributed to the development of sectoral strategies for the harmonious, rational, and efficient use of renewable and non-renewable natural resources, the progressive decrease in air, soil, and water pollution, and the promotion of industrial development based on the least environmentally destructive technologies. An important number of Cuban scientists participate in international projects and organizations, expert groups, courses, and other environmentally themed activities at the international level.

Economic Regulation

The use of economic regulation as part of the environmental policy and management tool kit takes form in the use, among others, of incentives and disincentives supported through tax and tributary policies, differentiated prices, and financial control measures that support activities with minimal impact on the environment.

International experience has demonstrated that regulatory measures designed to control the environment must be complemented by economic tools that can serve as indirect control valves. This process is based on the ties that link socio-economic development to environmental problems. Since its application, the national policy has corroborated these concepts.

Economic tools used for environmental protection and sustainable use of natural resources should be based on appropriate systems of control and accountability.

The National Environmental Fund

The National Environmental Fund was created by the Environmental Law in order to completely or partially finance projects and activities designed to protect the environment and promote the sustainable use of natural resources.

The Regimes of Administrative, Civil, and Penal Liability

The Environmental Law defines the systems of environmental liability – in the administrative, civil, and penal spheres – as national instruments of environmental

policy and management.

The regime of administrative liability applies to the natural or legal person who violates the stipulations established by the implementing legislation and imposes punishment in the form of fines or other legally applicable sanctions.

The regime of civil responsibility establishes that all natural or legal persons, who by action or carelessness harm the environment, must cease this conduct and repair any harm or damages caused. It also identifies those who may claim for the repair of the harm or the indemnification of the damages caused.

Legally prohibited and socially dangerous actions or oversights that threaten environmental protection will be classified and consequently punished by the terms of current criminal legislation.

CHAPTER IV. FUTURE PROJECTIONS: STRATEGIC OBJECTIVES, ACTIONS, AND NGOALS THROUGH 2010.

4.1. AREA A. NATURAL RESOURCE MANAGEMENT

4.1.1 Soils

Principal Plans and Programs:

- **National Program for Soil Improvement and Conservation**
- **National Program for the Fight against Desertification and Drought**
- **Turquino – Manatí Plan**
- **National Program for the Production of Organic Matter**

Specific Objectives:

- Halt and diminish the effects of soil degradation in Cuba, and begin gradual recuperation.
- Continue implementing sustainable agriculture as a means to contribute to the achievement of national food security in Cuba.
- Apply the monitoring system to Cuban soils.

Goals	Actions
Management systems and technologies toward sustainable agriculture in regions of the country with productive soil have been applied.	Apply measures from the National Program for Soil Improvement and Conservation. Apply appropriate technologies and systems that encourage sustainable agriculture and the gradual introduction of conservation agriculture.

	Develop units or systems of production based on integrated resource management, seen as a system that integrates the production of agriculture, forestry, and livestock. Balance current intensive agricultural practices with the gradual, systematic, permanent and integrated introduction of the necessary components of sustainable agriculture.
The increase in surface area of the country affected by factors that could lead to desertification has been halted. During the last five-year period, 500,000 hectares of soil have benefited with an annual increase of 3%.	Apply the Monitoring System to Cuban soils. Carry out a bi-annual evaluation of the effectiveness of the National Program for Soil Improvement and Conservation and adjust the goals according to the outcomes of said evaluations. Apply measures of deep subsoil till, simple leveling, minimal cultivation, and other agro-technical techniques that support the recuperation of affected soils more widely. Institute changes in farming and cultivation models and the zoning of soils for optimal fertility, agro-productivity, and water availability. Reduce use of inorganic fertilizers and shift to a balanced application of inorganic and organic fertilizer of the appropriate quantity and quality. Increase the construction and use of built-in drainage systems, soil leveling, and other hydraulic works used for flood control.

	Apply, use, and promote multi-crop farming, in addition to crop rotation and intercalation. Avoid degrading effects on the soil caused by inadequate pasturage management. Continue developing livestock production, while taking into account the use of local resources, silvi-pasturage, and the use of leguminous plants for animal feed.
More than 3% of agricultural labor is carried out with the assistance of drive animals, thereby alleviating the soil from compaction and shifts in physical properties that result from the use of agricultural machinery.	Reduce the use of agricultural machinery. Apply an adequate balance between heavy and light machinery employed in the fields. Increase the use of drive animals.
The volume of water applied to irrigated fields is reduced by 15%, while maintaining required quality of distribution.	Optimize or substitute inefficient agricultural irrigation systems according to the Environmental Impact Assessment. Systemically evaluate the impact of current irrigation systems. Control the quality and quantity of water used in irrigation and the state of water sources. Increase water reuse intended for diverse purposes.
80% of pests and crop disease control in Cuba is done with natural products or biological pest control. 100% of the country's agricultural areas are under integrated management schemes for the prevention of disease and pests.	Consolidate integrated pest management with alternative natural products and biological means. Decrease the use of chemical pesticides. Apply an adequate varietal policy ensuring that biotic and abiotic stress-resistant varieties and quality seeds are obtained. This

	should be accomplished through the use of biotechnological results, with the appropriate safety.
40% of solid and liquid waste resulting from sugar cane production and other agricultural activity are reused.	Increase the reuse of solid and liquid waste resulting from sugar cane production and other agricultural activity for fertilizers and soil enhancers. This should be done only after full characterization of waste products is conducted, and with specific recommendations for their use for different crops. Eliminate the use of solid and liquid waste as soil and water contaminants. Construct, maintain, and/or repair waste treatment systems.
The mining industry meets at least 95% of environmental licensing obligations relating to area restoration, quality, and time limits.	Make the restoration of areas affected by mineral exploitation mandatory, including those areas mined before the passage of the Law.
An internationally recognized Cuban system of organic certification is available.	Work with the community to increase the knowledge and application of scientific results and technological innovation. Increase organic production and develop a corresponding certification process.
Avoid urban growth by achieving superior maximization of space in new construction.	Develop rational and suitable urban architectural designs that contribute to the protection of man and sustainability.

4.1.2 FORESTS

Principal Plans and Programs:

- **National Forestry Program**
- **Turquino – Manatí Plan**

- **National Forest Fire Prevention Program and Strategy**
- **National System of Protected Areas Plan for 2003-2008**

Specific Objectives:

- Achieve Sustainable Forest Management in Cuba.
- Decrease the area affected by forest fires.
- Conserve forest resources as elements of biological diversity and for their general contribution to the conservation of biodiversity.

