Coastal Zones Management and Tourism in the Dominican Republic

Contents:

1. The coastal zones in the Dominican Republic

Bordered by 1,389 km of coasts, the Dominican Republic presents a very rich composition of coastal and marine ecosystems ranging from sandy beaches, rocky coasts, estuaries, mangroves, marine prairies and coral reefs. For the purposes of this report, we will divide the countries' coastal and marine zones in 7 macro areas:

1.1. The North-West (Montecristi) – characterized by coral reefs and estuaries it is one of the most important areas from the ecological viewpoint. Tourism development has not occurred in this area which conserves its natural state. Main threats are the pollution of Yaque del Norte river which carries sediments and pollutants from the agricultural areas upstream.

1.2. The North (Puerto Plata, Sosua, Cabarete) – characterized by rocky coasts, sandy beaches, mangrove ecosystems and wetlands and coral reefs. Most of the coast has seen a rapid tourism development and is threatened by high loads of organic pollutants originating from urban areas along the coast and previously by the sugar cane plantations.

1.3. The North-East (Samaná peninsula) – characterized by sandy beaches (a small portion of which of coral origins) interrupted by rocky coasts, and coral reefs. The South of the peninsula is characterized by an estuary (Yuna river) whose natural sedimentation caused a former Island to become the current peninsula. The highest production of prawns takes place in this area. The Southern part of the peninsula forms the Haitises National Park, with estuaries and small portions of coral reefs. This is an area with high tourism and ecotourism potential, given the diversity and proximity of ecosystems.

1.4. The East (Bávaro – Punta Cana) – dominated by coral reefs, this area is predominantly characterized by white sands very attractive for the tourism industry. The coast continues with cliffs of coral origin. This part of the island has been formed by coral deposition which makes it very different from the rest of the country, mainly of volcanic origins. The only relevant economic activity in the area is Tourism.

1.5. The South-East (La Romana – Bayahibe) – characterized by sandy beaches (the ones in the Parque Nacional del Este are in their natural state) and cliffs. The area is very important for tourism development and with a high potential for the cruise industry.

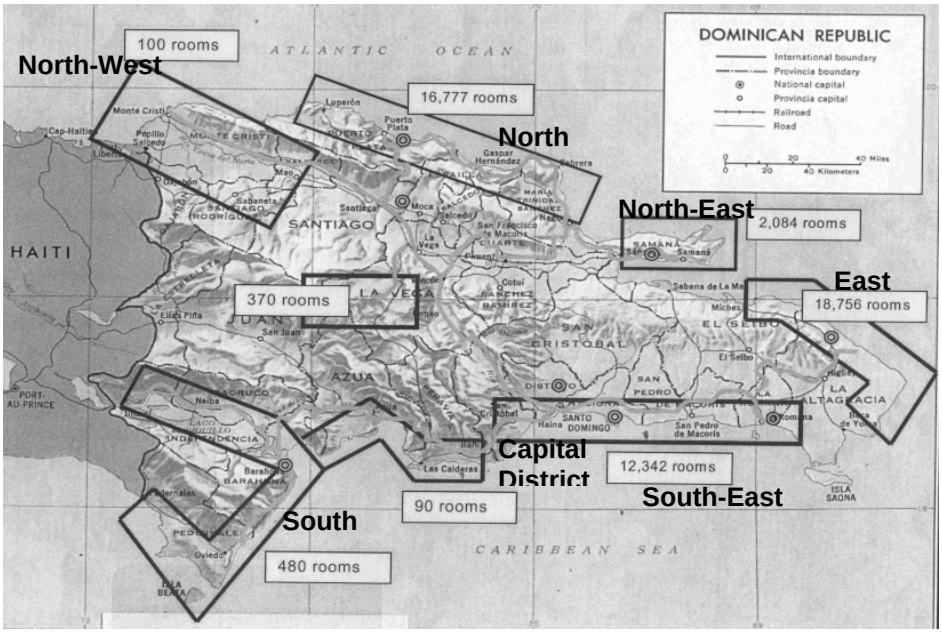
1.6. The capital area (Boca Chica, Juan Dolio, Guayacanes and Santo Domingo) – characterized by artificial beaches it has been heavily transformed by the tourism development (being the first tourism pole in the country) and other economic activities such as ports, yatch marinas and commercial activities associated with urban areas. White sandy beaches, of high aesthetic value, originated from a small coral reef formation.

