

INT-2359

UNITED NATIONS

UNITED NATIONS ENVIRONMENT
PROGRAMME



ECONOMIC COMMISSION FOR
LATIN AMERICA

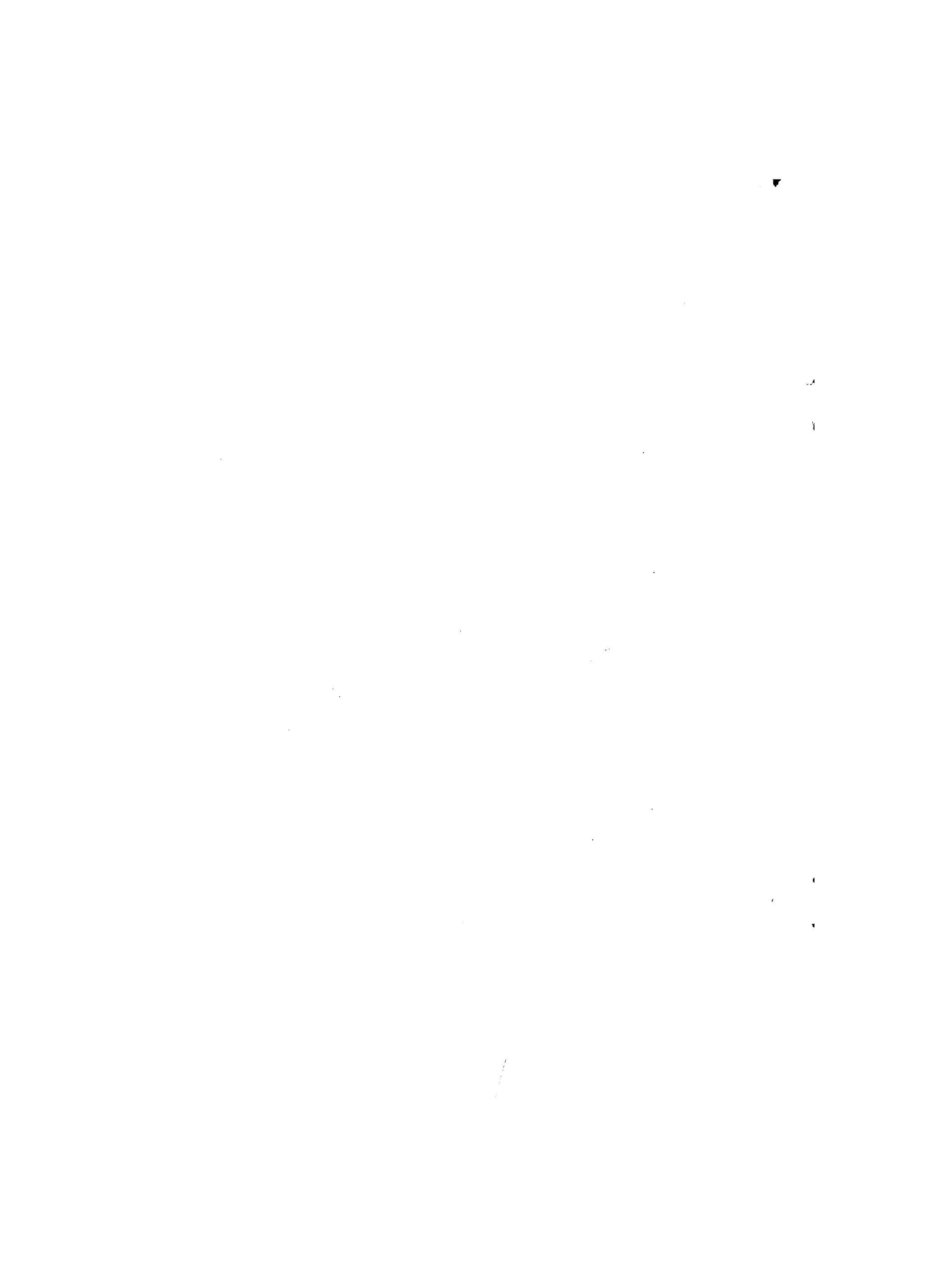
JOINT PROJECT FOR ENVIRONMENTAL MANAGEMENT
IN THE WIDER CARIBBEAN

LIMITED
September 1979
ORIGINAL: ENGLISH

REPORT OF THE SECOND ADVISORY PANEL MEETING OF THE
JOINT UNEP/CEPAL PROJECT FOR ENVIRONMENTAL
MANAGEMENT IN THE WIDER CARIBBEAN AREA

(Mexico City, 10 - 12 September 1979)

79-9-415-200



CONTENTS

	<u>Page</u>
I. Organization of the meeting	1
1. Place and date	1
2. Attendance	1
3. Opening meeting	1
4. Election of Chairman	1
5. General Briefing on the Caribbean Environment Project	2
6. Closing session of the meeting	3
II. The Meeting	4
Annex I: Development and environment in the Wider Caribbean Region: A synthesis	
Annex II: Suggested modifications of the synthesis document	
Annex III: Identification of pilot projects	



I. ORGANIZATION OF THE MEETING

1. Place and date

The second meeting of the Advisory Panel of the Joint UNEP/CEPAL Project for Sound Environmental Management in the Wider Caribbean Area took place on the 10th-12th September, 1979, at CEPAL's Office in Mexico City, Mexico.

2. Attendance

The members of the Advisory Panel were J. Carrizosa, G. Colmenares, H. Ferrer, B. Gouveia, C. Matos, R. Thelwell and V. Sánchez.

The following staff members of the Caribbean Environment Project (CEP) were present: T. Boothe, Co-ordinator; M. Gajraj, Senior Research Officer; A. Rodríguez, Scientific Advisor.

Also present were G. Posenthal, Director, CEPAL/Mexico; S. Keckes, Director, Regional Seas/Programme Activity Centre, UNEP; J. Lizárraga, Director and Regional Representative, UNEP Regional Office for Latin America and the Caribbean; and D. Bitrán, Technical Co-ordinator, CEPAL/Mexico.

3. Opening meeting

The opening ceremony of the Meeting took place on the morning of 10th September. Mr. Lizárraga welcomed the Panel members and noted the importance of the task at hand.

The Project Co-ordinator, Mr. Boothe, added his welcome and presented brief opening remarks.

4. Election of Chairman

Mr. Thelwell was elected Chairman of the Second Session of the Advisory Panel.

/5. General

5. General Briefing on the Caribbean Environment Project

The meeting had before it for consideration the following documents:

"Development and Environment in the Wider Caribbean Region: A Synthesis." This is attached as Annex I.

"Draft Action Plan for Sound Environmental Management in the Wider Caribbean Area", as revised at the first meeting of the Advisory Panel, 5-7 April, 1978.

Drafts of the nine sectoral overviews listed in section 4 of Annex I.

In briefing the Advisory Panel on the progress of the Project since the First Meeting of the Advisory Panel, the Co-ordinator highlighted the major activities and present status of the project. These are summarized below:

1. An interagency meeting was held in Mexico City in August 1978 at which terms of reference were drafted for preparation of Sectoral Overviews by specialized UN agencies;
2. Agreements between CEPAL and the UN agencies responsible for preparation of the sectoral overviews were concluded in January 1979;
3. During 1979, the CEP staff increased consultations with the Governments of the Region and attended several relevant meetings and conferences. These activities were reflected in the Co-ordinator's interim report covering the period September 1978-March 1979;
4. The present status of the sectoral overviews, as well as overall agency responsibility for their preparation, was outlined.

The Co-ordinator then drew the attention of the meeting to the following key areas deserving the attention of the Advisory Panel;

1. Review of the synthesis document;
2. Revision of the Draft Action Plan;

/3. The

3. The following elements of the Suggested Strategy for the Action Plan:

- a) Institutional arrangements;
- b) Financial arrangements;
- c) Legal arrangements.

6. Closing session of the meeting

At the final session held on the afternoon of 12th September 1979, the Co-ordinator in his closing remarks thanked members of the Panel for their valuable contributions, and for the time and effort which they had put into their deliberations, so increasing the prospects for success of the Project.

The Chairman thanked members for their participation in the meeting and also congratulated the staff of the Project for the work which had gone into making the meeting a success.

II. THE MEETING

Noted with appreciation the briefing on the Caribbean Environment Project (CEP) by the Project Co-ordinator.

Noted with satisfaction the effective work of the CEP staff and the resulting progress of the Project.

Expressed concern about the highly complex administrative organization under which the Project is operating, and noted the need for closer co-ordination among the participating elements of the UN system.

Strongly recommended that all necessary steps be taken to ensure continuity of professional staff between the present phase of CEP and the implementation of the Action Plan.

Strongly recommended that the documentation for the forthcoming GNEM and IGM meetings be prepared jointly by CEP and UNEP-RS/PAC.

Agreed that the Suggested Strategy for the Action Plan is too fragmented and that it should instead focus on a few, especially important environmental needs of the Region.

Recommended that the Action Plan focus on the following areas of concern:

1. Water, including water quality and water supply, with special attention to reuse;
2. Energy, with special attention to alternative sources;
3. Human settlements, with special attention to appropriate technology;
4. Coastal area management, with special attention to the impact of development on coastal ecosystems;
5. Natural disasters and oil spills, with special attention to mitigation and preparedness;
6. Environmental impact assessment of development projects.

Recommended that the Action Plan contain a clear statement of Goals and Objectives, including the substance of those set forth in Annex II.

Suggested numerous other revisions of the synthesis document, as specified in Annex II.

/Recommended

Recommended that research programmes within the framework of the Action Plan focus on solving problems. The need is for applied rather than pure research.

Noted the need to apply uniform assessment methodologies to ensure the compatibility of data.

Agreed on the need for preparation of principles and guide-lines to guide the drafting of a regional legal agreement, and on the need to consider the proposed principles and guide-lines at the next meeting of the Advisory Panel.

Agreed on the need to identify pilot projects to illustrate concretely the kinds of activities that would result from implementation of the Action Plan. Some tentatively suggested projects are included in Annex III.

Agreed on the need to compile a full list of ongoing technical projects, to aid in the selection of pilot projects as well as to provide an information source within the Region.

Recommended that UNEP be the agency responsible for implementation of the Action Plan.

Recommended that the Regional Co-ordinating Unit which will be required for the implementation phase be located in Kingston, Jamaica.

Recommended that the Regional Co-ordinating Unit be headed by a technical director at the highest level.

Recommended that the Regional Co-ordinating Unit, in addition to its other functions, serve as a referral centre providing information to aid participating countries in solving specific environmental problems;

Recommended that another meeting of the Advisory Panel be held during November 1979 to review proposed documentation for the GNEM.

Recommended that all documentation for the GNEM and IGM meetings be available in English, French, and Spanish.

Recommended that simultaneous translation facilities for English, French, and Spanish be available at both the GNEM and IGM meetings.