Goals	Actions
National forest coverage increases to 2,943,576 hectares by 2010, such that the index of forest coverage will reach 26.7% of national territory.	Diversify species composition to increase biological diversity in our forests. Achieve an appropriate specialization in reforestation for different ecosystems, including the varieties of trees best suited to each area, both for environmental reasons and economic value. Enrich the diversity of forest flora and institute proper controls after planting. Work toward improving seed resources in the country, and seed preservation in the event of catastrophes, in order to achieve production with required quality and stability.
One million hectares of forest are maintained under the National System of Criterion and Indicators for Sustainable Forest Management. In 2007, the National Forestry Planning is	Systemize the implementation of the System of Criteria and Indicators for Sustainable Forest Management, which allows periodic and systematic control of the country's forested resources.

complete. By 2010, all forested areas that require management have forestry management plans. The environmental goods and services offered by forests are institutionally recognized.	Conclude the planning stage of the country's National Forestry System Apply intensive enhancements using valuable or fast growing native or naturalized wood species, Elaborate forestry management plans in the areas that so require.
Actions of the energy forest subprogram included in the National Forestry Program are achieved.	Increase the planting of energy forests in an attempt to eliminate the use of other types of forests as energy sources (with the exception of waste products from silvicultural treatment, forest reconstruction, and waste and firewood located in productive tree felling zones.
Lands affected by forest fires are reduced to 2 hectares or less for each 1,000 hectares of forested land (according to the figures from the year 2000). 70% of forest fires impact less than 5 hectares of land. A 10% reduction in forest fires of unknown causes.	Implement an anti-forest fire system containing specific preventative actions including the regulation of the use of fire. In order to achieve this, create a Coordinating Body to serve as an umbrella organization for all agencies with jurisdiction over forest fires. Develop a regulatory technical norm in conjunction with the Forestry Law and its regulations to address anti-forest fire measures, with prioritizing specialized technical measures. Balance the efforts and distribution of resources allocated to prevention and fighting of forest fires in order to take full account of the fact that the latter is a cost while the former is an investment. Decrease the risk of forest fires due to fires set in forested areas and agricultural zones, while simultaneously optimizing controlled burns used primarily in the management of

	combustible materials. Create a scientific and technological foundation that facilitates the establishment of a forest fire danger prediction system, increase the pace of newly introduced technologies, of technological advances and strategies, thereby taking full advantage of the possibilities that technical and economic viability can offer to this problem. Ensure that all activities related to the prevention of forest fires comply with established requirements in environmental legislation. Establish priorities for forest fire prevention in all circuits and territories in accordance with the varying municipal, provincial, and regional levels of jurisdiction. Organize personnel in order to manage and fight forest fires based on a generalized model of broader fighting of forest fires through organization, training, and the equipping of Professional Forest Ranger Corps, Specialized Brigades, and Volunteer Brigades. Gradually implement a network of specialized decision-making command posts within the Forest Rangers Corps to supervise detection, dispatch of fire fighting resources, and data processing. Increase understanding of the genesis and impacts of forest fires in order to effectively institute prevention measures in the first instance and, in inevitable cases, properly

	evaluate qualitative and quantitative damages and corresponding rehabilitative actions. Impart all required technical knowledge to the personnel of the Forest Rangers Corps. Appropriately train all managers and staff of the Professional, Specialized, and Voluntary Brigades in accordance with their particular function in the combating of forest fires. Gradually increase the ability to effectively determine the causes of forest fires.
Our forest patrimony is conserved.	Strengthen the integration of surveillance and protective bodies through cooperative surveillance and the registration of inspectors. Increase capacity building for inspectors from the surveillance bodies. Develop environmental awareness and education in rural communities, among decision-makers and other actors, with the active participation of governments and local social and popular organizations.
In 2007, the reforestation of riparian buffers in streams and reservoirs is completed according to the Program designed to that effect. 69% of the national forest area is made up of forests that function as buffers to protect coastal areas, soil and water, and conservation forests.	Comply with the reforestation program for riparian buffers for streams and reservoirs. Improve reforestation efforts in the major mountainous massifs and other fragile ecosystems. Increase survival and plantation indexes, with a special emphasis on fragile ecosystems. Comply with the National Forestry Program.
By the year 2010, 175,530 hectares of lands formerly dedicated to sugar cane cultivation are reforested.	Comply with the Forestation Program known as the "Álvaro Reynoso Task" of the Sugar industry.

By 2009, a management program for invasive plant species is complete.	Establish and effectuate a management program for invasive plant species which will address the mitigation of adverse effects resulting from these species.
By 2007, a methodology for evaluating forested regions as carbon sinks is available.	At least one million hectares of forest offer information about carbon storage.

4.1.3. The Fight Against Pollution

4.1.3.a) Liquid wastes

Principal Plans and Programs:

- **Environmental Strategy of the National Institute of Hydrological Resources.**
- **Aquaduct and Sewage Investment Plan (PIAC)**
- **Environmental programs and strategies in different economic sectors**
- **National Plan for Introduction of Cleaner Production in Environmental Business Management**
- **National Water Savings and Rational Use Program**

Specific Objective:

- Prevent, reduce, and control pollution caused by inadequate liquid waste disposal, increase reuse and treatment, and reduce generation of liquid waste.

Goals	Actions
Complete the body of legal regulations	Revise, draw up, and put in force technical

required in order to adequately control pollution.	environmental standards for fresh and salt water. Complete the updating of Decree-Law 138 of the Inland Waters through the drafting of a new Water Law.
100% of potential places within the business sector where liquid waste could be reduced are identified.	Introduce the concept of Cleaner Production as a means to prevent the generation of liquid waste.
100% of the sources of inorganic pollution load introduced into the environment are identified and characterized. An annual reduction in the amount of organic pollution load introduced into the environment of no less than 1% is achieved. 2% reduction in the level of pollution emanating from the disposal of liquid waste from hospitals. 2% annual increase in the volume of recycled and reused waste water. 2% increase in the total volume of treated wastewater in correlation to the total volume of wastewater. The issue of sewage and waste treatment networks is propelled to the forefront of national priorities, and the pace and quantity of funds dedicated improving these networks is increased. More than 40% of the population has access to sewage services. Sanitation coverage in urban and rural areas	Increase the coverage of liquid waste treatment through concerted investments both in the construction of new treatment plants as well as in the maintenance and repairs of existing systems, with a special emphasis on the domestic, industrial, farming, and hospital sectors. Achieve the effective functioning, rehabilitation, and maintenance of wastewater treatment systems built upon the main social and economic objectives. The inclusion of these goals into investment considerations should be considered obligatory. Likewise, the use of the most environmentally advanced technologies possible is also of prime importance. Continue to increase financial gains generated through the reuse of appropriately treated liquid wastes for agricultural, industrial, and aquaculture purposes. Increase surveillance over operations and maintenance activities of current waste treatment systems, for which the assigning of financial resources for the acquisition of equipment and reactive agents will be necessary.