1.7. The South – characterized by rocky coasts interrupted by small beaches formed by the sedimentation of the various rivers. The area West of the Parque Nacional Jaragua is lower in altitude and has a coral reef origin. It is characterized by white sandy beaches and for this reason the area has a very high tourism potential, so far untapped.

The following table summarizes and gives a description 'at a glance' of the coastal areas in the country.

Table 1. Coastal areas and economic activities in the Dominican Republic

Area	Coral	Mangroves	Tourism development	Fisheries	Urban Development
North-West	YES	High	Low	Low	Very low
North	Partially	Medium	High	High	High
North-East	Partially	High	Medium	High	Low
East	YES	Medium	High	Low	Low
South-East	YES	Low	High	Low	High
Capital district	Partially	Low	High	Low	Very high
South	YES	Medium	Very Low	Low	Very low



2. The causes and the cost of degradation in coastal areas

Information on coastal zones pollution has traditionally been lacking in the Dominican Republic. Several authors however agree that most of the pollution originates from inland activities. Degradation also occurs due to the unsustainable use of marine resources, such as coral reefs, mangroves ecosystems.
The following table describes the main sources and recipients of environmental impacts in the coastal areas. We identified three four main economic actors: (1) the tourism industry, (2) the fishermen, (3) urban areas and industry, (4) agriculture. Sources of environmental degradation are organized in rows and recipients are in the columns. So

the 'Urban areas' (third row) are a *source* of solid waste and water pollution that *affects* 'tourism' (first column).
The elements in the main diagonal, i.e. those impacts caused by a sector upon itself, are of particular relevance, not only for the extent of the impact but also given the institutional challenges they pose. We will concentrate on each of these. We will also consider the 'off-diagonal' externalities, especially those linking tourism and urban areas. Notice that each one of the coastal 'macro-areas' identified in session 1 are characterized by a different mix of environmental impacts so that a different table could be originated for each area.
The analysis that follows will consider the two main recipients of degradation: the tourism and the fishing industries.

Table 2 – Identified sources and recipients of degradation in the coastal areas

Recipient / Source	**Tourism**	**Fisheries**	**Urban areas and industry**
Tourism	Superficial, underground and coastal water pollution, congestion of beaches, overexploitation of aquifers, degradation of ecosystems (i.e. coral reefs eutrophication)	Water pollution in coastal water	Underground water pollution
Fisheries		Potential but undocumented overexploitation of fishery resources, especially near the shore where reproduction takes place	
Urban areas and industry	Uncontrolled landfills, solid waste accumulation, superficial and underground water pollution, landscape degradation, air pollution, noise	Water pollution in coastal waters	Air, water, solid waste pollution (out of the scope of this report) Air and water pollution (out fo the scope of this report)

2.1. Tourism development and the cost of degradation

Stylized facts about the tourism industry in the Dominican Republic are:

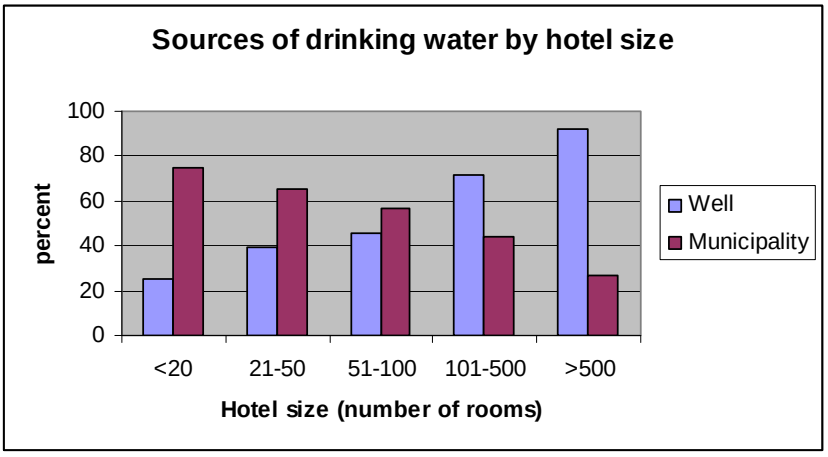
- The tourism industry has been growing faster than the rest of the economy in the past 10 years. Between 1995 and 2000, the tourism GDP has grown at a 12% every year, compared to 8% for the rest of the economy.

