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Second Meeting of Government-Nominated Experts to Review the Draft Action Plan for the Wider Caribbean Region

CO-OPERATIVE PROJECTS PROPOSED AS PART OF THE CARIBBEAN ENVIRONMENT PROGRAMME

(Preliminary unedited draft)

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jlt569; 2 June 1980

1. INTRODUCTION

The Wider Caribbean Region has been recognized by the Governing Council of the United Nations Environment Programme (UNEP) as a concentration area in which UNEP, as the "focal point for environmental action and co-ordination within the United Nations system" (1), should attempt to fulfil its catalytic role in assisting States of the Region to develop and implement, in a consistent manner, an Action Plan for the protection and development of the marine environment and the coastal areas of the Region.

The Wider Caribbean is defined for the purposes of the Action Plan as comprising the States and Territories of the insular Caribbean (including the Bahamas), the north-eastern parts of South America from Colombia to French Department of Guiana, Panama, the States of Central America, Mexico, 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.

The Meeting of Government-nominated Experts to Review the Draft Action Plan for the Wider Caribbean Region (Caracas, Venezuela, 28 January - 1 February 1980) recognized (2) that "the Region is a geographical entity made up of States and Territories with diverse economic and political structures, natural resources, social systems, environmental characteristics and potential development capabilities." and that "the island countries of the Region have special needs owing to the fragility of their ecosystems and their particularly limited carrying capacities."

The meeting also recognized that "the principal objectives of the Action Plan are to assist the Governments of the Region in minimizing environmental problems in the Wider Caribbean through assessment of the state of the environment and development activities in environmental management. Furthermore, the Action Plan will establish a framework for activities requiring regional co-operation in order to strengthen the capability of the States and Territories of the Wider Caribbean Region for implementing sound environmental management practices and thus achieve the development of the Region on a sustainable basis. In order to achieve these overall goals, co-operation will specifically include:

- assistance to all countries of the Region recognizing the special situation of the smaller island countries;

- use of the Region's human, financial and natural resources through technical co-operation between developing countries (TCDC);

- regional self-reliance through the sharing of experience on common problems;

- co-operation on problems of a transnational or international nature, including natural and man-induced disasters;

- stimulation and co-ordination of international assistance activities;

- strengthening of existing national and subregional institutions;

- increasing public interest in, and awareness of the environment/ development process."

The meeting requested the secretariat to convene, prior to the intergovernmental meeting which will consider the adoption of the Action Plan, an additional meeting of experts to review, inter alia, "concrete project proposals with thei approximate costs and the proposed operational time frame." The meeting also requested "that the specialized agencies of the United Nations, with the projects experience and knowledge of the Region, should have as critical a role and function in the implementation of the Action Plan as they had in the preparatory phase, and that every effort should be made to avoid duplication in the activities of implementing the Action Plan."

In preparing the response to these requests the secretariat, through the UNEP/ECLA project team and with the assistance of UNEP's Regional Seas Programme Activity Centre, drafted this document which should be considered as a preliminary draft. Inputs into the documents have been received from the United Nations Department for International Economic and Social Affairs (UNDIESA), United Nations Industrial Development Organization (UNIDO), Food and Agriculture Organization of the United Nations (FAO), United Nations Educational, Scientific and Cultural Organization (UNESCO), Intergovernmental Oceanographic Commission (IOC) of UNESCO, Pan American Health Organization (PAHO), Inter-governmental Maritime Consultative Organization (IMCO), International Union for the Conservation of Nature (IUCN) and the United Nations Disaster Relief Organization (UNDRO).

This preliminary draft is intended to be used for informal consultations the secretariat is conducting with the Governments concerned with the Action Plan, with the potential financing agencies, and with the international, intergovernmental and non-governmental organizations which may take part in the implementation of the Action Plan.

Based on the comments and suggestions received during these consultations (June - August 1980), the final draft of the document is intended to be prepared in co-operation with the organizations interested to support the various projects (September 1980). The final draft will be officially distributed to all parties concerned and will be used as one of the basic working documents for the Second Meeting of Government-nominated Experts to Review the Draft Action Plan for the Wider Caribbean Region (planned for January 1981).