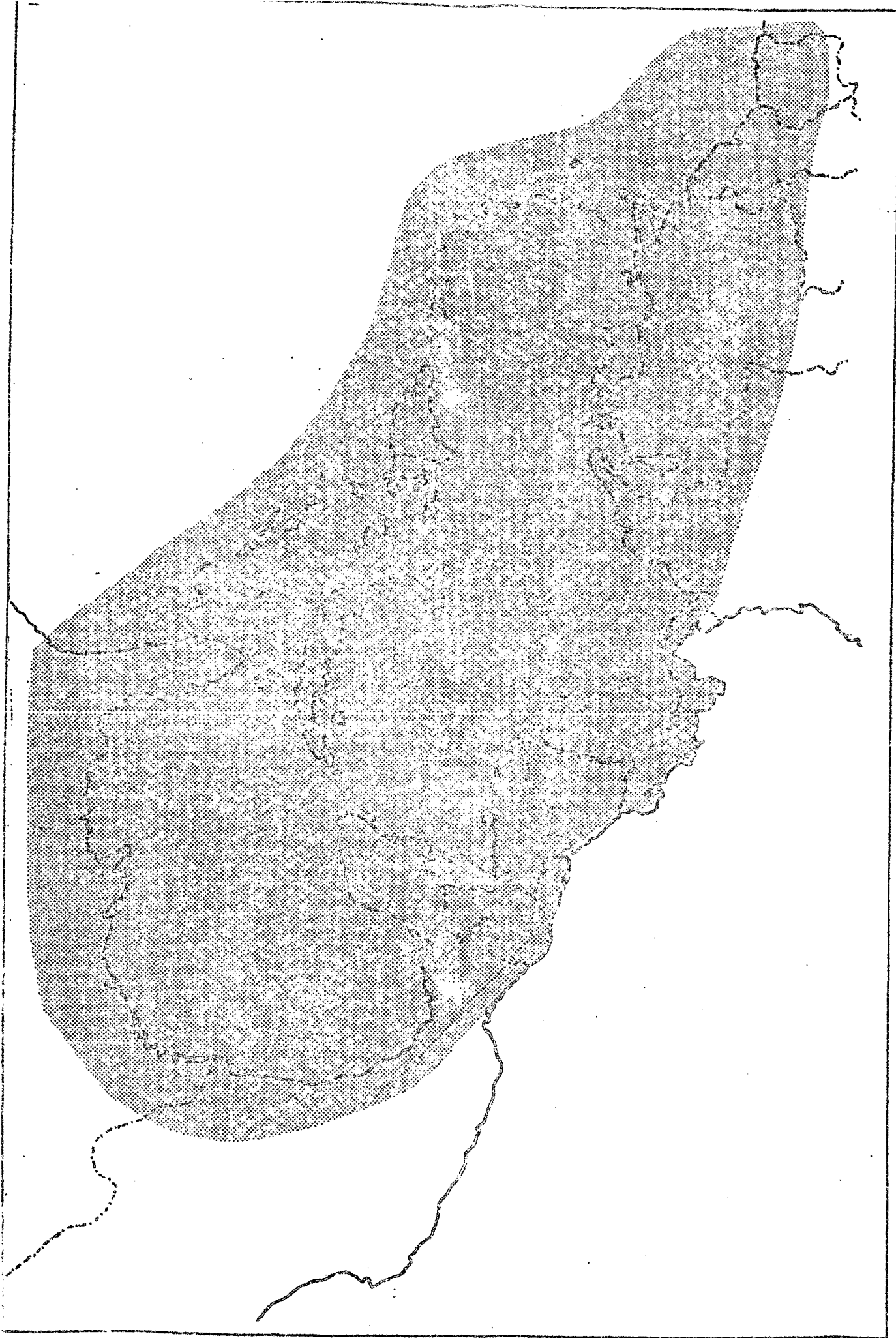
Annex I

DEVELOPMENT AND ENVIRONMENT IN THE WIDER CARIBBEAN REGION: A SYNTHESIS

INTRODUCTION

1. In accordance with resolution 2997 (XXVII) of the General Assembly, UNEP was established "as a focal point for environmental action and co-ordination within the United Nations system". The Governing Council of UNEP defined this environmental action as encompassing a comprehensive, transectoral approach to environmental problems which should deal not only with the consequences but also with the causes of environmental degradation.
2. Although environmental problems are global in scope, a regional approach to solving them seemed more realistic. By adopting a regional approach, UNEP felt it could focus on specific problems of high priority to the States of a given region thereby more readily responding to the needs of the Governments and helping to mobilize more fully their own national resources. It was thought that undertaking activities of common interest to coastal States on a regional basis should, in due time, provide the basis for dealing effectively with broader environmental problems.
3. UNEP's regional approach is at present being applied to eight regional seas where action plans are operative or are under development: the Mediterranean (adopted in 1975), the Red Sea (adopted in 1976), the Kuwait Action Plan Region (adopted in 1978), the West African Region (under development, adoption expected in 1980), the East Asian Seas (under development, adoption expected in 1980), the South-East Pacific (under development, adoption expected in 1980), the South-West Pacific (under development, adoption expected in 1981) and the Wider Caribbean Region.^{1/}

^{1/} Unless stated otherwise, the Wider Caribbean Region is defined as comprising the States and Territories of the insular Caribbean, the north-eastern parts of South America from Colombia to French Guyana, the States of Central America, the Gulf States of the United States, as well as the coastal and open waters of the Caribbean Sea proper, the Gulf of Mexico, and the waters of the Atlantic Ocean adjacent to the States and Territories mentioned above. (Map 1)



Map: The "Wider Caribbean Region", as defined in this document.

4. Two elements are fundamental to UNEP's regional approach:

a) Co-operation with the Governments of the regions. Since any specific regional programme is aimed at benefiting the States of that region, Governments are encouraged to participate from the very beginning in the formulation and acceptance of the programme. After acceptance, the implementation of the adopted programme is carried out by national institutions which have been nominated by their Governments.

b) Co-ordination of the technical work through the United Nations system. Although the regional programmes are implemented predominantly by Government-nominated institutions, a large number of the United Nations specialized organizations are called upon to provide assistance to these national institutions. UNEP acts as an overall co-ordinator although in some cases this role is limited to the initial phase of the activities. Thus the support and experience of the whole United Nations system contributes to the programme.

5. The substantive aspect of any regional programme is outlined in an "Action Plan" which is formally adopted by the Governments before the programme enters an operational phase.

6. Preparing such an Action Plan is the objective of the Joint UNEP/ECLA Project for Environmental Management in the Wider Caribbean Area. (Caribbean Environment Project). The Economic Commission for Latin America serves as implementing agency for the Project. UNEP's Division of Environmental Management played an active role in initiating the project and is providing principal funding. UNEP's Regional Seas Programme Activity Center is providing supplemental funding as well as technical co-operation and support. The methodology followed by the Regional Seas Programme in preparing action plans for other regions has been adapted for application to the Caribbean.

7. This document was prepared for the Caribbean Environment Project by UNEP's Regional Seas Programme Activity Centre, revised by a group of experts^{2/} (and endorsed by the meeting of the Advisory Panel on the

^{2/} T. Boothe (UNEP/ECLA), J. Carrizosa (consultant), M. Gajraj (UNEP/ECLA), S. Keckes (UNEP/RSPAC), J. Noble (consultant), A. Rodriguez (UNEP/ECLA), V. Sánchez (consultant), F. Szekely (UNEP/ROLA), and R. Thelwell (consultant).

Caribbean Environment Programme (Mexico City, 10-12 September 1979)) as one of the basic background documents for the Meeting of Government-Designated Experts (Caracas, January 1980) which is being called to review the draft Action Plan for the Caribbean Environment Programme.

8. The basis for the document is the nine sectoral overviews (Refs. 1-9) prepared to highlight the economic, social, and environmental problems of the Wider Caribbean Region, as well as additional background information, reports, publications and communications available to the authors.

9. The document has three sections. The first briefly describes the scope and purpose of the document. The second examines some key issues relating to development and the environment in the Wider Caribbean. The third presents a suggested strategy for an action plan consisting of the following components: Functional Activities, which includes assessment and management components; and Supporting Activities, which includes legal, institutional, public awareness, and financial components.

1. Scope and purpose of the document

10. Many of the environmental problems of developing countries, of the world in general and of the States and Territories of the Wider Caribbean in particular, result from underdevelopment. Other problems have resulted from the type of development process typified by the highly industrialized countries of the world and the more developed Caribbean ones. It is not development per se that has caused the environmental problems; rather, it is the type or pattern of development pursued. Although it would be unacceptable to suggest that development be suspended because of environmental concerns, the environmental dimension must be incorporated into the planning and implementation of development so that environmental degradation, with its attendant costs, may be minimized.

11. Sustainable development must be based on environmentally sound development policies, i.e., on policies that take account of the rational utilization of available resources and the natural capacity of a given ecosystem to support the utilization of those resources, non-renewable and renewable. Uneven distribution of natural resources and population, as well as variation of ecosystems, prevent most (and perhaps all) States and Territories from achieving sustainable development, without close mutual cooperation.

12. Ecosystems, which include man and his entire socio-economic system, are by definition complexes of mutually interacting plants and animals and their habitats. All ecosystems are characterized by their ability to adapt to changes and modifications. They are in a state of dynamic equilibrium as a result of continuous natural changes caused by forces from within and from without the systems. They have evolved a capability to withstand some man-induced stress before their structure and integrity are disrupted. Indeed, man's actions can enhance the useful productivity of some systems, but there is a limit to the interference they can tolerate. Man is in a position, therefore, to operate as a manager of ecosystems for sustainable development, but only if he is aware of their complexity and their reaction to his interventions.

/13. An understanding

13. An understanding of the functioning of local ecosystems, is basic to attaining optimum management of natural resources and to guiding development. Large-scale data collection is not necessarily the best way to understand environmental problems. Larger data systems, founded on the uncritical collection of irrelevant information, are not necessarily better than smaller data systems if their purpose is to contribute to decision making. Indeed a large volume of information already exists; the problem is that most of it relates to temperate climate ecosystems. A careful search is required to identify information relevant to the ecosystems predominant in the Caribbean, so as to determine gaps in knowledge that need intensive investigation. In addition, it is necessary to study man's social and economic systems and their interactions with the ecosystems.

14. Too often, relevant information is presented in a manner that is not readily understandable to planners, administrators, and decision makers, who are not trained in the mix of disciplines necessary for environmental management. There is, therefore, an important need for continuous dialogue among scientists (pure and applied), planners, sociologists, economists and decision makers. Such dialogue is necessary because of the difficulty of identifying environmental and socio-economic characteristics that may influence development programmes or their impact.

15. Such an approach to development will require greater amounts of investment capital. As the experience of many highly industrialized countries demonstrates, however, the cost of corrective action in the medium to long term is many times greater than the initial cost of prevention; in some cases the damage is irreversible, and often the social costs have been found to be quite unacceptable.

16. The Region is a geographical entity made up of States and Territories with different economic and political structures, national resources, social systems, environmental and ecological characteristics, and potential capabilities. Any environmental programme should take into account the lessons learned from the recent history of developing and developed

/countries

countries throughout the world, and the international economic order within which they operate at present. It has been found that the indiscriminate transfer of technologies, life-styles, and development patterns from the more developed (and basically temperate climate) countries to the less developed (and basically tropical) ones, has been generally unsatisfactory.

17. It is against that background that a search is taking place for alternative patterns of development, consistent with the resources, social and cultural values, and hopes and needs of the people (endogenous development), together with a new international economic order.

18. The present document attempts to examine some key issues related to development and environment in the Wider Caribbean Region. The document also considers possible actions which could lead to environmentally sound, sustainable development of the Region, together with financial and institutional arrangements that may be necessary to fulfill the adopted strategies for action.

19. The peoples of the Region share many common problems, are linked by a common sea, and are exposed to many of the same natural hazards. The environmental resources of the Region, taken as a whole, have enormous potential to satisfy the development needs of the people, given sound environmental management.

2. Development and environment: Some issues

20. This section of the document attempts to synthesize the findings of a number of sectoral overviews which explore the interrelationships between developmental activities, policies, and the environment. Presenting a balanced synthesis is difficult because of the cultural, social, economic, and physical differences between these States and Territories (see Statistical Annex), each with its own developmental priorities, social goals, and values assigned to environmental quality. Rather than emphasizing the characteristics of each State and Territory, the overview attempts to identify concerns common to the Region, emphasizing those that require joint action on Regional and sub-Regional levels.