if increased to over 95.5% (broken down between sewage, ditches, and latrines).	Improve the sanitary conditions of surface waters associated with primary mountain settlements and with the treatment and reuse of liquid wastes, especially those originating from coffee production. Implement a progressive tax system for the primary contaminating entities. Establish a stimulus and incentive system for those entities that achieve a gradual reduction in their waste flows and begin to recycle their waste and by-products. Promote the use of natural biological wastewater treatment systems, taking into account increased efficiency in removing contaminants and the low cost of investment, operation, and maintenance.
85% of the primary polluting sources of fresh and marine water are identified, leading to the systemic waste management. The receiving bodies of salt and fresh water flows are being monitored in accordance with established priorities. Strategies for the struggle against pollution are established taking into account the aggressive nature by which these contaminants impact the environment.	Guarantee the systematic control and identification of primary sources of salt and fresh water contamination. Establish an adequate compliance requirement to ensure the implementation of measures promoting the decrease and eventual elimination of the pollutant's harmful effects.

4.1.3.b) Solid Wastes

Principal Plans and Programs:

- **Environmental programs and strategies in different economic sectors.**
- **National Plan for the Introduction of Cleaner Production in Environmental Business Management.**

Specific Objective:

- Prevent, reduce, and control pollution resulting from the inadequate management of solid waste.

Goals	Actions
70% of the total volume of solid waste (from domestic, hospital, and industrial sources), is properly identified, treated, and disposed of.	Introduce Cleaner Production practices, including the search for and application of advanced technologies.
2% annual increase in the volume of recycled and reused solid waste.	Increase levels of solid waste recycling and reuse.
100% of dumps are adequately managed and function efficiently.	Increase coverage of collection, treatment, and waste disposal services, with a special emphasis on hazardous wastes.
The original point of generation of solid waste is identified for at least 15 locations throughout the country.	Implement environmental education and awareness campaigns.
More renewable and recyclable construction materials are being used.	Establish adequate classification of rubble and debris, in order to facilitate their reuse and recycling.
Extraction of new building materials is avoided through the reuse of existing materials.	Establish strategies for the sugar cane industry according to the new missions assigned to the industry. Included among these missions is the identification of

	potential environmental impacts resulting from the operation, disposal, and transportation of grain silos.

4.1.3.c) Emissions into the Atmosphere and Noise Pollution

Principal Plans and Programs:

- **Environmental programs and strategies for different economic sectors.**
- **National Plan for the Introduction of Cleaner Production in Environmental Business Management.**

Specific Objectives:

- Prevent, reduce, and control pollution resulting from emissions into the atmosphere.
- Prevent, reduce, and control sound pollution resulting from poor management in order to improve the quality of life of the population.

Goals	Actions
100% of green house gases (CO_2, CH_4, N_2O, HFC, PFC, SF_6) are estimated, monitored, and controlled through compliance with the monitoring plan. The concentration of particulate matter (PST-PM10 sulfate, nitrate, ammonium, calcium, magnesium, and some heavy metals), certain gases (SO_2, NO_2, NH_3, H_2S, O_3), and nitrogen oxide and sulfur oxide emissions are monitored.	Monitor emissions into the atmosphere. Develop emission standards for the main productive activities that take place in Cuba.

The consumption of ozone depleting substances is regulated.	Comply with the national timetable established for the reduction of ozone depleting substances.
An annual reduction of 1% is achieved in contaminating sources that emit higher than legal levels of gases and dust particles contributing to atmospheric pollution.	Encourage the application of Cleaner Production practices and self-regulation in the industrial sector, with special emphasis on the cement industry, fertilizer production, thermo-electrics, mining, and the sugar cane industry. Strengthen the systems of surveillance and control of atmospheric pollution emanating from mobile sources.
Renewable energy sources meet at least 20% of national energy matrix by the year 2010. The morbidity rate attributable to acute respiratory illnesses is reduced.	Empower new research on atmospheric pollution and its effects on human health and the environment within the National System of Science and Technological Innovation. Continue the search for new technologies and greater efficiency in the generation and use of energy, thereby reducing the environmental impacts of energy use. Particular attention should be assigned to the desulfurization of domestic crude oil before combustion, as well as the reduction of gases that are byproducts of combustion.
Measures are implemented to decrease to an adequate level or, when possible, eliminate noise pollution and other vibrations. A higher quality of life with improved sound barriers in architectural and urban spaces is achieved.	Identify and implement solutions to problems associated with noise and other vibrations. Adequately utilize sound barriers in all architectural and urban designs.

4.1.3.d) Chemical Products

Specific Objective:

- Achieve the safe management of chemical products throughout their life cycles.

Goals	Actions
Management plans governing chemical products are completed and implemented in 100% of agricultural production units based on the premises of a rational planning. The existence of expired or idle chemical products in Cuba is reduced by 95%. 100% of agricultural zones are run with an integrated pest management plan. The national use of agro-chemicals is reduced by 5-10%. 100% of transportation, storage, manipulation, and use requirements are met in 100% of production units.	Develop management plans that cover different life cycle stages of chemical products to be employed by production and/or service entities. Increase the application of integrated pest management schemes. Introduce Cleaner Production practices, including the application of the best available techniques and the best environmental practices. Increase the coverage of treatment and/or final disposal. Create and/or strengthen existing infrastructure to facilitate access to and exchange of information regarding chemical products. Increase awareness and capacity building at all levels of production and/or service organizations, , and among the general public. Train and prepare human resources for the development of alternative solutions capable of securely managing chemical products. Establish and/or consolidate national

	mechanisms working toward domestic implementation of the Stockholm Convention (Persistent Organic Pollutants) and the Rotterdam Convention (Prior Informed Consent)

4.1.3.e) Exploration and Production of Hydrocarbons

Principal Plans and Programs:

Program for Technical Development

Program for the Assimilation of Services to Wells

Program for the Evaluation and Development of Fields

Exploration Program 2005-2010 (Including the EEZ)

Exploratory/Production Investment Program

Specific Objectives:

- Minimize environmental impacts of petroleum exploration and production and its associated systems.
- Decrease contamination generated by companion gases.