- The tourism industry is a very important economic sector. Tourism GDP accounted in 2000 for nearly 8% of total GDP and tourism revenues represented 40% of GDP and three times the flow of foreign direct investments (FDI)
- Ownership in the tourism industry is segmented: small hotels (i.e. less than 50 rooms) belong to a physical person; larger hotels (i.e. more than 100 rooms) belong to corporations.

The Dominican tourism industry faces a series of environmental challenges, nominally the availability of water services (sewerage and drinking water) and the lack of disposal of solid waste. Importantly, unplanned urban development is affecting the aesthetic qualities of tourism centers. Another source of environmental degradation may be arising in the future due to the unsustainable exploitation of underground water, especially in the East. While no systematic information has been collected on marine water quality and the state of coastal and marine ecosystems (mangroves and wetlands, coral reefs), degradation is probably causing serious losses in the services provided by such ecosystems {THE DIAGNOSIS PRESENTS SOME CALCULATIONS WHICH MAY BE PRESENTED HERE}

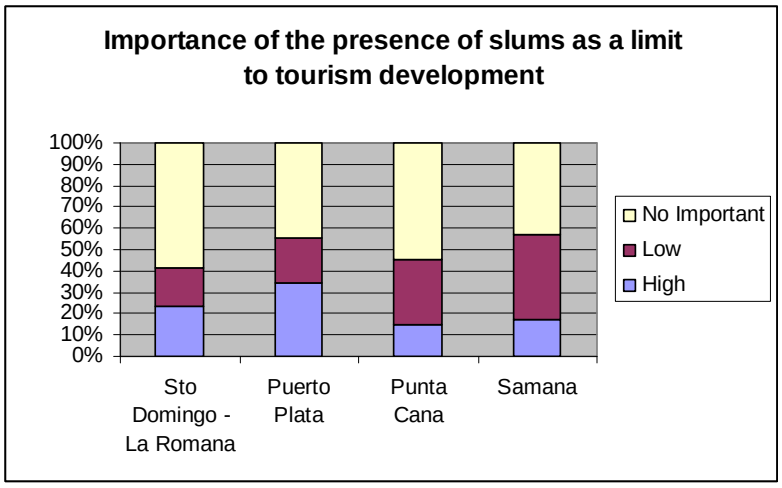
Water services are facing increasing demand and water resources are expected to receive growing pressure from tourism development.

Only 10-15% of smaller hotels (less than 50 rooms) have a water treatment plant. Most of small hotels depend on the municipal, and often inefficient, coverage. On the other side, about 90-100% of the larger hotels (more than 100 rooms) have declared having water treatment plants. Given that 59% of wastewater from DR tourist facilities is infiltrated in the subsoil (and only 10% goes to sewerage systems) the treatment of wastewater becomes an important issue.
With regard to drinking water: most of the smaller hotels use the municipal system. Larger hotels are much less dependent on municipalities and use aquifer resources. The following figure shows the sources of drinking water for hotels according to their size. Large resorts depend heavily on aquifer resources, especially in the East, characterized by relatively little precipitation, fewer and distant water bodies and the carsick morphology of the area. Availability of water in the future may pose a threat to tourism development: a recent survey showed that nearly 50% of hotel operators consider the lack of water infrastructure a limiting factor to development.



Urbanization is a major pressure to the tourism resource base

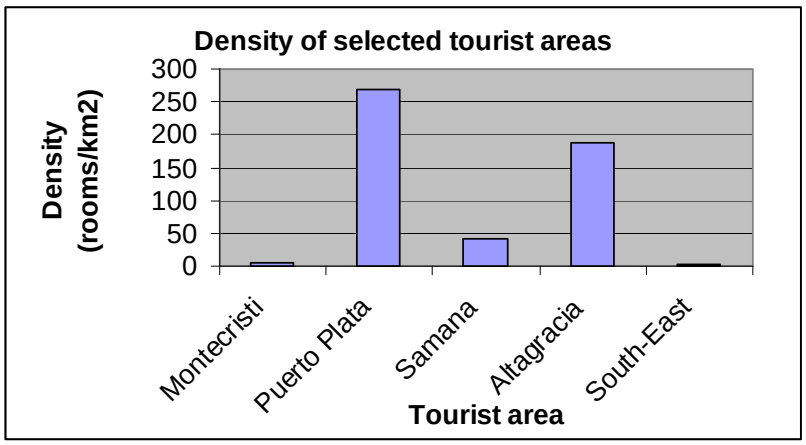
The rapid growth in the tourism sector had the effect of increasing the urban population in the vicinity of tourism centers. The growth of cities has been in many cases unplanned and evidence shows that the process is affecting the tourism industry itself. A recent survey of hotel operators shows that the problem is particularly acute in the North coast and is a growing problem in Samaná, where more than 55% of hotels surveyed consider slums as a limiting factor to development (see Figure).
Water pollution has caused the need for increasing hotels' expenditure in beach clean up (Playa Dorada has recently started to deal with the accumulation of solid waste in the beach) and in occasions has caused closure. An example is a hotel been affected by solid waste and organic matter being loaded in the estuary of a nearby river in Sosua.