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(1) Resolution 2997 (XXVII) of the General Assembly, 1972.
(2) E/CEPAL/PROY.3/L.6.

jlt570; 2 June 1980

2. PROGRAMME OUTLINE

One of the major constraints affecting the effective use of resources in the development processes under way in the Wider Caribbean Region is the paucity and heterogeneity of information on the resources of the Region and on the environmental implications of their utilization, impeding rational decision making. This lack of adequate information is particularly critical as it relates to issues of a fundamental nature such as (i) the potential of underutilized resources, (ii) the fragility of many of the ecosystems of the Region; (iii) the inability of overutilized and degraded resources to maintain sustained yields; and (iv) the presence of many island countries which are ecosystems with limited resources and relatively large populations. Consequently, the environmental assessment component of the Action Plan, which includes the systematic description and examination of environmental topics or problems evaluating their present and future implications to man and his environment, should underlie and facilitate decision making and the implementation of the environmental management elements of the Action Plan.

Due to the lack of basic environmental data and scientific knowledge a co-ordinated overall resource inventory and environmental monitoring will be developed throughout the Region, particularly for coastal and marine areas and neighbouring areas that affect the latter (including estuaries, deltas, marshes, mangroves, lakes, coastal lagoons, coral reefs and sea grass beds) as a basis for providing guidelines for environmentally sound development as well as for training purposes. However, it should be emphasized that every assessment activity will have a definite management objective.

The operational details of these programme will be based on existing and projected national, regional and international activities in this field.

The meeting of experts in Caracas recommended that, in order to achieve the objectives of the Caribbean Action Plan, the following environmental assessment and management activities should be undertaken:

(a) Assessment including an inventory and analysis of the natural resources and their environmental characteristics, as necessary to formulate an environmental diagnosis in order to provide a basis for sound environmental management;

(b) Management including the formulation of guidelines, plans and specific projects as well as the determination of the means necessary to this end.

Furthermore, the meeting recommended that the Action Plan:

(a) should concentrate its activities on the coastal areas, making special reference to the interactions among terrestrial, coastal and marine ecosystems;

(b) should recognize two distinct action levels:

(i) development of long-term comprehensive strategies for environmentally-sound development, taking into account the priorities, needs and capabilities of the Region; and

(ii) initiation of specific action-oriented co-operative projects responsive to important and immediate environmental needs of the Region;

(c) should make all components of the Action Plan interdependent so that they constitute a framework for comprehensive action contributing to both the protection and the continued environmentally-sound development of the Region. No component should be an end in itself.

Based on the activities recommended by the meeting of experts in Caracas to be covered by the Caribbean Action Plan, the following projects are proposed as the major activities of the environmental assessment and management components of the Action Plan:

General (Institutional Capability)

The concrete results of the Action Plan depend on action at regional, subregional and national levels. It is therefore important to identify and develop appropriate institutional capabilities and co-ordinating mechanisms at each of these levels. The following projects are envisaged to achieve these objectives:

1. Survey of national capabilities and means to respond to environmental problems including scientific and administrative institutions, manpower, research facilities and equipment (APCEP 1):

   1.1 compilation of lists of Government-designated institutions (APCEP 1/1);

   1.2 survey of research facilities, equipment and manpower (APCEP 1/2);

   1.3 survey of environmental laws (APCEP 1/3).

2. The development and strengthening of the capability of the nations of the Region to prepare environmental impact analyses of major development projects and plans in order to incorporate the environmental dimension in the planning and implementation of socio-economic development programmes (APCEP 2).

3. Promotion of increased technical and financial support for sound environmental management practices within on-going national, regional, and internationally-supported economic development activities, so that they will have a demonstration effect (APCEP 3).

4. Promotion of a fuller utilization of existing mechanisms for continuous exchange of environmental data and other relevant information between the countries at the regional and subregional level (APCEP 4).

Protected Natural Areas

In order to maintain the essential ecological processes and life support systems, preserve genetic diversity and ensure the sustainable utilization of species and ecosystems which support the agricultural, industrial and fisheries needs of the Caribbean Region it is necessary to identify and develop networks of coastal, marine and terrestrial protected areas. The objective of the following projects is to achieve this end.

5. A survey of potential areas for national parks and marine reserves that could serve as tourism resources, and at the same time to protect fragile ecosystems and areas of scientific interest (APCEP 5).