Goals	Actions
Six documents are elaborated that correspond to the technical and legal norms governing the exploration and production operations.	Make available the required regulatory framework to ensure sustainable development of petroleum exploration and production.

Environmental indicators related to the execution of this activity are established and controlled.	Implement management systems in organizations that engage in petroleum exploration and production in order to evaluate the environmental performance of this activity.
More 50% of the waste products generated are used for economic purposes. Petroleum waste products are disposed of at sites previously approved by environmental authorities.	Guarantee the safe management of waste products resulting from petroleum exploration and production.
A program of planned investments for the hermetic control of systems associated with petroleum production is implemented. More then 90% of companion gases generated through this activity are being utilized.	Guarantee the execution of investments for treating, transporting, and utilizing companion gases.
Specified pipeline regulations are approved and implemented.	Achieve secure petroleum and gas pipeline management.
The Business Plan includes and implements restoration measures.	Establish restoration programs for the areas impacted by petroleum production.
Contingency systems are established and put into effect in case of hydrocarbon spills. Training plans are executed.	Guarantee that these contingency systems function in case of hydrocarbon spills.

4.1.4. Biological Diversity

Principal Plans and Programs:

- **Action Plan of the National Biological Diversity Strategy**
- **National System of Cuban Protected Areas Plan 2003-2008.**

- **National Forestry Program.**
- **Biological Diversity Program of Prioritized Watersheds.**
- **Integrated Mountain Development Program.**
- **National Biosafety Action Plan.**

Specific Objectives:

- Promote the conservation of ecosystems, habitat, biomes, species, and genes.
- Promote sustainable use and consumption.
- Control threats posed by exotic invasive species.

Goals	Actions
Effective implementation of at least 80% of the actions indicated in the Action Plan (the updated version of the National Biological Diversity Strategy). The Strategic Environmental Assessment is developed. Biological resources that lend support for sustainable ways of life, local food security, and the provision of health services are maintained. Traditional forms of knowledge, innovation, and practices are protected. By 2008, Cuba has an economically and environmentally sustainable fisheries strategy.	Conclude the process of updating of the Action Plan of the National Strategy for Biological Diversity, establishing priorities and specific areas for cooperation based on identified critical points. Achieve the effective implementation of these priorities. Ensure that in the discussion, evaluation, and approval processes for territorial Land Use Planning, biological diversity principles of conservation and sustainability are upheld, with particular emphasis on the coastal zone and its corresponding protection zone, as well as in protected areas. Evaluate the impact of the "Álvaro Reynoso" Task on the conservation of biological diversity.

	Include as part of national fisheries strategies the use of adequate fishing methods and gear for the conservation of biological diversity, as well as when dealing with already introduced species. Increase the level of implementation of work programs related to international conventions (CBD, Ramsar, Cartagena, CITES, CMS, among others.) Achieve greater public awareness and a change in attitudes that lead to increased citizen participation regarding the use and conservation of biological diversity through environmental education and environmental disclosure. Guarantee the effective functioning of quarantine mechanisms and ensure that existing systems comply with biosafety requisites.
A reduction in the rate of habitat loss and degradation nationally. Ten percent of the country's coastal zones are subject to an integrated coastal management regime. Management plans for watersheds and coastal zones are integrated in all provinces with relevant basins. Twenty-five percent of the vital coral barriers are maintained under monitoring and conservation programs. Ten percent of mangrove forests are subject to monitoring and/or management plans.	Establish rehabilitation and restoration plans for degraded ecosystems and habitat. Establish action plans for the conservation and sustainable use of prioritized ecosystems. Develop methodologies and instruments for the assessment and economic valuation of biological diversity resources, incorporating these instruments into the economic planning process.

The capacity of ecosystems to provide goods and services is maintained.	
The decrease in number of taxonomic groups of particular importance is restored, halted, or reduced. Cuba counts on a legal framework, with a corresponding list of species, to grant licenses authorizing the use species under special protection. At least 50% of the rare, threatened and endangered species, are under monitoring and/or a protection regime. By 2010, all the species under exploitation are covered under a management plan. No species of wild flora or fauna is endangered due to international trade.	Make the list of endangered species of Cuba (Red List). Establish a national program of documentation, re-categorization and recovery of threatened species. Carry out a gap analysis for populations of endangered species in the National System of Protected Areas to develop biological research and management plans for wild species of flora and fauna under exploitation to ensure sustainable use. Carry out the necessary studies on native species of fish for farming. Develop a national program for farming native species of fish.
Areas of particular importance for biological diversity are protected. Cuba counts on an integrated Plan for the National System of Protected Areas (SNAP) comprising designated protected areas managed efficiently in accordance with national legislation, and representing 90% of natural landscape types, 15% of the marine platform, 25% of coral reefs, and 95% of endemic and/or threatened species. The total national territory included in the National System of Protected Areas is increased by at least 7%. By 2010, the total	Implement strategic decisions included in the 2003-2008 Plan for the National System of Protected Areas (SNAP), particularly those relevant to: • Strengthening the work of the Coordinating Board of the National System of Protected Areas. • Making the legalization process for protected areas identified by the National System viable, as well as the development of its operative management plans. • Strengthen the work mechanisms of administrative and controlling bodies over activities undertaken in protected

portion of national territory designated as protected areas will comprise 11.4% of Cuban territory, including approximately 7% of the territory covered by areas designated protected areas under strict management control or as areas of national importance. The area of island shelf of the national territory incorporated into the National System of Marine Protected Areas is increased by 12%. This increases the overall percentage to 15% by the year 2010. 100% of Protected Areas approved by the Executive Committee of the Council of Ministers have elaborated their operating and management plans. The effectiveness of the management of protected areas is increased by 10%. An information system for protected areas is available and used as a decision-making tool. A system of biological corridors and/or other systems that guarantee connectivity between protected areas and *in situ* conservation of biodiversity are available.	areas. • Perfect the integration and interaction of the National System of Protected Areas with other systems, plans, and programs. • Prioritize the designation and attention to the areas under international recognition (Ramsar sites, World Heritage, Biosphere Reserves) and achieve national and international budgeting projections that allow for the adequate search for and securing of funds and resources. • Prioritize the declaration of marine protected areas and achieve viable national and international protections that allow for adequate search for and securing of funds and resources. • Develop the research, validation, and introduction of advanced technologies, implementing an information system for the management of the SNAP. • Promote community work and citizen participation in protected areas, strengthening the capacity for dissemination of information, environmental education, and public use that will contribute to the sustainability of these areas.
The genetic diversity of crops, livestock, and species of trees, fishes, and wildlife collected commercially, and other socio-economically valuable species are conserved. Local knowledge associated with these topics is maintained. A complete legislative framework for the	Encourage the development of a normative strategic framework that incorporates in an integrated way the existing links between biological diversity and the development of genetic resources for food and agriculture. Establish norms to govern the use and conservation of resources found in biological