21. Because of the complex interrelationships within ecosystems, sound environmental management requires an integrated, resource-oriented perspective. This provides a sounder basis for action than does the traditional sectoral approach. Accordingly, the first six parts of this section describe key resources as components of the ecosystems of the Region: freshwater, agricultural, marine and fisheries, wildlife and genetic, energy, and mineral resources. Three important developmental activities that make significant demands on the Region's resources and environment are then described separately: human settlements, tourism, and transport. Industrialization, which makes demands on virtually every resource, is considered in conjunction with description of each affected resource.

a) Freshwater resources

22. Freshwater resources are unevenly distributed within the Region. Even in those States and Territories where overall resources are sufficient, there are problems of seasonal and spatial distribution.

23. The overwhelming majority of the freshwater discharged into the sea is carried by comparatively few large rivers, remote from locations

/which require

which require water supply. A few of the smaller rivers, whose waters are used, are suffering increasingly from sedimentation and pollution occasioned by upstream activities, mainly industrial. Many water courses are subject to competing demands - as sources of drinking water, for example - and as receptacles for industrial and domestic waste.

24. On many small islands, especially those with mountainous topography, the residence time of surplus precipitation is extremely short, thereby reducing percolation and accessibility.

25. The destruction of forest cover in the watershed areas has intensified the problem of water supply in many parts of the Region, since many streams and small rivers which used to maintain satisfactory year-round flows now virtually dry up in the dry season.

26. i) Water for agriculture. Although the majority of the agricultural lands in the Region receive annual rainfall in excess of the total required by the crops for satisfactory growth, the seasonal distribution of the rainfall is a major constraint in using it efficiently for agricultural and other purposes.

27. Given the seasonal rainfall pattern, agricultural production can only be increased through supplementary irrigation during the dry seasons and by extensive drainage systems to avoid flooding and waterlogging in the wet seasons. The costs involved are quite considerable and increasing rapidly.

28. Because of the expenditure involved, irrigation schemes are often developed primarily for the more lucrative, large-scale, export-oriented agricultural sectors, with only marginal allocations for domestic food crops. This is a serious handicap for the expansion and development of local food production within the Region.

29. This situation does not necessarily arise from national agricultural policies; it is partly a result of the lack of domestic financial resources needed to implement drainage/irrigation schemes. The countries

/are forced

are forced to turn to the international finance market for loans, which naturally are granted only on the basis of returns on investment and ability to repay the debt in foreign exchange. Thus, countries whose foreign exchange earnings are almost totally dependent on agricultural exports, are in effect caught in a vicious circle.

30. ii) Drinking water. The goal of supplying adequate drinking water to urban areas appears to be attainable in the majority of the countries. However, the process of rapid urbanization will continue to make urban water supply a major problem in the Region. One of the unsolved problems in the urban areas is the high rate of loss due to leaks and wastage. The reported figures for some cities are as high as 55% to 60% of the total water produced.

31. Water services to rural areas are less satisfactory than those to urban areas.

32. Providing for an adequate supply of potable water requires large capital expenditures. For example, a water supply project in Trinidad (population 1 million) for an additional 60 million gallons/day is costing more than 200 million dollars.

33. iii) Water-related diseases. Contamination of water resources with pathogens frequently leads to enteric infections and some parasitic diseases.

34. Available information indicates that diarrhoeal diseases are a major health problem in the Region, particularly among children under five years of age. Around 1975, enteritis and other diarrhoeal diseases stood among the five leading causes of death among those under five years of age in almost all the countries for which information was available.

35. The mortality rates for enteritis and other diarrhoeal diseases vary considerably. In 1975, very high rates per 100 000 inhabitants were reported in Guatemala (979.1) and Nicaragua (678.2), which

/represented

represented respectively 26.0% and 33.9% of the total number of deaths for these countries. At the other extreme, Barbados (29.7), Cuba (44.0) and Puerto Rico (22.1) showed the lowest rate per 100 000 in the Region.

36. Typhoid fever is another enteric infection, mostly caused by polluted drinking water. The available information shows a very high average annual typhoid fever rate per 100 000 inhabitants for Haiti (56.7), Colombia (32.4), Honduras (24.1), Dominican Republic (19.0), and Dominica (21.7).

37. Malaria is reported to have disappeared or never existed in most of the States and Territories of the Region. Isolated cases, however, have been reported from Honduras, Nicaragua, Guatemala, Colombia and Haiti. Recent increases have been observed in several countries.

38. Schistosomiasis is endemic in Martinique, but is on the retreat from the few countries known to suffer from it (Puerto Rico, St. Lucia, Suriname).

39. Cases of hepatitis were consistently reported at high levels during the five-year period 1972-1976 as indicated by average annual rates of 74.9 per 100 000 population in Costa Rica and 167.8 in Cuba. However, mortality data indicate that the death rate from infectious hepatitis was low, below 1 per 100 000 in almost all the countries, with the exception of Belize which reported 2.3 (1973), 3.7 (1974), Costa Rica 1.0 (1973), Mexico 1.0 (1973) and Suriname 1.9 (1975).

40. Epidemics of dengue have occurred in the Region in different periods of this century. They continue to occur in many areas still infested with the *Aedes aegypti* mosquito, the dengue vector. A major dengue pandemic broke out in the Caribbean in 1977, although no cases of dengue haemorrhagic fever or dengue shock syndrome were confirmed.

41. Outbreaks of jungle yellow fever have occurred in recent years in Colombia, Panama, Guyana, Suriname, and Venezuela where the disease is endemic in monkeys living in forested areas. Available data seem to indicate a gradual shift of the disease towards the north and north-eastern part of Colombia and a wider geographic spread of the disease over the

/continuation.

continent. Also, in 1979, a few cases occurred in Trinidad and Tobago where none had been reported over the previous decade.

42. *Aedes aegypti* eradication campaigns are proceeding in most countries, but progress has been slow.

b) Agricultural resources

43. The diverse soil resources of the Region include 517 525 000 hectares, of which 9.7% are classified as arable and permanently cultivated, 22.7% permanent pasture, 50.3% forest, and 17.3% miscellaneous. There are four main problems relating to utilization of these resources: erosion, salinization, waterlogging, and chemical degradation.

44. The most serious problem affecting the soils of the Region is erosion due to specific soil characteristics, type of vegetation cover, intensity of rainfall, winds, topography, and inappropriate agricultural practices. The most vulnerable areas are the Greater Antilles and parts of Venezuela, Colombia, Guyana, and Trinidad and Tobago. Apart from soil degradation, an example of the costly effects of erosion is the Archicaya dam in Colombia: after only 21 months the reservoir was one-quarter full of erosion sediment, and after ten years silt took up three-quarters of its capacity. Desertification risk due to soil erosion is high in some parts of the Region (parts of Mexico, including the Yucatan peninsula).

45. It is estimated that Panama has 1 million hectares of eroded soil, Venezuela ten times more.

46. Salinization, mainly due to poor soil management practices, is in comparison a minor problem affecting an estimated 0.7% of the total land surface of Central America (Mexico). Saline intrusion is also an important cause of salinization in some islands.

47. Waterlogging is a minor agricultural problem for the Region, mainly associated with river deltas, plains, some savannahs, and coastal basins in Guyana, Suriname, French Guyana, and the Orinoco delta.

48. Chemical degradation, is a specific but minor problem of some soils due to the toxicity or lack of some minerals.

49. 1) Soil utilization. Significant changes have been observed in soil resource utilization. For example, since 1969 arable and permanently cultivated land increased by 4 million hectares (8.6% increase), while land for urban and industrial development, road construction and as waste land increased by 7.5 million hectares (9.1%). Some of the agricultural problems relate to availability of arable land which is under high pressure from urban and industrial developmental activities. The per capita arable land of the Lesser Antilles is 0.13 hectares, one-third of the average for the whole Region.

50. The agricultural output required for the population of the Region is inadequate since a significant proportion of arable land is under permanent export produce such as sugar-cane, bananas, coffee, cocoa, and cotton. The Region is increasingly dependent on imported edible oils, cereals and dairy products. Dependency on imported cereals increased from 6% (1955-1960) to 46% (1965-1970) and 60% (1971-1975) of total food imports.

51. The large export-oriented systems, in addition to causing environmental degradation of the soil through monocultural practices, generally lead to increasing marginalization of a large section of the farming community, thus contributing to the flow of landless population into urban areas with all the environmental consequences of rapid unplanned growth of such areas.

52. Agricultural practices, especially in the continental sub-Regions, have been constantly modifying the agricultural frontiers by removing the protective forest cover, possibly causing unwanted negative environmental changes in micro-climate, availability of water resources, soil erosion, etc.

53. The major environmental problems associated with agricultural activities stem from the utilization of unsuitable soils. The problem has arisen partly because of the land tenure situation in which the bulk of the farmers are forced on to marginal lands because the best lands are being occupied by comparatively few farms. However, it should be

/emphasized

emphasized that mere redistribution of land cannot and does not solve the problems of misuse of the resource. For land reform to be truly effective, it must be carried out simultaneously with educational programmes, and mechanisms must be found for the farmers to have access to credit and technology. An additional related problem for the small farmer is the lack of adequate storage facilities, transport and access to markets.

54. In some cases, particularly in the smaller islands, there is insufficient suitable land even if the land tenure system is satisfactory. Also, large-scale farming is often characterized by under-utilization of the resource.

55. ii) Pasture lands. The pasture lands of the Region (117 457 239 hectares) are used for direct foraging of animals, mainly beef cattle and dairy cows. In the last ten years, there has been a reduction of the pasture lands by 105 million hectares, which have been turned to other types of use.

56. Over-grazing is the main environmental problem associated with inappropriate utilization of pasture lands, leading to severe soil erosion (water and/or windborne) and soil degradation. In general this is a problem associated with small farms, particularly in Central America and the insular Caribbean. In the interior plains of Colombia, over-grazing plus seasonal burning created in 1979 massive attacks of insects and complete destruction of pasture.

57. iii) Forest lands. The total area under forest is estimated for 1975 as 221 million hectares. Since 1966, ten million hectares have been lost and, taking into account present forest management practices, the forest area is expected to shrink to 194 and 175 million hectares by 1980 and 2000, respectively. Many areas originally covered by forest could not be reforested, since centuries of man's activities have changed the basic characteristics of soils and the topography. Barbados, once completely forested, no longer has any forests; Colombia and Mexico are losing substantial forest lands. Development of commercial forests

/frequently

frequently led to serious environmental damage. Nevertheless, reallocation of forest land may be beneficial if its consequences are considered and found acceptable.

58. The most serious ecological consequences of deforestation are erosion and the disturbance of the hydrological equilibrium. Erosion leads to destruction of the soil characteristics and fertility and, in hilly or mountainous areas, encourages landslides. Disturbance of hydrological equilibrium affects the surface water supply of the river basins, leading to extremely exaggerated differences in river flow between seasons, reduction of underground aquifer recharge, sedimentation of rivers, estuaries, swamps and coastal areas as well as to increased incidence of flash flooding. Also, because of changed surface-air moisture equilibria and the reduction in evapotranspiration, changes in micro-climates occur, and in severe cases of deforestation major large-scale climatic changes can occur, leading to serious drought or desertification.

59. The environmental effects of deforestation in the humid tropics are quite different from those in the temperate regions of the world. The humid tropics are, in general, subject to far higher annual rainfall, and this precipitation is also much more intense for longer periods. For example, hurricane Flora reportedly caused extensive damage in deforested areas of Cuba, yet relatively insignificant losses were reported in natural forest areas. A similar situation occurred in Honduras when hurricane Fifi struck that country.