Congestion in tourism areas

Evidence suggests that growth in certain tourism poles has been very high, posing threats on the sustainability of the industry itself. The following chart compares densities across

tourism areas. The province of Puerto Plata, in the North, is by far the province with more rooms per square kilometer, followed by the province of Altagracia, in the East[1].



Impacts caused by industrial activities

Industrial activities in coastal areas are linked to the generation of electricity and the port operations. An anecdotic example is the operation of a thermal plant in the port of Puerto Plata, whose smoke and noise affect nearby hotels in certain moments of the year.

Other environmental problems are likely to cause costs to the tourism industry. While not having cost estimates, a simple look at the relative prices in different tourism areas may shed some light into the effects of environmental degradation on tourism. The following box describes the case of Puerto Plata and Altagracia provinces, where tourism development has taken different paths and where hotel room prices seem to embody such differences.

Box – A tale of two tourism paradises: Puerto Plata and Punta Cana

Puerto Plata (in the North Coast) and Punta Cana (in the East Coast) constitute a good comparative case study of development patterns the tourism industry can take. The relative endowments of natural and manmade resources have been very different in the two sites. The Puerto Plata area, located north of the city of Santiago, has enjoyed good transport infrastructure and has benefited from the wave of investment following the 1971 tourism incentive law. On the other hand Punta Cana, in the 'far East' of the country, was developed in the late 80s, in an area with very little or no infrastructure. Currently both locations count respectively 16,000 and 18,000 hotel rooms being the two main tourism poles in the country.
Compliance with environmental norms has been strikingly different. A recent study highlights that, in Puerto Plata, 75% of hotels (mostly small) do not have a treatment plant and 73% use the soil as a receptor body. In Bavaro – Punta Cana the numbers are respectively 23% and 37%. Densities (measured as the number of rooms per square kilometer) are also different: Puerto Plata has 269 rooms/km2 vs. Punta Cana's 167 rooms/km2. In the following table we present these results together with average room prices taken from a sample of hotels. The correlation between

[1] Note that the morphology of the coast in the North is characterized by a large number of relatively small beaches, as opposed to the situation in the East where there are fewer beaches of larger size.

room price and environmental quality cannot be taken as conclusive but clearly poses the question whether environmental quality is having financial impacts on the tourism industry.

Location	Percent of hotels without treatment plants in the area	Percent of hotels disposing of wastewater underground in the area	Density (rooms/km2)	Average price for rooms with similar characteristics
Puerto Plata	75	73	269	US$83
Bavaro – Punta Cana	23	37	167	US$93

The Bavaro – Punta Cana example also suggests that tourism rents can be successfully used to cover basic infrastructure and environmental management needs. Puerto Plata has traditionally depended on the municipal infrastructure for the provision of water services and waste collection. The hotel industry in Bavaro – Punta Cana on the other hand could not claim a "right" to publicly provided services, having arrived there before urban life did. The tourism sector in the East financed the construction of residences for tourism employees, the construction of the international airport and a private firm is in charge of solid waste collection. Note however that environmental pressures in Bavaro – Punta Cana are not absent. For example, the geologic nature of the soil is such that underground wastewater disposal may in the long run cause serious damages to the aquifer which is the main source of drinking water in the area.
This observation points at the fact that most of the environmental problems encountered in tourism areas are linked to institutional factors. Management of environmental problems and the incentives structure should take into account the geographic as well as the social differences among tourism poles.

2.2. There is no baseline information to assess whether the fishing industry is unsustainable

Fishing in the Dominican Republic is essentially a subsistence activity. The latest public estimates on fishing effort are from the 1991 census, when a total of 3,752 boats and 8,640 (0.1% of the national population) fishermen were registered. The estimates suggest that nearly 95% of fishermen use artesanal practices while the remaining 5% can be considered semi-industrialized (i.e. boats larger than 6 meters used for fishing in the Silver Bank and Christmas Bank off the Atlantic coast)[2].
Over fishing has not been documented so no conclusive assessment is possible. The last estimate of MSY, from IADB (pre 1981), is 10,454 mt/year. Catch has consistently overcome this amount, as shown in the following table.