introduction to, access to, and use of genetic resources, including their corresponding intellectual property rights is developed. Regulations governing the use and adequate conservation of resources found in biological collections are established. A national policy and a normative and legal framework are in place for the secure transfer, manipulation, and utilization of modified living organisms that result from modern biotechnology. At least 80% of the actions that comprise the National Biosafety Action Plan are implemented.	collections. Dedicate special attention to the issues of introduction, access, and use of genetic resources and the corresponding intellectual property rights, including completing the required legal framework. Design and approve a national policy and a normative and legal framework for the development and use of genetically modified organisms resulting from modern biotechnology. Implement the necessary strategies and legislation in order to guarantee a just and equitable distribution of the benefits derived from the use of genetic resources.
Joint regional and international programs relating to monitoring, management, research, and utilization of biological diversity are established. Biological diversity information networks on the national level are established and/or strengthened. A National System of Environmental Monitoring incorporating issues of biological diversity and fragile ecosystems, based on a system of indicators that responds to national needs is available.	Strengthen scientific, technical, and institutional capacities (on both a regional and national level) of knowledge, as well as the conservation and sustainable use of biological diversity. Strengthen the coordination and integration between national entities directly or indirectly linked to the conservation and use of biological diversity. Look for synergies between commissions and groups involved in the protection and use of natural resources in order to better integrate current environmental efforts and thereby achieve more efficient results. Promote the establishment of joint regional and international programs relating to monitoring, management, research, and utilization of biological diversity.

	Promote the use of Geographical Information Systems and other modern digital technologies as tools for the management of biological diversity. Define the methodological and functional bases and strengthen the infrastructure necessary for the implementation of a National System of Environmental Monitoring, on biological diversity, the pressures that lead to its loss, the occurrence of pests and disease, and the impact of chemical agents used to control pests and disease. Develop a set of biological diversity indicators that respond to national needs and, at the same time, provides the information that the country is committed to present regarding the 2010 Goal relative to significantly reducing the loss of biological diversity.,
Measures are implemented to mitigate the negative impacts resulting from the introduction and spread of exotic invasive species. Strategies and Operative Plans for the control of selected exotic invasive species are developed, with at least 50% of the actions implemented.	Create a national inventory of exotic invasive species. Identify and select a group of these species to work with during the current period, both according to priorities and to the possibility of effectively taking action. Establish management strategies and plans for the exotic species selected. Increase controls over invasive species, including studies on how to avoid the introduction of new species that could negatively affect the ecosystems in which they thrive.

4.1.5 Hydrological Resources

Specific Objectives:

- Increase water quality and supply, in addition to increasing its rational use.

Goals	Actions
A 30% reduction in the volume of water used in production processes, specifically targeting the sugar cane industry, the agricultural sector, the food industry, construction, and tourism. Morbidity rate attributable to water-borne diseases is decreased annually. The supply of potable water to over 96% of the population is achieved (broken down by location, easy access, and public services). Water supply service is offered according to quality standards. The average time when potable water services are available is increased. The annual rate is kept above 95% of water supply treated, chlorinated, and potability index. By 2008, a detailed evaluation, quantification, and characterization of its existing water reserves in Cuba is available.	Increase the coverage, chlorination levels, and quality of potable water. Improve and control operation of the zones that serve to protect water supply sources. Increase water savings in the main productive activities and services. Finish the classification and evaluation of water reserves and mountain and river supply sources. Adequately evaluate and quantify the country's existing water reserves. Develop early warning systems for drought. Increase the coverage of liquid waste treatment, making the necessary investments in construction of new facilities, as well as in maintenance and repairs for existing systems. Special emphasis should be placed on the domestic, industrial, agricultural, and hospital sectors. Continue to increase the economic exploitation and reuse of properly treated liquid waste for agricultural, industrial, and aquacultural uses. Plan and carry out the necessary actions

	toward mitigating the effects of drought, with respect to assuring water supply to the population, industry, and services. Utilize the option of desalinization when feasible to increase sources of water supply.

4.1.6. Natural Disasters

Specific Objectives:

- Reduce the impacts of natural disasters on the population, the economy, and the environment.
- Execute DIRECTIVE #1/2005 of the Vice-President of the National Defense Council for the planning, organization, and preparation of the country in the event of a natural disaster.
- Anticipate the risk factors involved in all activities related to construction, from the selection of materials to technology, building design and maintenance, and even reuse.

Goals	Actions
Using the country's scientific potential, studies have been conducted to assess threats, vulnerability, and risks associated with natural disasters, as well as their environmental impacts. A plan of measures for mitigation and adaptation to the effects of climate change is available. Early warning systems are available. The production of construction materials,	Decide on new studies that need to be carried out, and subsequently conduct them relying on the scientific background of CITMA and other ministries, territories, and NGOs, including assessments of the environmental impacts of potential natural disasters. Special emphasis should be placed on meteorological drought and the incidence of tropical cyclones. Based on these studies, develop a Disaster Reduction Plan for each sector and territory focusing on prevention.

buildings, and urban spaces with greater levels of interchangeability in regards to open design modulation and conception is guaranteed. Disaster reduction studies and plans that mitigate man-made and natural disasters that heavily impact the environment, with particular attention paid to disasters that are natural, technological, and public health-related, have been established.	Design and implement measures to mitigate and adapt to the effects of climate change, especially sea level rise and the possible increased occurrence of natural meteorological phenomena, taking regional initiatives and experiences into account. Improve the exchange of experiences and cooperation in and between regions in order to minimize the effects of natural phenomena and environmental emergencies, both accidental and induced. Formulate policies that strengthen disaster response capacities as well as inter-regional and international cooperation. Develop early warning systems for all types of natural disasters, including drought. Increase the assessment of the impacts of natural disasters on natural resources. Develop rehabilitation and mitigation plans that address the impacts of natural disasters on environmental resources for all entities. Create architectural designs sufficient for our climatic conditions, cultural antecedents, and contemporary aesthetic influences, employing appropriate construction materials.