60. Another significant problem associated with deforestation relates to the fact that, in the tropics in general and in the humid tropics in particular, the nutrient cycle is very rapid. Most nutrients are found in the first few centimetres of soil and in the vegetation itself. Consequently, total elimination of the forest biomass means that the majority of the nutrients are lost from the ecosystem and a poor soil is left. This can create serious obstacles to reforestation efforts if the two activities are not undertaken at the same time.

61. One of the prime causes of deforestation in much of the Region is the migratory agricultural practice of clearing land using the "slash and burn" technology.

62. Much deforestation is carried out in order to extract mineral resources; to shift rapidly increasing, almost uncontrollable urban populations; and to increase agricultural land urgently needed to feed the growing populations.

63. iv) Agricultural chemicals. Although chemicals can be beneficial to agricultural production (fertilizers, pesticides) and in food-processing, there are frequent negative side effects such as occupational diseases, accumulation of pollutants in the ecosystem, and impairment of agricultural productivity. In Colombia, for example, the export-oriented cotton industry has suffered economic crisis as the result of massive utilization of pesticides which created genetic resistance and eliminated competence in the associated fauna without controlling it.

64. The widespread use of pesticides is resulting in frequent pesticide intoxications: in the period 1971-1976 more than 8 000 cases were reported from Guatemala.

65. High levels of pesticide residues have been found in meat and other food products, especially in the cotton-growing countries. It has been estimated that 85% of the pesticide consumption is being used on cotton. Guatemala has reported the highest values in the world of DDT contamination in human milk.

66. An area of concern is lead and cadmium contamination of canned fruit products, probably due to the use of cans without resin protection. High levels of lead have also been found in cereals.

c) Marine and fisheries resources

67. Fish protein forms a significant part of the protein intake of the peoples of the Region, and fisheries figure prominently in the national economies. This is especially true of smaller islands, which lack facilities for livestock production. Although much of the fish requirements

/are presently

are presently imported, for mainly historical reasons, Caribbean fisheries are developing and expanding.

68. The total estimated potential of fisheries resources for the Region's continental platform ranges between 3 and 4.5 million tons per year. The theoretically sustainable exploitable potential is between 1.3 and 2.6 million tons per year.

69. Data on the amount of these resources actually extracted are incomplete. Data on fishing by countries from outside the Region are missing altogether. Incomplete data from countries of the Region indicate that their present fishing practices are unlikely to result in overexploitation of their resources over the continental platform, except possibly in localized areas.

70. The most significant fishery activities of the Region are to be found at the Campeche Bank in the Gulf of Mexico, at the Mosquito Bank in the Caribbean Sea off the coasts of Honduras and Nicaragua, in the Gulf of Paria between Venezuela and Trinidad and Tobago, and the coastal waters in the Guyana-Suriname area.

71. Because of a pronounced lack of upwellings and the existence of a stable thermocline in the Caribbean, nutrient-rich waters do not rise to the surface. This results in a generally low level of zooplankton in the food-chain and in significantly smaller populations of exploitable fish. As a consequence, coastal mangroves, estuaries, and coral reef communities play a proportionately large role in providing nutrients and breeding grounds for many species.

72. Coastal and inland fishing in the Region is mainly artisanal in nature.

73. Few or no statistics relating to inland fisheries or aquaculture in the Region are available. Inland fishing is generally carried out in a small unorganized private capacity, with much of the catch being consumed by the fisherman and his family, and any remainder being sold outside the commercial market. Aquacultura is little developed in the Region.

74. Stresses.

74. Stresses. Natural environmental conditions in the Region impose a high stress on marine life, particularly in inshore areas, which often leads to natural fish kills. The superimposition of man-made stresses could lead to a reduction in the sustainably exploitable fisheries resources.

75. One major man-made stress is destruction of habitats through such activities as development of marinas, harbours, and coastal resorts. Inland activities, such as the construction of dams and channelization of rivers, may also influence migratory species and affect the quality of the marine environment.

76. Another major stress is pollution by industrial, agricultural, and urban wastes. The type and amount of pollutants affecting fisheries resources in the Region have not been quantified. With growing industrialization, urbanization, and coastal tourism, the problems associated with water pollution will increase considerably in the years to come if measures for control are not accelerated.

77. Less than 10% of total domestic waste receives treatment before disposal. Much of this waste reaches rivers, inland waters, and coastal waters, causing severe local damage to fisheries.

78. Pollution from the sugar industries and distilleries, characterized by high BOD, suspended solids, and high pH values is familiar in most Caribbean countries. No figures are available, but visual evidence indicates that most of the streams and inland waters receiving effluents from these industries are putrefied due to the resulting anaerobic conditions.

79. Effluents from refineries are causing extensive damage to water courses and coastal waters.

80. Several harbours in the Region are experiencing accelerated eutrophication because of the disposal of inadequately treated domestic and industrial wastes.

81. Offshore oil drilling presents another danger to fisheries of the Region, in particular to the coastal shrimp industry. The recent IXTOC-1 blow-out off the Campeche zone in Mexico demonstrated the possible environmental consequences of accidental oil spills.

/82. The transport

82. The transport of large amounts of toxic chemicals, oil in particular, is another potential source of pollution that may affect fisheries. Although the oil spill caused a few months ago by the collision of tankers off the Tobago coast does not yet appear to have caused significant damage to the fisheries resources of the Region, another accident of the same type might not end so fortunately.

d) Wildlife and genetic resources

83. Tropical ecosystems have the greatest diversity of species, and the Caribbean area follows this pattern.

84. Wildlife, at present, is mainly related to land areas commonly considered as marginal from the productive point of view, although they may cover nearly 40% to 50% of the total surface of the Region. Enormous numbers of wild plant and animal species are currently used for food and feed; for traditional medicine; as hides and skins, trophies, and pets; and as raw material for cosmetics, drugs, local handicraft products, oil, building, and other purposes.

85. The degradation of the wildlife resources is considerable. Forty per cent of the global vertebrate extinction has occurred in the Caribbean. Compared to 40 000 marine turtles hatching on the Gulf of Mexico in 1974, only 700 were found in 1976 and 450 a year later. The white-tailed deer, the wild rabbit, and the spider monkey have disappeared from El Salvador, although they were used as important protein sources by local farmers.

86. Habitat destruction and overexploitation are the main causes of this sad state of affairs. In the absence of appropriate research and statistical data, it is difficult to assess the magnitude of the ecological and economic damage brought about by such extensive loss of wildlife, but perhaps the most serious consequences are in terms of lost or endangered genetic resources.

87. The recent extinction or replacement of indigenous species by imports has greatly eroded the genetic resource base of the Region. The

/irreplaceable

irreplaceable value of the indigenous species stems from their excellent adaptability to local conditions and their higher resistance to pests and diseases indigenous to the Region. As such they constitute a valuable reserve as potential genetic resources to be used in cross-breeding and in implanting resistance to other species or breeds that are more vulnerable to some diseases or less adapted to local environmental conditions.

e) Energy resources

88. The energy resources of the Region are unevenly distributed. As developmental potential is to a large extent dependent on energy resources, the future rate of development of each Caribbean State and Territory will depend on the use it will make of its own energy resources and on co-operative arrangements with other States in the field of energy.

89. At present oil and gas provide most of the energy required for development. Petroleum accounted for nearly 55% of regional energy consumption in 1977, natural gas for 12%, solid fuels 20%, hydro 13%, and nuclear less than 1%.

90. Operational and accidental losses of crude oil are only part of the environmental problems associated with the exploration, exploitation, and utilization of oil and gas. Waste products of oil and gas combustion in industry, in internal combustion engines, and in domestic installations are causing heavy air pollution. The formation of heavy smogs over densely populated urban areas is causing serious health problems requiring urgent solutions.

91. Although the Region is highly dependent on petroleum as its major commercial source of energy, firewood still plays a significant role. Gathering of firewood remains a significant cause of deforestation, with all its negative environmental consequences. Firewood and charcoal are estimated to supply 80% of the domestic energy used in rural areas. It is likely that several countries will increasingly turn their attention

/towards

towards their forests to seek at least a partial solution to their deficiency in alternative indigenous sources of energy. Adequate forest management could raise present yields, providing a continuous supply for domestic consumption and for export.

92. Biomass other than firewood, based on agricultural products and residues, may have a significant future as a renewable source of energy in the Region. It could be a supplementary supply for some States and Territories that have limited prospects of being self-sufficient in terms of energy supplies from more conventional sources. Direct combustion of agricultural residues is just one, perhaps not the most important, use of biomass. Aerobic fermentation of sugar- or starch-bearing crops (sugar cane, cassava) for production of alcohol as fuel, or anaerobic digestion of vegetal and animal wastes for the generation of biogas, are promising and environmentally-sound technologies which could, on various scales, replace the currently used energy resources. The former is of particular importance as it could produce a partial substitute for fuels used in internal consumption engines (automobiles), while the latter could easily meet many of the local energy needs of farms and small communities.

93. Only a few States exploit coal reserves to an appreciable degree, although recent prospecting shows that coal could represent an alternative solution to the energy problems of some of the countries. Combustion of coal, even more than oil, can lead to serious pollution problems.

94. Hydrological energy reserves are mainly concentrated on the mainland, with a few minor exceptions. Hydroelectricity, compared with conventional thermal generation of power, seems to be a non-polluting and renewable source of energy. However, hydropower can also have an indirect negative impact on the environment, in particular when its generation is linked to dam construction. The large reservoirs created by damming river valleys can contribute to the spread of certain tropical diseases by providing habitats for disease vectors, to climatic and ecosystem changes, and

/to changes

to changes in the socio-economic structure of the communities affected by the construction of artificial lakes in places which have been traditionally used for other purposes.

95. Geothermal energy is used as an alternative energy resource in some countries of the Region. If no precautions are taken, air pollution (heavy metals, sulphuric acid, ammonia and others) in the vicinity of the geothermal power plants can sometimes be considerable and can affect human health, livestock, and the natural composition of the adjacent ecosystems.

96. The Region, due to its location on the globe, is suitable for the exploitation of solar energy. While large-scale applications of sophisticated technology (solar cells) may not now compete economically with other types of energy generation, small-scale use of solar energy for water heating, crop drying, and solar pumps could in many instances be considered as economically and environmentally sound alternatives.

f) Mineral resources

97. i) Oil. The production, conversion, and transportation of petroleum and petroleum products are the most significant economic activities of the Region as a whole. The location of the area, with respect to the major petroleum producing areas in the Middle East and the major consuming areas of the north-eastern United States and Canada, has made petroleum products even more dominant within the Region.

98. The total crude oil production of Venezuela, Mexico, Trinidad and Tobago, Colombia, and Barbados was 3.6 million barrels per day in 1977. Since then the production figures have increased considerably, largely due to the increase in Mexican production.

99. Petroleum refining is fast developing in most of the oil producing countries. The refining capacity of the Region has increased in the 1973-1980 period by 27% (Dominican Republic 190, Mexico 121, Bahamas 100, Virgin Islands 87%) and exceeded 6 million barrels per day in 1978.

100. No region-wide figures can be given for refinery pollution in the Caribbean. However, when compared to the volume of PHCs entering the ocean from exploration and production, coastal refineries account for almost twice the PHC volume from exploration and production activity. Refined products are also much more persistent and long-lived in the marine environment than crude oil, so they may pose a more serious long-term threat.

101. Losses of PHCs occurring from marine transport account for up to one-third of the total volume of PHCs entering the oceans. On the basis of the limited evidence available for the Caribbean, it appears that much of the pollution originates from losses and dumpings from tankers.