6. Development of regional and subregional networks of coastal, marine and terrestrial protected areas, in such a way as to help maintain the living natural resources vital to development. To further existing efforts and agreements involving countries of the Region, development of co-operative activities for the protection of endangered and threatened species so as to help maintain the region's wealth of genetic resources; and the harmonization of national policies for the management of wildlife, genetic resources, and natural habitats (APCEP 6).

7. Analysis of development trends in the Region, particularly in coastal areas, in order to determine possible areas of environmental stress resulting from multiple demands on limited resources (APCEP 7).

Pollution Control

The Caribbean in general is a Region where the level of industrialization, urbanization and intensive mechanized and chemically subsidized agriculture is still not fully developed. Consequently widespread water and marine pollution problems have not reached the levels found in more industrialized regions. Nevertheless there are many areas within the Region which are experiencing severe pollution problems and others where expected activities will generate such problems if appropriate control measures are not developed. The following projects aim at minimizing the ill-effects of development and industrialization by reducing the level of pollution.

8. Assessment of the origin and magnitude of pollution in the Region with specific reference to hydrocarbons and other hazardous substances (APCEP 8) including:

8.1 determination of technical knowledge as well as the existing means and economic capabilities at the national or regional level for preventing, combating, limiting and, insofar as possible, eliminating pollution and other adverse effects due to the exploration, exploitation, refining and transportation of hydrocarbons and other hazardous substances (APCEP 8/1);

8.2 studies on the sources of pollution by hydrocarbons and other hazardous substances (APCEP 8/2);

8.3 identification and monitoring of existing and potential direct and indirect effects of exploration, exploitation, refining and transportation of hydrocarbons and other hazardous substances (APCEP 8/3);

8.4 studies of the destination and effect of oil pollution, especially oil spills, on tropical coastal ecosystems, particularly those of economic importance, such as mangrove swamps, coral reefs, beaches and coastal fisheries by using and taking advantage of accidental spills (APCEP 8/4);

8.5 identification and monitoring of potential and existing hazards from the transportation of hazardous substances other than oil and petroleum hydrocarbons (APCEP 8/5).

9. Development of regional and subregional co-operation in preventing, combating, detecting, containing and cleaning up accidental spills of hydrocarbons and other hazardous substances including the promotion of contingency plans, at the national, subregional or regional levels, to control pollution caused by hydrocarbons and the co-ordination of existing national, subregional and regional plans (APCEP 9). This project will consist of:

9.1 formulation of a framework for regional co-operation in oil spill combating with particular reference to island States and Territories participating in the Caribbean Action Plan (APCEP 9/1);

9.2 development and implementation of an oil spill preparedness training programme (APCEP 9/2);

9.3 development of national contingency plans and subregional arrangements for co-operation and mutual assistance in combating oil pollution with particular reference to Central and South American countries participating in the Caribbean Action Plan (APCEP 9/3);

9.4 study on the feasibility of instituting suveillance flights over tanker routes to determine the extent to which oil is being discharged by tankers and cargo vessels in violation of international regulations (APCEP 9/4);

9.5 development and implementation of Harmonized Procedures to Monitor Tanker Slop Tank Oily Residues at Tanker Terminals in the Caribbean (APCEP 9/5);

9.6 study on the disposal of recovered oil and oily debris to determine the methodology which would be most adaptable to the island nations and result in the least long term environmental damage (APCEP 9/6);

9.7 study of beach cleaning methodology for recreational beaches which suffer from varying degrees of erosion (APCEP 9/7).

10. Assessment of the sources, quantities and routes of industrial and agricultural wastes as well as domestic and municipal wastes reaching the marine environment and their effects on human health, marine ecosystems (in particular fisheries resources) and coastal amenities (APCEP 10).

11. Strengthening of national capabilities for pollution control and monitoring through training and harmonization of methodologies (APCEP 11).

12. Strengthening of national capabilities to develop or improve programmes for water quality control in coastal areas (APCEP 12).

Coastal Areas

Development trends in the Wider Caribbean are leading to increasing stress on the coastal and marine environment. The increased demands on the limited and intertwined coastal resources is having and will continue to have a definite impact on coastal marine resources which are vital to sustain economic and recreational activities. The following projects are geared to assess the impact of land and coastal based activities on the marine ecosystems and to develop means to ensure the rational utilization of coastal resources.