4.2. AREA B. TOOLS FOR ENVIRONMENTAL POLICY AND MANAGEMENT

4.2.1. Environmental Planning

Specific Objective:

- Achieve the interrelation between environmental and land use planning, ensuring that regional land use planning for socio-economic development is integrated with relevant environmental planning. This will facilitate the responsible management of natural resources, the protection and rehabilitation of the environment in order to increase the quality of life of the population, and also contribute to the sustainable development the territory.

Goals	Actions
Environmental and land use planning are integrated. The legal framework that guarantees the effective introduction of the environmental dimension to land use planning has been perfected. 100% of national territory is incorporated into the approved general schemes of land use planning, with due consideration given to environmental variables. 80% of the Special and Partial Plans for coastal zones, mountains regions, and watersheds of national significance is approved.	Equip land use planning with a higher hierarchy legal instrument (Decree or Decree-Law) that regulates sustainable land use planning processes. Develop a methodological instrument effective in land use planning. Achieve an institutional strengthening that allows proper projections of environmental planning by CITMA Improve the environmental dimension of OACEs sectoral plans. Ensure that compliance with the environmental requirements and regulations incorporated in land use planning is achieved before approval. Achieve the proper interweaving of the

	National System of Protected Areas and other natural and sensitive areas of national interest in the land use planning processes. Revise and improve the necessary normative framework for the achievement of said actions.

4.2.2. Environmental Legislation

Specific Objective:

- Deepen the application of the Law, while filling existing legal gaps in order to continue to consolidate efficient and effective legal framework, as an essential strategic objective.

This assumes a relationship between the regulations of prevention, mitigation, reparation or solution, and control of the country's main environmental problems, as well as the consideration of options and the definition of which actions to carry forth, taking into account current economic changes, our own idiosyncrasies, and culture, education, and participation.

Goals	Actions
The legal framework for the protection of the atmosphere and for the general implementation of energy policies is completed. The Decree-Law governing access to genetic resources is approved. Enforcement of legislation covering soils, waters, flora, and fauna. Pertinent environmental prescriptions are included in the Civil Code, the Law of Civil	Complete the legal environmental framework in those areas where gaps have been identified. In necessary cases, revise and modify current legislation. Improve and complete Cuba's system of technical environmental standards introducing preventative approaches. Introduce environmental requirements into current civil and penal legislation.

Procedures, and the Penal Code. Citizens are aware and make use of the legal instruments that the state depends on for the protection of the environment. Legislation regarding insurance against the risks of environmental accidents referred to in Law 81 is fully implemented.	Increase public awareness and use of legal instruments available in Cuba to promote environmental protection. Consolidate the process of harmonization between environmental legislation and other spheres of legal regulations.

4.2.3. Environmental Impact Assessment

Specific Objective:

- Strengthen the Environmental Impact Assessment as a tool of policy and environmental control used to protect the environment and promote the rational use of natural resources, representing a means to reach economically and socially sustainable development.

Goals	Actions
Methodologies for the Strategic Environmental Impact Assessment of Plans and Programs are approved and applied regularly. Its application has been tested in the sectors of tourism, fisheries, soil management, forestry management, hydrological resources, and mining. It is guaranteed through effective control measures that 100% of new works and activities as well as expansions and modifications requiring environmental impact assessments are submitted to this process and that they comply with prevention and mitigation measures and other monitoring programs for negative environmental impacts identified in the assessment process.	Develop a methodological instrument for the Strategic Environmental Impact Assessment of Plans and Programs, in accordance with Article 31 of the Law. Perfect the Environmental Impact Assessment process for new investments, expansions or modifications of existing works, cases of rehabilitation of currently stalled activities, and other works and activities in progress that could generate significant negative impacts. Increase the scientific and technical rigor of the Environmental Impact Assessment process. Apply the Cleaner Production approach to

Cleaner Production approach is applied to the process of Environmental Impact Assessment. 100 % of the projects that require public consultation are presented to it.	the process of Environmental Impact Assessment, such that it becomes an instrument that facilitates the prevention of risks and environmental damages, as well as increasing the economic efficiency of the projects subject to this process. Develop methodological baselines for the inclusion, at a minimum, of cost-benefit analysis in the Environmental Impact Assessment process. Present projects that require public consultation to the public.

4.2.4. Environmental Licensing

Specific Objective:

- Harmonize the legal regulations that govern the granting of licenses, and establish effective and quick procedures for the issuance and control of said licenses.

Goals	Actions
Harmonization and synergies exist between the different environmental licenses granted for an activity. Control over all requirements imposed on issued environmental licenses is guaranteed.	Develop and put into effect regulations that harmonize permits and licenses issued by other OACEs and CITMA, whenever said licenses have the same purpose. Adequately integrate and synergize the types and modalities (permits and authorizations) of licenses granted by CITMA.

4.2.5. State Environmental Inspection System

Specific Objective:

- Strengthen Inspection as well as the appropriate state control mechanisms.

Goals	Actions
Each territory in the country has a body of state environmental inspectors. The required aspects to guarantee environmental protection are included in systems of state inspection of the OACEs. The linking of the results of the state environmental inspection to the fiscal verifications of the General Attorney of the Republic has been achieved. State inspectors of the Ministry of Fishing, Agriculture, Transportation, Public Health, Hydrological Resources, and Forest Service are empowered to demand administrative responsibility on environmental issues under their jurisdiction. The scope of actions and the faculties of popular inspectors have been defined for the environmental field.	Encourage the effective application of current legislation relating to State Environmental Inspection. Develop and complete the system of state environmental inspectors, ensuring their presence with necessary working resources in all regions of the country in need of their services. Strengthen the role of the territories in State Environmental Inspections. Integrate the activities of all bodies involved with those of the Local Agencies of the Peoples' Power (Órganos Locales del Poder Popular). Coordinate CITMA's activities with those of the OACEs in a systematic way, that due to their main functions and attributes carry out state inspections. Include the required aspects necessary to guarantee environmental protection in these inspection systems. Empower state inspectors of other OACEs to apply environmental contraventions to relevant frameworks in their fields.