102. ii) Mining. At the end of 1977, no fewer than 56 large-scale mining operations were in production in the Region: 30 in the Central American subregion, 10 in the South American subregion, and 16 in the Greater Antilles. The most important minerals mined over the ten-year period 1967-1976 included gold, silver, copper, lead and zinc, iron, bauxite, manganese and nickel.

103. Over the ten-year period, the Region produced on average, 16.7% of the world's gold output, with a peak of 30.9% in 1976. None of the gold mines and mills in the Central and South American subregions were located on the coast, save an underground mine in Santa Barbara, Honduras, about 50 miles from the Caribbean coast. In the Dominican Republic, the Pueblo Viejo gold mine and cyanide plant at Sanchez are very near the north-eastern coast. Plans are under way to expand operations here, following discovery of a deposit at Los Cacaos. Mercury is also being recovered at Pueblo Viejo.

104. Regional bauxite production has been impressive in the past. Over the ten-year period 1967-1976, the Region averaged 37.4% of the world output. Production came from five countries: three islands and two countries in South America. In all cases, the environmental impact of mining activities on the coast has been considerable. In Guyana and Suriname, the deposits are near rivers, a little over 50 miles from the coast, and the interaction may not be as severe as in the case of the island countries.

105. Bauxite processing is concentrated in the developed countries, not in the ore-producing countries. The Region accounted for over 37% of the total ore production of the market economies in 1976, but for only 19% of the world's production of aluminium. A considerable proportion of the benefits from bauxite extraction are therefore lost to the Region. In response to this, a number of initiatives have been taken within the Region, particularly with regard to increasing regional refining and smelting capacities.

106. Available information suggests that management of waste resulting from bauxite mining and processing (red mud) may be a problem in some areas, e.g. in Jamaica, and that very little treatment of wastes takes place in general. The production of over 2.5 million tons of alumina in Jamaica, in 1976, resulted in the production of about half a million tons of waste. From bauxite processing in Suriname, over 2.5 million tons of waste were produced, while in Guyana the figure was only about half a million tons. With respect to the continental countries, these figures may not be significant, but on the islands, given the smaller surface area, they may have a greater impact.

107. Regional production of silver has not been as impressive as that of gold, even though most of the silver produced is in association with gold production. Production, mainly from Mexico and Honduras, has been 14.9% of world production over the 1967-1976 period.

108. Iron ore is produced on a large scale within the Region. At least 11 large-scale operations exist in Venezuela, Mexico, and Colombia.

/Given the

Given the deposits discovered but not yet exploited, iron ore will play a major role in the Region in the future. None of the major operations are located within the coastal area save for operations at Puerto Ordaz and San Felix on the Orinoco River in Venezuela.

109. Regional nickel ore production amounts to an average of 7.4% of world output. Cuba and the Dominican Republic are the major producers in the Region.

110. Small-scale mining in the Region accounted for the production of about 6% of the world's annual output of antimony during the period 1967-1976. A considerable amount of lead and zinc were also produced as by-products in silver and gold extraction. Small amounts of magnesite, manganese, mercury, molybdenum, and tungsten; phosphate rock in the Bahamas, Cuba and the Netherlands Antilles; and a variety of other industrial minerals including salt, sand and gravel, kaolin, asbestos, and gypsum were also obtained.

111. The Region is a net exporter of salt. For some of the island countries, this commodity is a significant foreign exchange earner. In the Turks and Caicos Islands, for example, salt is the only known mineral wealth.

112. A potentially important mineral in the island States and Territories is the iron-bearing magnetite and titanium-bearing ilmenite. Commonly referred to as beach sands, these metalliferous sands, when processed, yield titanium dioxide, the most important compound of titanium.

113. Another mineral product of increasing importance in some of the islands is aggregate. Fine aggregate in particular, is obtained from mining beach sands in almost all the islands. These activities, although they represent a significant economic benefit, are the single most destructive human activity in terms of beach erosion in many of the islands.

114. Beach mining operations have seriously disturbed coastal and marine ecosystems. Where nursery or spawning grounds are present, losses in fish stock may occur. In addition, several island countries in the Region, in seeking to establish or increase tourism, rely upon the natural attributes of unspoiled beaches, clear waters, and coral reefs. Sand and

/silt

silt disturbed by the mining operation may not only cause temporary increases in turbidity of the water, but may blanket benthic communities and smother coral reef communities.

115. The generation of waste and waste products and their management in the mineral industry, especially with regard to the coastal areas, is of great environmental concern, although the simple fact that wastes are present in the environment does not per se indicate pollution.

116. Apart from the environmental consequences of inadequate protective measures in the exploitation of mineral resources, a large number of occupational diseases have been recorded in many States and Territories of the Region. The most serious include silicosis, lead and arsenic poisoning, and asbestosis. In Colombia, 13.6% of the mine population is affected by silicosis. Among the industrial workers, rates of 5.2% for silicosis, 23% for asbestosis, and 10.3% for lead poisoning are reported.

g) Human settlements

117. The Region is characterized by the uneven spatial distribution of its population. Data on population density per country frequently do not show this clearly because they do not reflect the often very uneven distribution of population within a given country. This has to be taken into account when considering the apparently low density of the Region as a whole.

118. The islands of the Antillean Arc have reached such a high population density that any significant further increase in their population would endanger their carrying capacity. (All these islands have more than 100 inhabitants per km², with exception of Cuba and the Dominican Republic, which have less; Barbados has over 550/km².) As most of these islands (with the exception of Cuba and the Dominican Republic) have few flatlands, the high population density results in a very intensive land use of hills and mountain slopes causing serious environmental degradation.

119. In contrast to the islands, the continental countries of the Region have a population density of slightly more than 25 inhabitants per km².

/Almost

Almost all these countries have therefore relatively large territorial reserves to accommodate an expansion of their populations. El Salvador is an exception. Its limited territorial extension, coupled with rugged topography and a markedly high population density (169.5 km²), makes it very similar to the highly populated islands of the Caribbean.

120. Historically, the populations of tropical Latin America settled in the valleys, plateaux, and watersheds of the highlands, i.e. in the less humid lands where the ecological conditions favoured human life. In Central America these lands are either near the Pacific Coast or are hinterlands far away from the coasts and separated by topographic barriers.

121. In recent times, the population of the coastal areas of the Region has experienced a marked increase, showing a continuous trend towards the occupation of these areas. As the population pressure will probably further increase, if adequate administrative measures are not taken, it could easily lead to unacceptable environmental and social consequences.

122. Venezuela and Colombia are the only countries with trends of population increase in the hinterlands. On the Caribbean coasts of these two countries, high increases in population densities occur only in very specific areas, influenced principally by the expansion of existing cities. Due to the very low population densities existing at present in the interior plains of these countries and expected growth rates of lower magnitude, the foreseen stress is different from that of the Central American subregion.

123. The population settled in cities and towns of over 20 000 inhabitants showed a marked growth, particularly in the 1950-1960 decade. The number of cities increased by a factor of 2.5, whereas the population of these cities practically tripled during the 1950-1970 period.

124. The annual growth rates for urban population were exceedingly high in comparison with total population growth for the whole Region except for the Bahamas and Belize, in the period 1960-1970, and Suriname throughout the two last decades. Nevertheless, rural population in the Region was still preponderant in 1970.

/125. The lowest

125. The lowest urban growth rates and urbanization levels corresponded to the insular countries of which more than 45%, in 1970, did not have urban centres of 20 000 inhabitants or more. On the other hand, the highest urban levels were found in the north and north-west Region of South America.

126. The largest percentage increases, both in numbers of cities and in population, occurred in cities having populations between 500 000 and 1 million inhabitants; up to 1950, these were almost non-existent. However, if absolute numbers are considered, it becomes evident that there was a greater proliferation of the smaller-sized cities than those with populations between 20 000 and 50 000, whereas the largest increases in population occurred in medium-sized cities, i.e. those with populations between 100 000 and 500 000. These data suggest that if the observed trend continues, the number of large-sized cities, i.e. those with populations ranging between 500 000 and 1 million, will increase significantly by 1980.

127. Density of occupancy figures, taken as an indication of housing needs and the percentage of the population covered by basic services, show serious deficits for most, if not all, of the countries of the Region. Between 1960 and 1970, no country had been identified as having produced sufficient dwellings to keep up with demographic growth. At the beginning of the decade, Venezuela was one country whose annual housing production most closely corresponded to demand (75% of the required number). Mexico, however, produced annually 30% of the required number during the decade. The equivalent figures for Costa Rica and Guatemala were 27% and 9% respectively. It is assumed that these figures refer largely to urban areas, since very few of the countries mentioned had rural housing programmes.

128. In urban areas the results of this situation are slums and squatter settlements, the latter being more typical of the continental countries and the former of the islands, although both types are present in all countries. These "precarious settlements" have received considerable attention over recent years, both as objects of study and policy. This

/is so because

is so because of the high proportion of the urban population they house and their rapid growth rates, frequently greater than overall urban growth rates. In many cases, the uses of these areas have changed with time, tending towards increased density as spaces originally utilized as one-family dwellings are progressively subdivided. This represents a deterioration in the service/inhabitants ratio, which is accelerated to the extent that the maintenance of existing services is neglected.

129. Rapid growth of metropolitan areas has implied in many countries the absorption of agricultural land by settlements. The only settlement reserves left to Mexico City, for example, are agricultural lands. It is calculated that currently 40% of the population is settled illegally on such lands, while by 1980, 26.5% of the agricultural land around the city will have been absorbed by settlements. Similar encroachment is also reported for San Jose, Kingston, and Bogota.

130. Urbanization can also increase problems of flooding, when deforestation and large earth movements are not accompanied by adequate drainage. This occurs, for example, in Venezuela where it is estimated that 25% of settlements of more than 2 000 inhabitants have a high flood potential.

131. Inadequate coverage of piped water and sewerage systems determine, on the one hand, that an important part of the urban population resorts to polluted surface waters for their needs, and, on the other, that sewerage is dumped directly into the closest water courses and often finds its way into the underground water layers.

132. Large metropolitan areas make enormous demands on water resources, and sometimes sources in the closer surrounding areas do not suffice. Wastage due to bad maintenance aggravates the problem. Increased infrastructure using more distant sources not only affects costs but also can prejudice activities such as agriculture.

133. The availability of urban sewerage services has failed to keep up with the extension and improvement in water supplies, and there is little, if any, sewerage service outside the urban areas. The situation appears more critical in the insular Caribbean where 60% of the islands reported

/few or no

few or no services. The available statistics indicate that the percentage of population connected to sewerage systems remained static between 1970 and 1975.

134. Air pollution is becoming more and more important in urban areas in the Region, mainly as a consequence of the effluents from industrial plants and of increased motorized transport.

135. Natural disasters constitute an additional constraint on human settlements. The most common disasters affecting the Region are earthquakes, volcanic eruptions, hurricanes, and tropical storms. Their frequency and the extent of damage they cause (in terms of lost lives, destroyed property and disrupted fabric of the society) require that a strategy for their mitigation be adopted. This strategy, although national in principle, requires a great deal of inter-country co-operation, as it can be based only on adequate disaster preparedness, which is most frequently beyond the economic capability of the smaller States and Territories.

h) Tourism

136. Tourism in the Region is most closely linked to the coastal environment, although in countries such as Mexico and Venezuela coastal tourism and recreation may be relatively secondary in economic terms.