Table: Dominican Republic Marine Fishery Landings (Mt) – 1992-1999

Year	1992	1993	1994	1995	1996	1997	1998	1999
Production (tons)	13,169	12,949	13,027	18,662	13,192	14,536	10,069	8,517

[2] Personal communication by Guillermo Alcantara – Coordinator CEDEP proyect of JICA-SEA

Source: USAID – Country Environmental Profile

On the other side, fishing techniques (mostly bottom fishing) and inappropriate timing and location may also suggest potential degradation of the resource. A recent World Bank analysis[3] estimated that in 2000 the value of the environmental services lost due to unsustainable practices in fishing areas was about US$3.36 millions, or 6.1% of production.
Overfishing is not a documented problem so measuring its costs is virtually impossible. In the near future the Dominican Republic could take advantage of its incipient but growing fishing industry to serve the demand from tourist centers and for exports. If the efforts to promote fisheries – and the related issue of poverty alleviation in coastal areas – continue, a measure of the sustainable use of fish stocks becomes a pressing need.

3. The Incentive framework in coastal and marine zones

3.1. Promotion of the tourism sector as been a priority over the last 30 years

Tourism incentive policy has been a priority since the decade of the 60s. In 1971 a first incentive law (Ley153-71) established fiscal exemptions for foreign and national investments. In 1992 the law 153-71 was eliminated. However tourism development continued at a fast rate.
In 2000 the new Environment Law (Ley 64-00) was issued, followed in 2001 by a new tourism incentive law (Ley 158-01: "Ley de oferta complementaria"). This new law, similar in the substance to its predecessor, has a marked regional focus, dealing specifically with areas whose potential has not yet been exploited, including the Southern part of the country, the Samaná peninsula and Montecristi. Main elements of the law are:

- **Regional focus covers ALL coastal areas not yet developed** – It aims at developing tourism in areas not yet developed. The provinces of Puerto Plata and Altagracia, which benefited largely from the previous law 153-71, are not totally excluded.
- **Incentives are categorized into exemptions and deductions.** The former include 100% exemptions of income taxes, import taxes and taxes on national and municipal permits and acts for new constructions. Deductions apply to company utilities that are used for new tourism investments.
- **The preparation of Environmental Impact Assessments (EIAs) is a requisite to apply for the incentive include.** The law puts a burden on the SEMARN which becomes responsible for the monitoring of the state of natural resources during construction and operations of the new facilities. SEMARN is also responsible for the compliance with the Land Planning (Plan de Ordenamiento Territorial).
- **The law establishes a Tourism Promotion Fund (TPF) –** The main objective of the fund is to help advertise Dominican tourism abroad. Sources of financing will be the airfare taxes and the revenues from tourism cards.

With the law 158-01 the stage is set for developing tourism virtually in all remaining areas of the country. Important questions at this regard are the ability of SEMARN to

[3] LIL on Public Policies for Environmental and Natural Resources Management.

cope with the potential demand for new EIAs and with the necessary monitoring (see institutional achievements and constraints in session 4).
Another powerful incentive to the use of environmental and natural resources in tourism areas is the very low cost of water tariffs, coupled with a very low level of metering. Data obtained for Puerto Plata indicated that the hotel industry constitutes nearly 40% of the municipal water utility (CORAAPLATA) but accounts for 70% of total consumption. Subsidy has been estimated at about 75%. World Bank estimates suggest that, in 2000, the Government implicitly subsidized DR$1 billion (representing 0.3% of GDP) in water tariffs. The situation is aggravated by the low number of meters. As an example, the installation of new meters in some hotels in the province of Puerto Plata increased the water bill up to 4 times[4].

3.2. Property rights in coastal and marine areas have not been observed

While mangroves exploitation for subsistence charcoal production was a concern during the 70s and 80s, it no longer constitutes a problem. A major threat to the conservation of coastal ecosystems are however the poorly enforced rights over the use of resources. Hotel construction has been done in many cases in prohibited areas, such as within the 60 meters from the shore limit, or in filled wetlands. In recent years, the best known example of actions taken by the public sector has been triggered by claims from the tourism sector itself. This indicates that there is a potential role for the private sector in the enforcement of property rights. The following table shows some examples.