13. Assessment of the impact of coastal and land-based activities on coastal marine resources comprising (APCEP 13):

13.1 identification of critical coastal areas within the Region (APCEP 13/1);

13.2 studies on the characteristics of industrial, agricultural and domestic waste discharged into coastal areas (waste discharge profile) (APCEP 13/2);

13.3 studies on the effects of pollutants and coastal development activities on important biological communities and habitats particularly those connected with coastal fisheries and other coastal dependent activities (APCEP 13/3);

13.4 development of a basis for environmental quality criteria applicable for the tropical coastal waters of the Region (APCEP 13/4);

13.5 studies of land use, conservation and recovery of coastal swamps and coastal lagoons (APCEP 13/5);

13.6 studies on the effects of pesticides used for banana and other major plantation crops and the possibilities for biological controls (APCEP 13/6).

14. Assessment of the coastal dynamics which have a significant impact on human health, marine ecosystems and human activities by modifying the fate of wastes, sediment and sand transport as well as the configuration of the coasts (APCEP 14).

15. Formulation of advisory coastal zone management schemes with particular reference to the preparation of guidelines for land use, resource management and environmental protection and support for national endeavours in this area (APCEP 15).

16. Catalysis of assistance to national institutions for the restoration of degraded coastal ecosystems, especially mangroves and coral reefs, as part of general coastal management plans (APCEP 16).

Fisheries

Fish protein forms a significant part of the protein intake of the peoples of the Wider Caribbean and fisheries figure prominently in the national economies of several of the countries in the Region. Caribbean fisheries are developing and expanding and although overfishing is not believed to be an imminent threat, an assessment of the fisheries potential and of the life-cycle of commercially important species in the Region is needed.

Due to a stable thermocline preventing vertical mixing and upwelling of nutrient-rich waters the coastal and estuarine ecosystems play a proportionately large role in providing nutrients and breeding grounds for many species of commercial importance. An assessment of the fisheries resource potential particularly in its relationship to coastal ecosystems and harvesting technology is necessary in order to develop guidelines for optimum rational exploitation of the resource.

In view of the existence and activities of the Western Central Atlantic Fishery Commission (WECAFC) and the well developed WECAFC programme covering the Wider Caribbean Region, no specific projects related to fisheries have been developed in the framework of the Action Plan. It is recommended that full support be given to the further strengthening of WECAFC and its programme and that the efforts related to fisheries be concentrated around them.

17. Studies of the life-cycle of commercially important species of crustaceans, fishes and molluscs, with particular reference to the role played by coastal ecosystems such as mangroves, coastal lagoons, coral reefs and turtle grass beds (APCEP 17).

Watersheds

The use of inland waters in the Caribbean Region has steadily expanded: new industrial, urban and agricultural demands on water quantity and quality have risen more or less simultaneously with a dramatic decline in water quality in most basins. Forest clearance, hydroelectric installations, irrigation and water supply works and pollution increase the cost of making water suitable for different uses, destroy, degrade or deplete its valuable ecosystems and species and increase the risks of disastrous effects of natural phenomena for those populations settled in the developed plains.

The projects below intend to assess the effects of disturbances on watershed processes and to develop means for watershed management.

18. Assessment of the effects of disturbances on the relationship between forest cover and water and soil resource utilization with a view to introducing environmental planning concepts in management of watersheds, particularly on small islands and coastal areas (APCEP 18).

19. Development of watershed management guidelines, especially for drainage areas surrounding the Caribbean Sea (APCEP 19) with particular reference to:

- control of floods, soil erosion and sedimentation;
- prevention of the destruction of tropical forests and establishment of reafforestation programmes as appropriate;
- protection of the hydroelectric potential of the rivers;
- maintenance and improvement of adequate freshwater management on the surface and underground;
- maintenance of wildlife habitats;
- prevention of the pollution of the catchment from domestic agricultural and industrial wastes.

Natural Disasters

The countries of the Caribbean are exposed to some of the most violent kinds of natural phenomena: earthquakes, volcanoes and hurricanes and tropical storms. The worst examples of these kinds of phenomena have caused disastrous effects in the Region with loss of life running into tens of thousands and economic losses amounting to hundreds of millions of dollars. Although there is no means of preventing these natural

occurrences it is now possible through monitoring and planning to reduce the scale of the disastrous effects. The projects described below are aimed at this end.