137. While Mexico dominates the Regions' tourist industry in terms of "tourist arrivals", the economic and environmental significance of tourism is much greater for some of the small States and Territories of the insular Caribbean. In the Bahamas, for instance, tourism contributes 77% of the country gross domestic product. The figures for Antigua are 40% to 50%, for Barbados 20%, for Jamaica 6%, indicating the importance of tourism for these countries but also their vulnerability to the fluctuations in the tourist market.

138. Benefits from tourism are frequently questionable, as development of tourism can have unpleasant economic, ecological, social, and cultural "side effects". It often results in inflated land values. High wages

/in tourist

in tourist industries often lure labourers out of mental, but essential jobs, and result in alienation of agricultural land when small farmers leave their land to work in urban tourist areas. Governments must spend significant amounts on infrastructure, such as power, roads, and sanitation for tourist complexes; this is often counted as a social cost, but it can also permit extension of these services to the local population, by virtue of economies of scale, and therefore there is a social benefit to this category of expenditure. High import bills for construction material, food and beverages, and furniture are endemic to the Caribbean tourist industry, and reflect the inability to create and exploit significant links with the national economy.

139. Tourism stimulates contacts and exchange of ideas among people of different cultures, but it can, and frequently does, lead to resentment and erosion of local values and customs essential for the social structure of the indigenous population.

140. The effects on coastal resources, which provide the basis for shore-based tourism, are usually on water quality. Local pollution occurs when tourist influxes cause waste loadings to exceed seasonal maxima; occasionally shellfish beds are affected. A particularly important problem in the Caribbean is the partial destruction of coral reefs through visitor-related damage; Buccoo Reef in Tobago is a classic example.

1) Transport

141. Maritime transport is the major transport activity of regional relevance, and because of the strong dependence of the Region on imports and exports, ports and harbours play an important role in the economics of the Region.

142. Ports and harbours are large direct consumers of coastal space, including areas for infrastructure. The risk of spills, discharge of noxious fumes, explosions, or fire requires the use of safety exclusion areas. Ports act as magnets, attracting the employed population, who wish to minimize their transport costs to work; this, in turn, attracts commercial enterprises, particularly services, which have a ready market.

/143. Petroleum

143. Petroleum plays a particularly large part in the transport economy of those islands States that are proximate to continental oil and gas resources, or that are sufficiently close to ultimate markets to be utilized as trans-shipment and intermediate processing points for crude being imported into North America; Trinidad and Tobago, the Netherlands Antilles, and the Bahamas are cases in point. Additionally, many of the island States and Territories operate refineries for their own needs, so there is a twofold need for oil terminals throughout the Region.

144. The concept of the "Free Trade Zone" or "Free Port" has induced extensive industrial development in some areas of the Caribbean. In Colombia, for example, the Port of Barranquilla, a free zone which started as a commercial centre in 1964, has become an industrial and manufacturing complex of 70 companies with 16 000 employees. In Panama, the Colon Free Zone, first established in 1948, now employs more than 5 500 regular workers and 1 000 "occasional" workers. This distribution and light manufacturing area now has a business volume of 1.5 billion dollars per year.

145. Coastal area land use varies significantly depending on the type of ports. Certain categories of facilities require large exclusion areas or remote siting because of potential hazards associated with the commodities handled (e.g. LNG, and LPG). In other cases facilities may be land-intensive because of storage requirements. This holds true for tank farms used for the storage of crude oil or refined products. It is also true of storage areas associated with container terminals, though not to as great an extent as for petroleum.

146. During the second half of the 1970s, there has been a marked increase in the development of container terminals in the Region.

147. The environmental constraints related to the fast-expanding maritime transport include pollution of coastal waters as a result of operational losses during loading and unloading operations (crude oil, bulk chemicals, ores) and of accidents involving loss of substances that could affect the marine ecosystems.

/148. The development

148. The development of trans-shipment terminals in the Region is a cause for special concern. At these terminals, which are designed to cater to vessels of deeper draft, smaller tankers destined for the north-eastern coast of North America are filled with crude oil from very large crude carriers. They themselves are not likely to increase the present pattern of accident risks, but the density of the smaller tankers most probably will. This is especially the case when they pass through waters such as the Mona Passage.

3. Suggested strategy for the Action Plan

149. Sound environmental management requires integration of the environmental dimension into the development process. This integration is suggested as the basic objective of the Action Plan.

150. Two fundamental activities are required to meet this objective. One is the assessment of environmental characteristics and developmental needs. The other activity is management, including policies, programmes and projects required for environmentally sound development.

151. The assessment and management functions, if they are to be successfully carried out, will require support in several areas, the most important of which are: legal, institutional, public awareness, and financial.

152. It is in this context that the Suggested Strategy for the Action Plan is presented for consideration. The suggestions, presented in general terms, represent an attempt to derive a common base from the more specific recommendations presented in the sectoral overviews and other documents prepared as supporting material for this document. (Refs. 1-9.)

a) Functional activities

153. i) Assessment. Assessment of the environmental problems of the Region, and of their causes, is incomplete. Because sound action requires an understanding of the intricate links between development and the environment, there exists a need for continuing systematic assessment of the main factors influencing environmental quality. Among the factors that could be investigated, on a regional or subregional basis, are the following:

- 1) National capabilities to respond to environmental problems, including scientific and administrative institutions, manpower, research facilities, and equipment;
- 2) Sources, causes, and extent of environmental degradation;
- 3) The resource potential of the Region;
- 4) Socio-economic trends that may affect environmental quality;
- 5) Opportunities for regional and subregional cooperation in responding to natural disasters, large-scale maritime accidents, and other environmental problems.

/154. ii) Management

154. ii) Management. The key to sustainable, environmentally sound development is the management of the resource base. Such management should take into account the carrying capacity of the environment, the goals of development as defined by relevant national authorities, and the economic feasibility of their implementation.

155. Most of the Region's environmental needs can best be satisfied, and will continue to be principally addressed, by individual States and Territories. Regional and subregional cooperative action, however, can strengthen and supplement national efforts, particularly in addressing joint concerns which by their nature lie outside the control of any single country. Sands that nourish a country's beaches, for example, larvae essential for its fishing industry, an oil spill, a natural disaster, may all cross international boundaries. In addition, cooperative regional and subregional action can be especially beneficial to the smaller States and Territories, which have limited capability to address environmental problems.

156. Possible types of regional and subregional action are numerous, including international consultations, cooperative research, networking of national institutions, and many others. Although specific actions can only be chosen by the participating governments, the following appear to present important opportunities for regional or subregional cooperative action:

- 1) Strengthening or expanding the relevant ongoing national, regional or internationally supported development activities which demonstrate sound environmental management practices;
- 2) Consultations on practices and policies for exploration, utilization, and marketing of nonrenewable natural resources;
- 3) Research on development of alternative energy resources available to the Region;
- 4) Consultations on national agricultural policies capable of lessening the Region's dependence on imported food;
- 5) Co-ordination of national research and development activities for improving the quality and quantity of agricultural products needed primarily for local consumption;

/6) Cooperation

- 6) Cooperation in the exploration and utilization of fisheries and forest resources to achieve the most rational utilization on a sustainable basis;
- 7) Cooperation on preparedness for natural disasters and measures to mitigate their consequences;
- 8) Research on, and development of, locally applicable low waste and pollution control technologies;
- 9) Harmonization of the development of maritime transport policies and facilities, including trans-shipment facilities;
- 10) Consultations on development of tourism that will be acceptable socially and profitable economically;
- 11) Consultations on conservation of wildlife, genetic resources, and natural habitats;
- 12) Cooperation on devising alternative development patterns appropriate for conditions in the Region;
- 13) Cooperation on improving capability to assess the environmental impact of development proposals;
- 14) Consultations on incorporating the environmental dimension in the planning and implementation of development programmes.

b) Supporting tasks

157. 1) Legal. To carry out the Action Plan, a formal regional legal agreement may prove useful in a number of ways. It could, for example:

- 1) Provide a legal framework for implementing the Action Plan;
- 2) Provide a framework for harmonizing national legislation, and create as necessary new legislations, relating to environmental problems;
- 3) Provide a forum for continuing high-level consultation among participating governments on implementation of the Action Plan;
- 4) Establish guidelines for coordinating environmental programmes and institutions at the regional and subregional levels;
- 5) Establish arrangements for financing such institutions and programmes;
- 6) Stimulate accession by more governments within the Region to existing legislation.

/158. A formal

158. A formal legal agreement may take the form of a regional convention, which requires ratification by States and Territories, or a declaration of principles, which does not require ratification.

159. To facilitate the harmonization of national legislation related to environmental issues, in particular legislation regulating national activities that may affect territories beyond the control of national jurisdiction:

- 1) Assistance should be provided, to States and Territories requesting it, in analysing their needs for new or revised environmental legislation;
- 2) Assistance should be provided, as appropriate, to aid States and Territories in exchanging information on national environmental legislation.

160. ii) Institutional. The concrete results of the Action Plan will depend on institutional capabilities, at regional, subregional, and national levels, to formulate and implement the defined programmes of action. It is of paramount importance, therefore, to identify and develop appropriate institutional facilities. The following components are essential for this task:

- 1) Regional Mechanism for Coordinating the Implementation of the Action Plan. An appropriate coordinating mechanism will be needed to assume responsibility for the timely and harmonious implementation of the Action Plan. This mechanism should be capable of providing not only coordination, but also direct assistance to countries, as appropriate.
- 2) Strengthening or development of Subregional and National Institutions. Whatever form the Regional coordinating mechanism may take, it is extremely important that the Action Plan be implemented through a network of subregional and national institutions. It will therefore be necessary to develop a programme to strengthen or develop such institutions, as appropriate.

161. iii) Public awareness. Notwithstanding the need for sound legislation, adequate care and management of the environment can only be achieved with the help of the entire population. Clearly, therefore, there is need for a high level of awareness of the environment and its

/problems,

problems, particularly those caused by the actions of human beings. To obtain these, the Action Plan must include an extensive programme of environmental education to offer the population correct information and dispel prejudices and change attitudes and habits which at present have a negative impact on the environment.

The awareness component of the Action Plan should include at least the following:

- 1) Educational programme, at all levels, closely related to local socio-economic and ecological characteristics;
- 2) Inclusion of an environmental component in primary, secondary and higher education;
- 3) Special environmental training programmes for professionals, technicians and others, e.g., decision-makers, teachers, mass media professionals, engineers, etc.
- 4) Special material on environment prepared and used by schools, mass media, and non-governmental organizations.

162. iv) Financial. Financial support of the responsive actions identified as part of the Action Plan, should come from participating governments, international and regional organizations, and non-governmental organizations. For these purposes the creation of a Trust Fund of financial resources, earmarked for implementing specific programmes and projects, could be considered.

Although the ultimate aim is that the implementation phase of the Caribbean Action Plan should be financially self-supporting, the United Nations System should initially provide a substantial financial contribution, progressively decreasing as the governments of the region, through a Trust Fund or other mechanism, assume fuller financial responsibility.