4.2.6. Scientific Research and Technological Innovation

Specific Objective:

- Optimize and systematize the impacts of science and technological innovation as a part of the solution to the country's environmental problems.

Goals	Actions
Methodological guides are available to guide the Science and Technology Units toward the development of scientific and technologically innovative projects that meet environmental standards. Annual seminars and courses about Cleaner Production techniques and technical aspects of the environment are carried out. Mechanisms for the evaluation of environmental impacts resulting from technology transfers are implemented. During this same period, the results presented at the Forum of Science and Technology aimed at solving environmental problems and making environmental management more rigorous and efficient are increased by no less than 5 %. Environmentally appropriate technologies are employed that combine traditional methods and national solutions with the demands and requirements of sustainable development. Industrial property rights form a part of the environment, science, and technological innovation system.	Guarantee that the environmental dimension is systematically incorporated into the country's prioritized Economic, Social, and Cultural Development Programs, and that this incorporation is based on and supported by the most recent scientific discoveries of the Science and Technological Innovation Programs and Projects. Based on previously identified environmental problems at the sectoral, local, and national levels, develop and implement scientific and technological innovation projects designed to prevent, evaluate, control, and revert these problems. Strengthen the environmental requirements of the Technical Scientific Programs and other components of the National Science and Technological Innovation Plan, from the first design stages to their economic evaluation and social impact. The objective of this increased stringency is to offer results that contribute to the guarantee of sustainable development. Promote the study and use of environmentally appropriate technologies that combine traditional methods and national solutions with the demands and requirements of sustainable development.

Ties between the scientific community and national structures designed to address environmental problems, such as those affecting watersheds and bays, desertification and drought, climate change, and others are strengthened. Sectoral Programs that respond to specific environmental needs are designed and implemented.	Develop the necessary mechanisms to evaluate and control for the environmental impacts of technology transfer processes, ensuring that all evaluations are based on the most current scientific data available. Provide incentives to the Science and Technology Forum and the Youth Technical Brigades to develop yet more solutions and innovations that contribute to achieving more efficient environmental management supported by solid scientific bases. Promote, design, and develop economic and social research required to support environmental activity. Ensure that the issue of industrial property rights becomes a substantive part of the system of the environment, science, and technological innovation.

4.2.7 Environmental Education

Specific Objectives:

- Reorient and strengthen education toward sustainable development, putting activities into practice in a coherent, systematic, and integrated manner, while incorporating all governmental agencies and institutions, social organizations, and society as a whole.

- Increase the development of environmental education activities that promote greater community participation and consciousness-raising of the citizens on issues of sustainable development.

- Identify the policy elements specifically related to the role of mass communication means, and communication processes in general, in the

development of an environmental culture among the populace.

- Increase and strengthen the spaces for participation of social organizations – primarily on the local level - in the processes of elaborating, implementing, and monitoring environmental policies and environmental management processes in particular.

- Systematically evaluate citizen participation levels and impacts of educational management on the development of an environmental culture among the Cuban population.

- Increase and strengthen the environmental dimension within the National System of Education and Higher Education in order to contribute to the development of an environmental culture in Cuba.

Goals	Actions
Effective environmental education programs are designed, strengthened, and implemented in prioritized ecosystems and in all political, student, youth, and mass organizations in the country, as well as among more vulnerable social groups, including the elderly and handicapped communities.	Design and implement specific environmental education programs and strategies that envision, identify, and promote the role of governmental agencies and institutions, the press, and social organizations, while also examining their respective scope, interrelationships, and cohesiveness.
Environmental education programs, projects, and experiences are implemented in all scientific, recreational, educational, and cultural institutions, prioritizing zoos, botanical gardens, aquariums, and museums, among others.	Design and implement environmental knowledge campaigns and programs that provide a base for the development of activities and that are capable of adapting appropriately to the institutional, provincial, and community specificities and needs.
Community projects related to environmental education are more widespread and strengthened, relying on schools as the community's most important cultural center for the development of a generalized and integrated culture.	Develop studies of environmental perception. Improve and increase the introduction of the environmental dimension into study plans and trainings within the National Education System, as well as within Higher Education.

All the provinces and the Special Municipality are equipped with diagnostics, prognostics, characterizations, and results regarding the local population, as well as perceptions and protection of the environment. CITMA-OACE agreements on environmental education are consolidated. The National Network of Environmental Training at the national and provincial levels is functioning and consolidated. The way in which environmental themes are introduced into programs and plans of study, text books, and the National System of Education is amplified and improved. Research in favor of environmental education, communication of the results of this research, and generalized models based on success stories are strengthened. The communication of environmental themes in information processes and mass media are more widespread and improved. The sense of responsibility that Cuban citizens feel toward the environment is amplified and strengthened, as well as the participation of all sectors of society in actions favoring sustainable development. Indicators that can be used to evaluate development and the impacts of management in environmental education are available.	Included in this process should be the consolidation and extension of the duties of the National Network of Environmental Training. Encourage the development of environmental education and awareness-raising activities in recreational, cultural, and scientific institutions, as well as within social organizations and scientific societies which carry out important informal educational functions among children, youth, the community, and the general population. Increase and strengthen the training for teaching staff and educators in general in order to foster the introduction of the environmental dimension in all the educational work of the country. Integrate and develop the environmental dimension – particularly related to the impact of productive activity and services on the environment – with training programs for management staff, technical assistants, and general laborers from these industries and services. Promote and consolidate areas of experience exchange for national environmental education experts at both a national and international level. Create a technical-advisory National Environmental Education Group that contributes to increasing and improving policy and strategies at the sectoral, provincial, and non-governmental level to increase the effectiveness of environmental

Publications, educational materials, and other means of communication that allow for a wider extension of current knowledge and the Cuban experience in regards to sustainable development and the environment are available. The National Environmental Education Group is functioning in an effective manner. State agencies and institutions have incorporated their own channels to spread environmental education and in particular the protection and sustainable use and exploitation of natural resources specific to their area of responsibility or with which they are linked via their activities or services. Environmental subject matter, and in particular, those aspects related to the way in which productive activity and services influence the environment, are included in training programs for management staff, technical assistants, and general laborers from these industries.	education in Cuba. Elevate the function and responsibilities of the mass media of communication into the incorporation of the environmental dimension in television and radio programming, the print media, print presses, and cartoons and graphics on both a national and local level, and then spread any advances that are achieved internationally. Encourage and support governmental and non-governmental agencies and institutions to incorporate the environmental dimension in their communication structures, particularly in regards to the protection of and the sustainable use and exploitation of natural resources specific to their area of responsibility or with which they are linked via their activities or services. Encourage, augment, and increase the volume, production, and availability of technical literature covering environmental subject matter.