20. Survey and evaluation of the disaster potential of natural phenomena (risk analysis) in order to develop an adequate short-term strategy and medium and long-term planning for the prevention and mitigation of risks (APCEP 20).

21. Continued co-operation with the pertinent agencies in the survey and evaluation of existing strategies and procedures of preparation for natural disasters and of the intrinsic effects of disasters, with a view to developing more appropriate national, sub-regional and regional response mechanisms in a form compatible with environmental protection (APCEP 21).

22. Strengthening of existing regional or sub-regional co-operation for natural disaster prevention and relief, and for environmental recovery following disasters (APCEP 22).

Energy

The energy resources in the Region are unevenly distributed. As the development potential of the States and Territories in the Region is to a large extent dependent on energy resources the future rate of development of each Caribbean country will depend on the efficient use of its energy resources and on the co-operative arrangements with other countries in developing new sources of energy.

The objective of the projects described below is to assess the potential in the Region for sources of non-conventional (renewable) energy and to promote co-operation in the development of activities to tap these resources.

23. Assessment of major sources of non-conventional energy and their potential for utilization (APCEP 23):

    23.1 survey of non-conventional energy sources in the Region (APCEP 23/1);

    23.2 assessment of the potential of the major sources of non-conventional energy in the Region (APCEP 23/2).

24. Co-operation and technical assistance in the application of energy accounting systems which may be used as the basis for the formulation and implementation of sound national energy policies and programmes (APCEP 24).

25. Reinforcement of regional and subregional integrated non-conventional energy activities with the objective of a fuller exchange and dissemination of all available information and provision of training opportunities (APCEP 25).

26. Development of a co-operative programme for the implementation of appropriate technologies and practices for waste disposal with special attention to recycling, energy generation and the special problems of the smaller islands (APCEP 26).

Human Settlements

The Region is characterized by an uneven spatial distribution of its populations. Urbanization, rapid growth of cities, rural developments are some of the factors associated with human settlements in the Region which have definite impact on the environment and on the quality of life of the settlements themselves.

To explore the trends and problems related to human settlements in the Wider Caribbean Region, particularly in coastal areas, and to promote planning measures, alternative development styles and appropriate technologies are amongst the objectives of the projects described below.

27. Assessment and evaluation of the present characteristics and future population trends, considering elements of growth, distribution, density and migration which are of environmental significance, with particular attention to the special problems of islands and the environmental impact of relocation and temporary housing (APCEP 27).

28. Assessment of existing coastal urbanization policies processes and human settlements technologies applied in the Region, including building technologies appropriate to the Region's environment (APCEP 28).

29. Identification of the interaction between the principal ecosystems of the Region in order to determine potential long-range effects caused by human activities and the environmental and infrastructural cost of population growth (APCEP 29).

30. Encouragement of the consideration of ecological variables and eco-development techniques in the design of new human settlements projects by means of: the formulation of human settlements projects leading to alternative styles of development; the promotion of policies and practices which give special attention to the ecological aspects of urban and rural development; the development of proper structural designs which take into account the possibility of natural disasters; the development of appropriate building technologies and the appropriate use of indigenous building materials on a sustainable basis (APCEP 30).

Tourism

With the exception of the larger continental countries, tourism in the Region is most closely linked to the coastal environment and constitutes an activity of great economic and environmental significance for the smaller States and Territories of the Wider Caribbean. Tourism has a definite impact on the social, cultural and environmental fabric.

Assessment of the nature and magnitude of this impact in order to recommend and promote actions which minimize the negative effects of tourism is the principal objective of the projects described below.

31. Assessment of the impact of tourism on the physical, social and cultural environment, particularly as they affect coastal zones (APCEP 31).

32. Assessment of alternative tourism (integrated tourism) aimed at reducing negative impact on local environments, bringing greater benefits to local people, and putting tourism on a sustainable basis (APCEP 32).

33. Development of guidelines to minimize the negative impact of tourism on the physical, social and cultural environment, particularly as regards coastal zones (APCEP 33).