4. References

- (1) Overview on Environmental Health in the Wider Caribbean Region, PAHO/WHO, May 1979
- (2) Agriculture and Fisheries Overview, FAO, 1979
- (3) Natural Disaster Overview, UNEP/ECLA Project FP/1000-77-01, 1979
- (4) Overview on Energy and Environment in the Caribbean Area, UNIDO, 1979
- (5) Human Settlements Overview, RHSP/ECLA, 1979
- (6) Marine and Coastal Area Development in the Wider Caribbean: Overview Study, UN/DIESA, 1979
- (7) The State of Marine Pollution in the Wider Caribbean Region, UNEP, August 1979
- (8) The Status of Oil Pollution and Oil Pollution Control in the Wider Caribbean Region, IMCO/UNEP, August 1979
- (9) Review of International Conventions relevant to the Environmental Protection of the Wider Caribbean Region, UNEP, August 1979
- (10) Statistical Yearbook 1977, United Nations, 1978

1875

No. 10

The

Board of Directors

of the

City of New York

do hereby certify that

the following is a true and correct copy

of the

minutes of the

meeting of the

Board of Directors

held on

the

10th day of

January

1875

at New York

this

10th day of

January

1875

J. R. [Signature]

[Title]

Statistical Annex

Table 1

SELECTED STATISTICAL DATA ON STATES AND TERRITORIES OF THE WIDER CARIBBEAN REGION: SIZE, POPULATION AND GENERAL INDICATORS

	Size km ²	Population in thousands	Annual increase in population	Disposable Income (per person US\$) (1978)	GDP (10 ⁹ US \$) (1978)	GDP per capita (US\$) (1978)
Antigua	442	65	1.4	322	30	490
Barbados	17 225	175	1.6		460	2 320
Guatemala	431	237	3.7	526	240	1 000
Belize	22 955	120	3.1	405	90	650
British Virgin Islands	153	9	3.1	472		
Cayman Islands	259	10	5.0			
Colombia	1 136 914	21 070	2.9	710	9 900	460
Costa Rica	50 700	1 871	2.5	525	1 320	710
Cuba	114 524	6 569	1.7		4 850	540
Dominica	751	70	1.1	271	30	360
Dominican Republic	48 724	4 006	2.0	720	2 310	320
French Guiana	91 000	55	3.5			
Grenada	344	93	0.4	352	40	350
Guatemala	1 779	324	1.6	620	360	1 050
Guatemala	100 809	5 100	2.9	710	2 590	500
Guyana	210 969	701	1.8	720	320	410
Haiti	27 750	4 329	1.5	94	570	130
Honduras	112 000	2 556	(40)	281	890	320
Jamaica	10 991	1 040	1.6	657	1 930	290
Martinique	1 102	324	1.3	010	660	1 330
Mexico	1 972 547	65 225	2.5	679	42 030	650
Montserrat	90	11	1.3	517		
Netherlands Antilles	941	210	1.4	275	360	1 330
Nicaragua	130 000	1 077	3.3	393	1 060	540
Panama	75 650	1 420	3.1	846	1 450	920
Puerto Rico	8 897	2 712	2.0	704		
St. Kitts-Nevis-Anguilla	357	60	0.5	240	20	450
St. Lucia	616	100	1.5	320	50	430
St. Vincent	380	67		222	30	300
Suriname	163 265	704	2.7	650	350	870
Trinidad and Tobago	5 128	940	1.1	740	1 300	1 310
Turks and Caicos Islands	430	5	1.3	350		
United States of America	9 363 123	203 235	0.8	265		
United States Virgin Islands	344	62				
Venezuela	912 050	10 721	3.1	943	10 340	1 630

Sources: Marine and Coastal Area Development in the Wider Caribbean: Overview Study, UNF/DTSEA, 1979; Statistical Yearbook 1977, United Nations, 1978.

SELECTED STATISTICAL DATA ON STATES AND TERRITORIES OF THE WIDER CARIBBEAN REGION: AGRICULTURAL AND FISHERIES PRODUCTION IN 1976

(In thousand metric tons)

	Cocoa (beans)	Coffee	Cotton	Maize	Milk	Rice	Tobacco	Wheat	Wool	Fish Catches
Antigua										
Bahamas										2.0
Barbados										4.0
Belize				11		6				0.6
British Virgin Islands										
Cayman Islands										
Colombia	26.0	516.0	145	800	2 200	1 560	38.6	32		73.1
Costa Rica	5.6	86.0	1	89	767	150	3.2			12.7
Cuba	2.0	26.9	1	125	637	420				200
Dominican Republic	32.0	42	1	35	293	250	46.0			7.1
French Guiana										1.1
Grenada	2.5									1.0
Guadeloupe	0.1									3.0
Guatemala		169.9	99	685	120	29	7.7	63		3.7
Guyana						227	0.1			20.1
Haiti	4.0	36.0	1	250	86					
Honduras	0.3	45.6	7		187	133	2.3			2.5
Jamaica	1.7			11	54	76	6.3	1		3.3
Martinique	0.1					2	1.2			10.1
Mexico	32.0	242.2	211	0 393	4 164	450	60.0	3 363		572
Monserrat										
Netherlands Antilles										1.0
Nicaragua	0.6	59.1	99	201	267	61	3.0			17.9
Panama	0.9	4.7	64		74	194	1.1			171.6
Puerto Rico		12.0			600	2	1.9			90.9
St. Kitts-Nevis-Anguilla										
St. Lucia	0.4									2.2
St. Vincent	0.1									
Suriname	0.1					173				4.5
Trinidad and Tobago	3.2	2.7				20	0.1			4.3
Turks and Caicos Islands										
United States of America			2 304	159 000	54 000	5 246	900	58 307	51	3 000
United States Virgin Islands										
Venezuela	16.0	49.6	23	532	1 193	277	15.0	1		146

Source: Statistical Yearbook 1977, United Nations, 1978.

Table 3

SELECTED STATISTICAL DATA ON STATES AND TERRITORIES OF THE WIDER CARIBBEAN REGION: ENERGY PRODUCTION AND CONSUMPTION IN 1976

	Electric Energy production 10 ⁶ kWh	Energy Production (10 ⁶ metric tons equivalent of coal)	Energy Consumption per capita (Kgs/person)
Antigua	47	0.17	2 438
Bahamas	600	1.54	7 206
Barbados	228	0.24	979
Belize	43	0.09	602
British Virgin Islands	12	.01	1 027
Cayman Islands	37	.09	2 558
Colombia	15 292	16.5	685
Costa Rica	1 646	1.02	448
Cuba	7 190	11.15	1 225
Dominica	15	.02	207
Dominican Republic	2 690	3.3	653
French	65	0.13	2 155
Grenada	28	.02	211
Guadeloupe	190	0.25	685
Guatemala	1 250	1.61	257
Guyana	398		
Haiti	209	0.13	29
Honduras	590	0.75	264
Jamaica	2 378	3.93	1 937
Martinique	194	0.36	984
Mexico	46 612	76.4	1 227
Montserrat	9	.01	1 978
Netherlands Antilles	1 500	5.5	22 900
Nicaragua	1 060	1.07	478
Panama		1.52	885
Puerto Rico	1 500	11.54	3 591
St. Kitts-Nevis-Anguilla	23	.02	202
St. Lucia	45	.04	366
St. Vincent	17	.02	200
Surinam	1 335	1.05	2 406
Trinidad and Tobago	1 367	4.6	4 272
Turks and Caicos Islands			
United States of America	2 123 406	2 495	11 554
United States Virgin Islands	720	5.16	54 283
Venezuela	23 276	3 500	2 938

Source: Statistical Yearbook 1977, United Nations, 1978.

Table 4

Table 4
 SELECTED STATISTICAL DATA ON STATES AND TERRITORIES OF THE WIDER CARIBBEAN REGION: MINING IN 1976
 (in thousand metric tons)

	Coal	Crude Petroleum	Natural Gas (core calories)	Bauxite
Antigua				
Bahamas				
Barbados				
Belize		20	37	
British Virgin Islands				
Cayman Islands				
Colombia		7 553	16 500	
Costa Rica				
Cuba		144	196	
Dominica				
Dominican Republic				
French Guiana				
Grenada				
Guadeloupe				
Guatemala		7		3 235
Guyana				719
Haiti				
Honduras				
Jamaica				
Martinique				
Mexico		41 700	120 000	10 309
Monserrat				
Netherlands Antilles				
Nicaragua				
Panama				
Puerto Rico				
St. Kitts-Nevis-Anguilla				
St. Lucia				
St. Vincent				
Surinam				
Trinidad and Tobago		10 200	15 700	4 587
Turks and Caicos Islands				
United States of America	23 255	401 000	4 990 000	2 420
United States Virgin Islands				
Venezuela		123 000	118 000	

Source: Statistical Yearbook 1977, United Nations, 1978.

Table 5

Table 6
SELECTED STATISTICAL DATA ON STATES AND TERRITORIES OF THE WIDER CARIBBEAN REGION:
CONSUMPTION OF SELECTED COMMODITIES IN 1976
(In thousand metric tons)

	Sugar ('000 metric tons)	Cotton ('000 metric tons)	Steel (kg/person)	Nitrogen fertilizer ('000 metric tons)
Antigua				
Bahamas				0.5
Barbados				0.7
Belize				0.3
British Virgin Islands				
Cayman Islands				
Colombia	814	70.5	30	142.7
Costa Rica	114	1.7	79	20.5
Cuba	572	27.1	107	197.0
Dominica				
Dominican Republic	167		26	35.0
French Guiana				
Grenada				
Guadeloupe				3.4
Guatemala	284	13.0	26	41.0
Guyana				9.1
Haiti		0.7	7	0.1
Honduras				33.0
Jamaica	164	1.1	30	7.3
Martinique				4.0
Mexico	2 675	164.6	94	891.0
Montserrat				
Netherlands Antilles				
Nicaragua	100	5.6	25	22.9
Panama			11	11.0
Puerto Rico				
St. Kitts-Nevis-Anguilla				0.3
St. Lucia				1.6
St. Vincent				2.1
Suriname				5.0
Trinidad and Tobago			121	6.0
Turks and Caicos Islands				
United States of America	9 643		604	9654
United States Virgin Island				0.7
Venezuela	540		229	74.3

Source: Statistical Yearbook 1977, United Nations, 1976.

/Table 7

TABLE 3
SELECTED STATISTICAL DATA ON STATES AND TERRITORIES OF THE LATIN CARIBBEAN REGION: MANUFACTURING IN 1976
(In thousands metric tons)

	Total Meat	Sugar ('000 metric tons)	Microgranular Fertilizers	Total Wood ('000 m ³)	Cement ('000 metric tons)
Antigua					271
Bahamas		0			
Barbados		156			
Belize		60		21	
British Virgin Islands					
Cayman Islands					
Colombia	625	975	66.4	950	1 612
Costa Rica	72	238	31.0	650	162
Cuba	237	6 150	69	50	2 501
Dominica					
Dominican Republic		1 290		10	982
French Guiana					
Grenada					
Guadeloupe					
Guatemala	82	577	5	267	130
Guyana		342		92	341
Haiti	45	60		12	232
Honduras	57	81		533	234
Jamaica	22	760	3		365
Martinique		14			
Mexico	980	2 719	650	1 850	12 691
Monserrat					
Netherlands Antilles					
Nicaragua	72	242		400	209
Panama	53	161		53	311
Puerto Rico	40	275			1 390
St. Kitts-Nevis-Anguilla		56			
St. Lucia					
St. Vincent					
Surinam					
Trinidad and Tobago		205	46.3	50	51
Turks and Caicos Islands				32	242
United States of America	17 900	6 161	790	89 000	60 300
United States Virgin Islands					
Venezuela	390	510	74.2	349	3 918

Source: Statistical Yearbook 1977, United Nations, 1975.