4.2.8. Economic Regulations

Specific Objective:

- Influence the sustainable use and management of natural resources and environmental protection through the employment of economic instruments deemed appropriate to the current country conditions. These efforts should operate in accordance with other instruments designated in this strategy and promote an evaluation of the impacts of said economic instruments.

Goals	Actions
Environmental budgeting and accounting are implemented by business. Preliminary versions of the system of integrated economic-environmental accounting are proposed.	Develop methods of valuation and accounting of our national environmental resources that allows for the application of economic and financial instruments that guarantee adequate record keeping, control, and impact over economic activity.
The design and application of a system of economic and financial instruments is achieved, allowing for the control and evaluation of resources allocated to the environment and the means to stimulate its preservation.	Take necessary steps to implement a system of integrated economic and environmental calculations to determine the correct valuation and accounting of natural resources and the environment.
Environmental insurance and/or restoration funds are created in economic activities that exploit designated ecosystems or that present the threat of environmental accidents.	According to the framework established by the Tax Law, gradually yet promptly implement taxes, rates, and other tariffs designed to promote environmental and natural resource protection.
The processes of negotiations at the World Trade Organization regarding Commerce and the Environment, as well as the negotiations about Environmental Services are followed.	Continue to stimulate environmentally friendly investments through granting medium and long-term soft credit, accelerated rates of depreciation, exemptions or reductions of taxes and tariffs, the granting of subsidies and other economic instruments.
Economic instruments are in place that serve as effective mechanisms for introducing cleaner practices and technologies, that minimize the generation of wastes and optimize the use of natural resources, products, and raw materials in factories.	Continue to improve the planning process related to the control of environmental protection investments made by selected OACEs and Provincial Administration Councils.
Methodological bases have been created for the inclusion of cost-benefit analysis as a minimum in the Environmental Impact Assessment process. A rise in exports is influenced by the	Establish mechanisms that enhance the ability to predict needs and provide the necessary financial resources to apply measures designed to protect, restore, and

development of environmental goods and services and organic products. Increased training on environmental and ecological economics in universities and other centers within Cuba, as well as strengthened institutional capacity within CITMA for this purpose is achieved.	conserve the environment, in the financing of investment projects of significant environmental impact, such as in the stage of exploitation and closings. Work toward the development of an insurance policy against the risks of environmental accidents. Establish the measures necessary for the development of environmental services and the recognition of their economic importance. Actively participate in the negotiations concerning this issue in the World Trade Organization. Initiate steps toward the introduction of Cuban Ecological Labels. Increase training and preparation of human resources in function of environmental and ecological economics. Cuba's Centers of Higher Education should increase the amount of attention they direct toward themes related to environmental and ecological economy.

4.2.9. National Environmental Fund

Specific Objective:

- Augment the Fund's role as a mechanism for financing projects and activities that promote environmental protection and the rational use of natural resources.

Goals	Actions
Greater financial resources are available for the Fund. The mechanisms for financing Fund projects, as well as financial control over their implementation, and measuring their impacts are perfected. Training and project quality has improved. The Fund has been strengthened institutionally. As a result of establishing strategic alliances, the environmental impacts of the assigned resources have been strengthened.	Coordinate and implement external fundraising activities in support of the Fund. Increase the degree to which currently approved financial sources are being utilized by the Fund, and negotiate the development of new sources of income. Improve the financial mechanisms and the control over Fund projects, as well as their impacts. Improve the quality of projects presented to the Fund, as well as the methodological requirements that projects must meet before they apply to participate in the Fund. Develop a territorial-scale training program designed to improve the quality of projects that apply to participate in the Fund. Consolidate the Fund's structure, personnel, and work resources in order to elevate the Fund as an independent institutional and legal entity. Develop strategic alliances between the National Environmental Fund and other existing funds.

4.2.10. National System of Environmental Information (SNIA)

Specific Objectives:

- Evaluate the state of the environment in order to contribute to decision-making relating to environmental protection, sustainable use of natural resources, and improving the populations' quality of life.

- Ensure that SNIA plays a key role in drafting reports on the state of the Cuban environment in Cuba and that the System achieves national reach. The system must be able to compile, process, and supply environmental information with the aim of offering a comparative vision of the state of the environment and be able to evaluate principal qualitative and quantitative environmental tendencies.

- Ensure that the System manages and facilitates the exchange of environmental information generated by the OACEs, and that this information is accessible to interested groups both domestically and internationally. This can be achieved via a system of interfaces that will allow different users to access environmental data and information of a provincial, national, or international nature, with centralized security models for data bases that grant authorized users access to information within the System's different topics.

- Ensure that SNIA becomes a key tool in the design of environmental educational programs relating to specific aspects of national interest or in the formation of national environmental consciousness in Cuban society.

- Guarantee that the Cuban environment maintains visibility, and continues to improve the way it is represented in official Cuban statistics.

Goals	Actions
SNIA satisfies the environmental informational needs and requirements of Cuban society. An efficient system for capturing, storing, processing, and distributing the information	Design SNIA with the participation of different sectors of society, staying within the regulatory framework imposed by the National Statistical System. Organize and systematize environmental

is implemented. Annual reports on the state of the environment are presented that cover points relevant to all the provinces and that provide a general perspective on the environmental progress that has been achieved in Cuba. Evaluation records and analysis of technological incidents with environmentally significant repercussions are available. An effective environmental monitoring system that uses analysis of pertinent indicators to funnel reliable information to the SNIA is in place. National and provincial data bases and networks based on available information are available, as well as networks for the distribution and exchange of information.	databases using modern technological tools, and provide timely and reliable information services for inside users as well as the general population. In this manner, the databases contribute to an efficient environmental management that is in line with the regulations governing the treatment of official and classified information. Develop tools that allow for the integration of different sources of environmental information and make said information available to all sectors of the public, taking into account the compatibility of this information with official statistics: Geographical Information System, System Internet and Intranet, among others. Improve the system of relevant environmental indicators. Create a group of experts at the territorial and national level for the analysis and integration of environmental data. Make nodes available in the provinces that guarantee the fulfillment of minimal technical requirements.