Environmental Health

Environmental health problems in the Caribbean Region vary with the level of social and economic achievement reached by the respective countries. In general, lack of planning and inadequate management have been important elements in frustrating the efforts of the countries to deal effectively with their growing environmental problems. Among the major interrelated factors are the absence of national policies on environmental health, the fragmentation of environmental health functions in various agencies, the inadequacy of existing legislation and the lack of surveillance of environmental quality.

To assess and define the environmental health problems and to develop and strengthen the capability to cope with such problems is the aim of the projects described below.

34. Survey of existing environmental health problems (APCEP 34) with particular reference to:

- availability and quality of drinking water supplies particularly in rural reas;
- waste water disposal;
- solid waste management;
- working environmental hazards;
- impact on human health of industrial waste and pesticide residues including the contamination of ground water;
- food contamination and its possible impact on the problems of human health and malnutrition;

- the health problems associated with migration to urban areas and the relocation of people as a result of development projects;

- vector control and vector-borne diseases.

35. Development and strengthening of national institutional capability for improving environmental health services including water supplies in urban and rural areas, water quality control, water resources, sanitary waste disposal, water pollution control and vector control (APCEP 35).

jlt571; 29 May 1980

3. DESCRIPTION OF PROJECTS

The operational details of the proposed projects have been prepared by the joint UNEP/ECLA Caribbean Environment Project (CEP) together with UNEP RS/PAC in a co-ordinating role, as a joint exercise of the United Nations organizations.

In formulating these details, planned, ongoing and previously executed national and regional programmes have been taken into account.

The description of the projects is prepared in a comparable way, giving for each of the projects:

(i) the title of the project with reference to the relevant paragraph of the Action Plan;

(ii) the overall objectives of the project;

(iii) the background information on the significance of the proposed activities, as well as on previous activities and existing data which may serve as justification for the project;

(iv) the activities proposed to be undertaken in the framework of the project;

(v) the planned outputs, divided into two phases, the first ending nine months after the project becomes operational, and the second ending 18 months after the end of the first phase, or earlier where the project is to be of less than 18 months duration;

(vi) the workplan and timetable of the envisaged activities, including the international organizations proposed to be responsible for the implementation of the project;

(vii) estimated cost of project.

For several of the projects, further specification of the details will only be developed after approval in principle for their implementation has been given by the participating Governments, and after those national and sub-regional institutions participating in the projects have been identified.

The weys and means of co-ordination envisaged for ensuring the harmonious development of the programme, as well as the financial implications of the programme's implementation, are explained in chapters 4 and 5.

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General (Institutional Capabilities)

APCEP 1 - SURVEY OF NATIONAL CAPABILITIES AND MEANS TO RESPOND TO ENVIRONMENTAL PROBLEMS INCLUDING SCIENTIFIC AND ADMINISTRATIVE INSTITUTIONS, MANPOWER, RESEARCH FACILITIES AND EQUIPMENT (Reference paragraph xxx of the draft Action Plan)

OVERALL OBJECTIVES

To gather in the form of directories, reports, surveys, bibliographies and references, information concerning the national capabilities and needs of the Region and to use this information to identify areas where improvements can be made and to establish the initial networks of institutions for implementation of the specific projects of the Action Plan.

Three APCEP projects are envisaged for this programme component:

APCEP 1/1 - COMPILATION OF LISTS OF GOVERNMENT DESIGNATED INSTITUTIONS

APCEP 1/2 - SURVEY OF RESEARCH FACILITIES, EQUIPMENT AND MANPOWER OF GOVERNMENT DESIGNATED INSTITUTIONS

APCEP 1/3 - SURVEY OF EXISTING ENVIRONMENTAL LAWS AND REGULATIONS

OBJECTIVES

To publish in the form of directories, surveys of the national institutional capabilities and needs of the Region for implementation of the programmes of the Action Plan.

To survey the manpower capabilities and needs.

To review the environmental laws and regulations of the Region.

To identify national and subregional institutions which can form networks for implementation of specific projects within the Action Plan.

BACKGROUND

The concrete results of the Action Plan depend on action at regional, subregional and national levels. National institutions designated by their Governments will provide the institutional basis for the activities, agreed upon between the Governments, as components of the Action Plan.

In principle, each of the activities agreed to as part of the Action Plan will be carried out by several national (as well as subregional and regional) institutions located in the various States and Territories of the Region, linked in networks of co-operating institutions.