Table 7

SELECTED STATISTICAL DATA ON STATES AND TERRITORIES OF THE WIDER CARIBBEAN REGION: COMMUNICATION IN 1976

	Radio Receivers (per 1000 persons) (1974/5)	TV Receivers (per 1000 persons)	No. Telephone per 100 persons	Newsprint (kg/persons)
Antigua	214	214	4.3	
Barbados	466		27.1	4.8
Barbados	554	163	19.1	2.0
Belize			4.0	1.4
British Virgin Islands			21.7	
Cayman Islands	318		36.6	
Colombia	119	51	7.0	1.7
Costa Rica	74	79	6.2	5.5
Cuba	224	64	1.2	2.5
Dominica			4.6	
Dominican Republic	40	34	2.6	0.5
French Guiana	49	52	14.9	
Grenada	229		1.4	
Guadeloupe	59	37		1.7
Guatemala	45	19		1.2
Guyana	354			2.2
Haiti	20	2.0	0.4	0.2
Honduras	53	15	0.7	0.7
Jamaica		54	5.4	4.2
Martinique	89	55	9.0	
Mexico	301	84	5.4	3.9
Monserrat			14.0	
Netherlands Antilles	550		19.5	2.0
Nicaragua	60		2.5	1.7
Panama	159	111	9.0	2.0
Puerto Rico	572	204	14.4	
St. Kitts-Nevis-Anguilla			4.1	
St. Lucia	748		6.8	
St. Vincent	300		4.8	
Surinam	261	81	4.2	1.4
Turkhead and Tobago	235	94	6.5	6.2
Turks and Caicos Islands				
United States of America	1 995	571	72.1	41.2
United States Virgin Islands	815	326	33.5	
Venezuela	171	107	6.0	7.9

Source: Statistical Yearbook 1977, United Nations, 1978.

•

•

•

•

Annex II

SUGGESTED MODIFICATIONS OF THE SYNTHESIS DOCUMENT

In addition to the specific recommendations set forth in the body of the report, the Advisory Panel suggested the following modifications of the synthesis document (Annex I).

a) Introduction (paragraphs 1-9)

- i) The introduction should include a list of the States and Territories included in the Region;
- ii) The Introduction should make clear which portions of the continental countries are included within the Region in substantially the following terms:
"The programme concentrates on the coastal zone, defined as the zone of immediate interaction between terrestrial and marine ecosystems. It also includes those areas of watersheds draining into the Caribbean where activities have direct impact on the marine environment";
- iii) Paragraph 6: The Panel noted the possible need for rewording of the description of the participation in the Project by UN constituent agencies. The Panel concluded, however, that any revision should come from UNEP and CEPAL;
- iv) Paragraph 7: This paragraph should state that the synthesis document was "considered" by the Advisory Panel.

b) Section 1: Scope and Purpose (paragraphs 10-19)

The Panel suggested a number of editorial changes.

c) Section 3: Suggested strategy for the Action Plan

i) Statement of goals and objectives

- 1) The Action Plan should contain a clear statement of Goals and objectives including the substance of the following:
Development is now being increasingly seen as the use of
/natural

natural resources in such a way as to improve the quality of life of the poorer majority of the population. This implies increased popular participation, improved distribution of benefits and access to resources, and sustainability of the process over the long term.

It has been widely established that the achievement of meaningful development involves the application of sound environmental management. This requires integration of the environmental dimension into the development process. This integration is suggested as the basic objective of the Action Plan.

This project is intended to provide a framework for regional co-operation in order to strengthen the capability of each country to implement sound environmental management and thus to achieve meaningful development for the Region's people. Such regional co-operation is intended to address several objectives:

- Increased assistance to the smaller countries;
- Increased use of the Region's human, financial, and natural resources and thus to advance the concept of TCDC;
- Increased regional self-reliance through the sharing of experiences on common problems;
- Increased co-operation on transnational and international concerns and activities, including natural disasters;
- The stimulation and co-ordination of international assistance activities;
- Strengthen national and subregional institutions;
- Demonstrate Region's appreciation of the importance of the environment/development process;
- Increase the public interest in, and awareness of, the environment/development process.

2) The Statement of Goals and Objectives should include explicit recognition that groups of States and Territories within the Region have distinctive needs which require special attention within the framework of the Action Plan.

3) Islands should be explicitly identified as having distinctive needs. Characteristics requiring special treatment of islands should be identified as including: the fact that the entire area of islands can be considered a coastal zone; that the small size of islands generates a fragile environmental system; that the short retention time of inland waters, the small size of aquifers, and the close proximity to the ocean, all require a water management methodology substantially different from that of the large continental land masses.

ii) Structure of the Plan

1) Paragraph 150. Three kinds of programmes should be identified as necessary to meet the goals and objectives of the Action Plan: assessment, management and public awareness.

2) Paragraph 151. Three kinds of supporting elements should be identified, in the following order: operational, financial, legal.

iii) Assessment

1) The assessment element of the Action Plan should focus on environmental processes (as paragraph 150 does), not on environmental problems(as paragraph 153 does).

2) Paragraph 153. The list of assessment tasks should be revised as follows:

- a) Inventory of sources, causes, and extent of environmental degradation;
- b) Assessment of national and subregional capabilities to investigate and manage environmental processes, including scientific and administrative institutions, manpower, research facilities, and equipment;

/c) Identification

- c) Identification of institutions with a potential to serve as "centres of excellence" in particular disciplines;
- d) Data on environmental processes;
- e) Assessment of characteristics of natural and man-induced disasters and of opportunities to mitigate and respond to their consequences;
- f) Data on resources of the Region;
- g) Data on competing demands for resource utilization;
- h) Assessment and management methodologies to enable States and Territories to make effective use of data obtained on environmental characteristics.

3) The assessment element should explicitly recognize that groups of States and Territories within the Regions have distinctive assessment needs and that these require special attention within the framework of the Action Plan.

iv) Management

1) The management element should call for adaptation of management techniques to the special needs of groups of States and Territories within the Region. The element should note that distinctive techniques are especially needed by islands because of the fragility of their ecosystems and their particularly limited carrying capacities.

v) Operational

- 1) The "institutional" component should be renamed "operational" component.
- 2) The component should be revised substantially as follows:
160. i) Operational. The concrete results of the Action Plan will depend on action at regional, subregional, and national levels. It is therefore important to identify and develop appropriate institutional capabilities at each of these levels. The following components are essential for this task:

/160A. 1) Regional

160A. 1) Regional co-ordinating unit. A regional co-ordinating unit will be necessary to ensure the timely and harmonious implementation of the Action Plan. The principal function of the unit will be to develop and co-ordinate networks of national and subregional institutions. The unit will not itself conduct research, however.

160B. 2) Strengthening or developing national institutions. It is envisaged that specific activities within the Action Plan will be carried out principally by national institutions. Programmes to strengthen or develop such institutions, as appropriate, are therefore an essential element of the Action Plan.

160C. Existing subregional institutions may also carry out some specific activities within the Action Plan. Accordingly, programmes to strengthen institutions within the Region should include these subregional institutions.

160D. 3) Networking of national and subregional institutions. Several options have been identified as possible means to create the operational linkages needed to carry out specific activities within the Action Plan. One, the regionwide option, would establish links between the regional co-ordinating unit and each national and subregional institution within the Region. Another, the subregional option, would establish links between the regional co-ordinating unit and several subregional institutions, each of which would in turn establish linkages with institutions in a specified geographical area. Both these options have been rejected.

The selected option relies on identification of a group of "centres of excellence", each having special expertise or facilities qualifying it to address a particular subject area. For each activity within the Action Plan, the regional

/co-ordinating

co-ordinating unit would establish linkage principally with the "centre of excellence", which would in turn co-ordinate the activities of other institutions pursuing that activity.

vi) Financial

The financial component should be revised substantially as follows:

162. ii) Financial. Financial support of the responsive actions identified as part of the Action Plan should come from participating governments, international and regional organizations, and non-governmental organizations.

162A. For these purposes the creation of a Trust Fund of financial resources, earmarked for implementing specific programmes and projects, could be considered. The Trust Fund would be controlled by a Council of Ministers drawn from the Region on the basis of a predetermined formula ensuring equitable geographical distribution. Funds would be disbursed directly from the Trust Fund to implementing agencies by the regional co-ordinating unit, within guide-lines established by the administrators.

162B. The regional co-ordinating unit should be empowered to assist any participating institution by helping to locate funds or technical assistance from outside sources.

162C. Although the ultimate aim is that the implementation phase of the Caribbean Action Plan should be financially self-supporting, the United Nations system should initially provide a substantial financial contribution, progressively decreasing as the

/governments

governments of the Region, through a Trust Fund or other mechanism, assume fuller financial responsibility.

vii) Legal

The legal component should be revised substantially as follows:

157. iii) Legal. To carry out the Action Plan, a formal regional legal agreement is needed for two purposes:

- 1) To provide a legal framework for implementing the Action Plan;
- 2) To create a legal basis for financing environmental programmes and institutions at the regional, subregional, and national levels.

157A. A formal legal agreement, if established for the above purposes, might also help in accomplishing a number of other objectives for which a formal agreement is not essential. For example, an agreement might:

- 1) Provide a framework for harmonizing national legislation, and create as necessary new legislation, relating to environmental programmes;
- 2) Provide a forum for continuing high-level consultation among participating governments on implementation of the Action Plan.
- 3) Establish guide-lines for co-ordinating environmental programmes and institutions at the regional and subregional levels;
- 4) Stimulate accession by more governments within the Region to existing legislation

/158. A formal

158. A formal legal agreement may take the form of a regional convention, which requires ratification by States and Territories, or a declaration of principles, which does not require ratification.

159. To facilitate the harmonization of national legislation related to environmental issues, in particular legislation regulating national activities that may affect territories beyond the control of national jurisdiction:

- 1) Assistance should be provided, to States and Territories requesting it, in analysing their needs for new or revised environmental legislation;
- 2) Assistance should be provided, as appropriate to aid State and Territories in exchanging "information" on national environmental legislation.

Annex III

IDENTIFICATION OF PILOT PROJECTS

1. Introduction

"Pilot projects" are specific activities that should be carried out in the Region. They include studies, scientific research, agreements, training courses and other concrete activities.

A list of pilot projects is necessary to illustrate concretely the activities that would result from implementation of the Action Plan, and to state priorities.

It is also useful to interest governments, financial and research institutions, and to obtain their co-operation.

2. General recommendations

a) Institutions (mainly research institutions) of excellence in the Region should be identified. Their present programmes and research capabilities should be determined with a view to entrusting them with implementation of parts of the Action Plan, and to considering their reinforcement.

b) Projects already being implemented by governments, the United Nations system, other international organizations, and private research institutions and which are pertinent to the CEP and the Action Plan, should be identified. The co-ordinating unit should see that the results and information stemming from them is made available in the Region in the necessary languages.

3. Tentative suggestions

a) Human Settlements

i) Pilot project on utilization of wastes in a small community;
ii) Pilot project on environmentally sound settlement of the Caribbean Coast of Central America;

iii) Pilot

iii) Pilot project of an alarm and rescue system in case of natural disasters;

iv) Research on minimum housing regulations for high density areas;

v) Research on techniques and materials for construction in areas of natural disasters;

vi) Case studies on management of coastal areas, and,

vii) Case studies on management of water basins.

b) Health

i) Research on ecological methods for controlling waterborne disasters;

ii) Research on new nutritional biomass products, and,

iii) Research on the health impact of bauxite.

c) Pollution

i) Oil pollution;

1) Creation of a pilot unit for oil cleaning

2) Training courses on management of oil contamination

3) Regional convention

ii) Creation of credit lines for water treatment.

d) Agriculture and fisheries

i) Marketing agreements for flora and fauna products;

ii) Creation of genetic resources bank;

iii) Pilot project for aquaculture in a small island;

iv) Case studies on reforestation and social structure;

v) Research and development of appropriate technology for Caribbean ecosystems, and,

vi) Research on ecological control of agriculture pests.

e) General

Research on the techniques of evaluation of the environmental impact of some common regional activities (tourist developments, port construction, coastal industrial parks, etc.).