Table: Examples of claims made by tourist operators and actions taken

Location	Type of claim	Date	Action
Juan Dolio (South-East)	Golf court construction without permit	5/2001	Being evaluated
Bavaro (East)	Waste from compressors and machinery disposed in inappropriate landfills	10/2001	Prohibited
Las Galeras de Samana (North-East)	Wastewater discharged in wetland	8/2001	Prohibited
Las Terrenas de Samana (North-East)	Wetland filling	6/2001	Being evaluated
Punta Cana (East)	Construction in wetland	7/2001	Prohibited
San Pedro de Macorís (South-East)	Illegal closure of beach and transformation of a coastal lagoon	5/2001	Action suspended and being evaluated

Source: Gladys Rosado, Environmental Quality Directorate, SEMARN (personal communication)

From the point of view of research and policy implementation, the coastal and marine resources conservation directorate has recently started a series of local projects with the assistance of international organizations. An example is the preliminary studies for the

[4] Personal communication, Ing. Carlos José Antonio (CORAAPLATA)

implementation of an "Integrated Coastal Zones Management" in the Azua – Barahona region (South coast) financed by the Organization of American States.
Incentives in the fishing industry have been aimed at increasing production and reducing poverty. Main actions taken have been training and technical assistance to provide fishermen with better equipment and fishing techniques.
Demand for fish production, particularly Conch (Strombus Gigas) and Lobster, in the Dominican Republic comes essentially from the tourism sector and from export activities, household consumption being very low. Fisheries in the Dominican Republic are virtually freely accessible and poorly regulated. Boats need to obtain a license from SEMARN and "Marina de Guerra" but no control on the number of licenses is currently made.
Despite the focus on production, very little effort has been made to foster sustainable use. Few existing regulations establish limits to catch and closed seasons for the Strombus Gigas and the Lobster. Closed seasons can cause an increase in catch of other species thus the net benefits do not have a clear sign. A proposal for the specification of allowable weight and size of lobster is being evaluated for the management of such industry. A shortcomings may be 'upgrading' of catch. No information is available on the level of monitoring and enforcement of regulations.

4. The institutional arrangements

Environmental institutions have gone through a deep transformation since the creation of the new Secretariat of Environment in 2000. The public sector institutional actors for coastal and marine zones management is represented by the recently created Directorate of Coastal and Marine Conservation, housed in the Subsecretariat of Coastal and Marine Reources, and the Subsecretariat of Environmental Management. Institutional coordination, both internally and externally to the Secretariat, constitutes still one of the major challenges for Environmental Management in DR.
Traditionally, development in coastal and marine zones has not taken into account the carrying capacity of ecosystems. Priority has been given to growth in tourism areas and industry (FTZs), and conservation has been virtually disregarded at least until the creation of SEMARN.
We analyze the following institutional functions in environmental management: (1) Planning; (2) policy formulation; (3) establishment of norms; (4) environmental assessment and (5) monitoring and enforcement.

4.1. Mainstreaming of environment in tourism development has been traditionally very weak

Main institutional actors in the tourism sectors are:

- Subsecretariat of Environmental Management and Subsecretariat of Marine and Coastal Resources, within the Secretariat of Environment (SEMARN)
- Tourism Secretariat (SECTUR)
- National Hotels and Restaurants Association (ASONAHORES)
- Hotel operators and associations

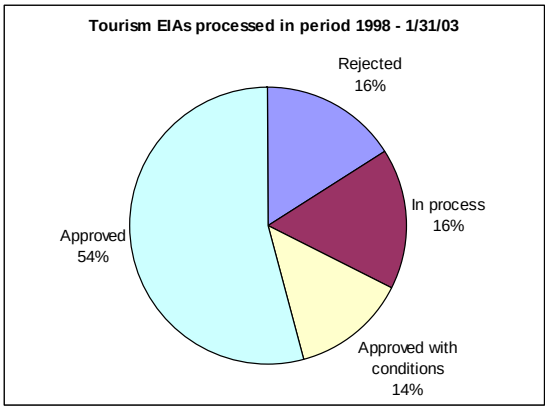
The following table identifies the role and achievements of each in the different stages of environmental management. It is possible to notice the fragmentation of roles between the Secretary of Tourism (leading the functions of planning and policy formulation) and the Secretary of Environment (dealing with norms, environmental assessment and monitoring and enforcement procedures). The Directorate for Coastal and Marine Conservation has virtually no role. Interviews in the field support the fact that there is very small collaboration and cross-support between the two ministries.

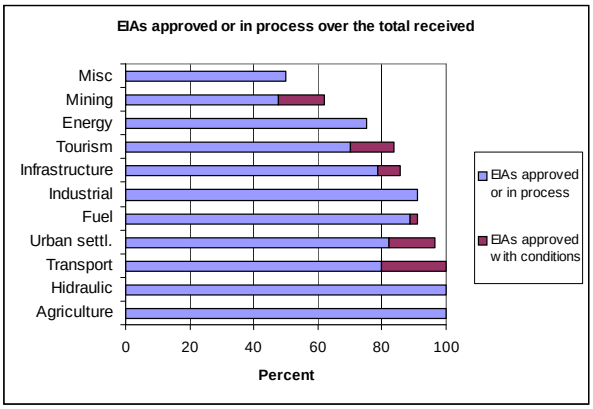
Table: Achievements and challenges in institutional capacity and institutional coordination in the tourism sector

Function	Description	Actor in DR	Achievements and challenges	Institutional coordination
Planning	Establish areas and modalities of construction and operation of Tourism facilities	Secr. of Tourism (earlier was a function of the Central Bank)	The first planning effort took place in the 80s with the IADB-SECTUR plan. The plan has lacked proper implementation. Recently SECTUR commissioned the preparation of development plans in tourism centers but there is no evidence of their use in planning. Currently SECTUR is preparing a strategy for tourism development in the next 10 years.	Low. Currently the Fourth Tourism Convention, which sets tourism development plans for the next 10 years, is being led by the Secretariat of Tourism, with inputs from other ministries.
Policy formulation	To guide the establishment of norms and the implementation of management plans	Secr. Tourism	Tourism policy is essentially dictated by the Secretariat of Tourism. The incentive law (158-01) contains conservationist elements putting a strong pressure on SEMARN. It should be complemented by norms on the use of economic incentives for environmental protection. The Sub secretariat of Marine and Coastal Resources is notably not involved in policy formulation for the tourism sector.	Very low
Environmental Norms	To establish environmental quality standards and natural resources use	Subs. Environmental Management (SEMARN)	Water quality control norms, standards for effluent discharges, solid waste norms and procedures have been established.	Low. Subsecretariats and departments contribute to the formulation.
Environmental Assessment	To identify and limit the environmental impacts of projects and	Subs. Environmental Management and other subsecretariats	EIAs have been practiced regularly since 1998. 37 EIAs received for revision between 1998-1/31/03 of which: 25 approved or not	Medium. The "Environmental Review Committee" is the only example of

	policies. Implementation of norms	(SEMARN) Sector Sectretariats Hotel industry	needing approval; 5 approved with conditions; 6 in process. Tourism sector projects have been the third 'slowest' compared to the other economic sectors projects requiring EIAs.	coordination among subsecretariats and across secretariats.
Monitoring and Enforcement	To ensure the compliance with environmental norms and land planning documents	Subs. Environmental Management (SEMARN) Hotel Industry	A total of 400 inspections of environmental impacts of existing infrastructure (all economic sectors) have taken place since the Law 64-00 was issued. However, environmental quality monitoring has been traditionally neglected. Private sector has occasionally presented complaints for the constructions and operation of facilities (mining, hotels, industries) going against environmental laws and territorial plans.	Low

As with regard to environmental assessment, the following chart shows the 'relative efficiency' in processing tourism EIAs compared to other sectors EIAs. 'Efficiency' should be intended in a very narrow sense, being simply the ratio of approved EIAs to received EIAs. Differences may be due to several causes and not necessarily to Government capacity. This indicator captures however some important differences across evaluation in different economic sectors. Tourism has a relatively high number of projects approved conditionally to the provision of further information, indicating lack of coordination between private and public sector. The chart also shows the breakout of tourism EIAs processed and in process since 1998 to date. Note that one third of the projects have been rejected or approved conditionally to the provision of further information.





4.2. Institutional capacity in the fishing industry has concentrated on production promotion rather than conservation

The main actors involved in the regulation of fishing are the Fishery Department of the Subsecretariat of Coastal and Marine Resources, in charge of the policy design and promotion of the fishing industry, the Marina de Guerra which has administrative powers over all aquatic transport, including fishing boats.
The Fishery Department of the Subsecretariat of Coastal and Marine Resources has taken the functions of the earlier Fishery Department of the Secretariat of Agriculture, focusing essentially on fishery promotion and development. These tasks dominate over, let alone the conflicting interests with, the coastal and marine conservation functions the Subsecretariat should fulfill. The following table summarizes achievements and challenges in the sustainable use of fisheries in DR.

Table: Achievements and challenges in sustainable management of fisheries

Function	Description	Actor in DR	Achievements and challenges
Environmental Norms	To establish norms for the exploitation of fisheries	Subs. Coastal and Marine Resources (SEMARN) – (Previously competence of Secr. of Agriculture)	Ley 5914-62 establishes the need for fishing permits. A proposal for a new Law on Fishery, Aquaculture and Conservation has been presented by the Subsecretariat of Coastal and Marine Resources.
Policy implementation	To regulate fisheries and apply instruments for sustainable practices	Fishery Department of Subs. Coastal Resources (earlier Secretary of Agriculture) Donors (JICA) Local NGOs (CEBSE in Samaná)	Open access situation – no control on the effort is in place. Closed seasons are established for threatened species (i.e. Strombus Gigas and Lobster) together with specification of nets and tools. Education program to raise awareness about the damaging effects of fishing near the shore, where species reproduce (with NGOs)
Monitoring and Enforcement	To ensure the compliance with environmental norms and land planning documents	Fishery Department of Subs. Coastal Resources Marina de Guerra	Fishery Dept. issues licenses to fishermen and boats. Monitoring is done by Fishery Dept. and by Marina de Guerra which supervises all aquatic transport. Monitoring has proven a politically sensitive issue and is virtually absent.

5. Elements for an action plan

The present report highlights environmental management challenges at three different levels: (1) environmental and natural resources degradation problems; (2) lack of institutional monitoring and enforcement capacity; (3) limited use of policy instruments other than command and control. A recent workshop on ‘priority setting for environmental management in DR’ highlighted the public opinion’s sensitivity for water pollution and water management as two of the top environmental priorities. While an effort has been made for the establishment of norms for water quality and for municipal

waste collection and disposal, very little progress has been recorded on implementation, monitoring and enforcement.
In the following table, main environmental problems in coastal and marine areas are identified. We identify possible actions and WB's potential involvement.

Table: Elements for an action plan

Environmental Problem or Issue	Cause	Action suggested / Instruments	World Bank's possible role
Congestion of tourism areas	No observation of development plans – lack of monitoring	Coordination among government secretariats. Involvement of ASONAHORES/SecTUR/SMRN in the planning process. Improvement of law and enforcement system, for faster processing of complaints from existing operators.	
Water pollution (superficial and underground water)	Insufficient treatment capacity	Short term: Complete infrastructure in tourism areas Improve monitoring and enforcement Medium term: effluent charges	Extend WB's water and sewerage project in tourism centers
Water management	Insufficient metering system Water under priced Lack of monitoring of aquifer capacity	Improve metering system Water pricing	Water project for improved management of superficial and underground water resources Technical assistance
Beach erosion; mangrove ecosystem degradation; coral reef destruction	No observation of development plans – lack of monitoring Land rights and planning not enforced. Department of Coastal and Marine Conservation currently understaffed and with a limited role in conservation	Creation of analytic database with a periodic monitoring system for coastal and marine resources. Capacity building and promotion of the Directorate of Coastal and Marine Conservation. Performance bond systems: hotel pays a deposit before building. The deposit is reimbursed upon showing beach quality Further promotion of certification schemes (Blue flag)	Coastal resources management support program – establishment of monitoring stations along the coast. Capacity Building in Coastal and Marine Zones Management
Slums growth and pollution from solid waste	Increase in urban population in tourist centers Lack of disposal and treatment (of competence of municipalities)	Resettlement plans and urban planning (note: previous resettlement plans in Sosua have shown limitations as people did not have any incentive to move to the new location) Slum upgrading Coordination among central government, municipalities and hotel operators for solid waste disposal.	Solid waste management project - Construction of sanitary landfills and design of charge system. Slum upgrade in coastal areas and improvement of waste collection systems.

		Creation and operation of sanitary landfills Charges and taxes Build capacity in financial administration for solid waste management in municipalities Education and awareness raising programs for solid waste disposal in poor communities	Capacity Building in financing solid waste management
Overfishing (a potential problem in the future)	Open access. Subsistence fishing near the shore.	Increase technical assistance and education with emphasis on conservation. Community involvement in quota allocation to fishermen.	