It is therefore important to identify and develop appropriate institutional capabilities and co-ordinating mechanisms at those levels.

ACTIVITIES

APCEP 1/1 - For each of the major subject areas of the Action Plan (marine pollution and fisheries, natural disasters, energy, human settlements and tourism and environmental health), preliminary lists of national and subregional institutions in the Region, will be prepared in collaboration with the relevant international, regional and subregional organizations.

These lists will then be submitted to the Governments through their national focal points (NFPs) for additions, deletions and comments as appropriate and for the Governments to designate those institutions which should participate in the Action Plan.

APCEP 1/2 - Through the use of questionnaires and visits, the RCU will compile in the form of directories, information on the research facilities, equipment, manpower and ongoing and planned activities related to the programmes of the Action Plan.

From an analysis of the information obtained, the capabilities and needs of the Region to implement the various programmes of the Action Plan will be determined; and an identification of selected institutional networks for implementation of specific projects will be undertaken.

APCEP 1/3 - In consultation with Governments of the Region and by using existing available surveys/studies, environmental laws and regulations will be compiled, reviewed and updated by the RCU.

OUTPUTS

(a) First Phase

Comprehensive lists of:

1. scientific and administrative institutions;

2. research facilities and equipment;

3. ongoing and planned activities dealing with environmental processes, with an assessment of the capabilities of these institutions and facilities;

4. preliminary indication of the role which they can play in the implementation of the Action Plan;

5. identification of selected institutional networks for implementation of specific projects.

(b) Second Phase

1. Directories[1/] including detailed information about the scientific and administrative institutions of the Region including facilities, manpower, ongoing and planned activities of these centres.

2. A review of regional manpower capabilities and needs.

3. A review of national environmental laws and regulations.

4. Updated version of the directories including the marine directory.

5. Further identification of selected institutional networks for implementation of specific projects.

[1/] Separate directories are to be prepared covering the following major subject areas: marine pollution and fisheries, natural disasters, energy, human settlements and tourism and environmental health.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Compilation of preliminary lists of national and subregional institutions for existing sources within the international system	0 - 2	UNEP(RCU)
Modification of lists by Governments and designation of institutions	4 - 6	UNEP(RCU)
Preparation of questionnaires about the institutions' research facilities, equipment, ongoing and planned activities	0 - 2	UNEP(RCU)
Visits to all countries to complete questionnaire	6 - 7	UNEP(RCU)
Analysis of the information collected and identification of the capabilities and needs of the Region	8 - 10	UNEP(RCU)
Compilation of environmental laws and regulations using existing and available surveys	8 - 9	UNEP(RCU)
Selected visits through several countries to complete compilation	10 - 11	UNEP(RCU)
Analysis of existing legislation to identify gaps and formulate recommendations	12 - 17	UNEP(RCU)

Total cost of project $15,000 (to be funded from secretariat budget)

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APCEP 2 - THE DEVELOPMENT AND STRENGTHENING OF THE CAPABILITY OF THE NATIONS OF THE REGION TO PREPARE ENVIRONMENTAL IMPACT ANALYSES OF MAJOR DEVELOPMENT PROJECTS AND PLANS IN ORDER TO INCORPORATE THE DIMENSION OF THE ENVIRONMENT AND NATURAL RESOURCES IN THE PLANNING AND IMPLEMENTATION OF SOCIO-ECONOMIC DEVELOPMENT PROGRAMMES (Reference paragraph xxx of the Action Plan)

OBJECTIVES

To review the manpower situation in the environmental planning sector of all countries in the Region and as appropriate to design training programmes for planning officials and engineers in charge of reviewing and/or implementing plans for major development projects.

To promote environmentally-sound development through application of engineering techniques which reduce environmental deterioration to the lowest possible level.

To identify the most prevalent negative environmental impacts of typical major projects in the ecosystems of the Region and the determination of practical measures that would result in a reduction of environmental damage.

To create or strengthen an interdisciplinary capability within the Region on a national and/or subregional basis to assess the environmental impacts of major projects.

To develop suitable training materials.

BACKGROUND

Many of the environmental problems of developing countries result from the type of development process pursued. It is not development per se that has caused environmental problems. Sustainable development must be based on environmentally-sound development policies, i.e. policies that account for 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.

In their legitimate quest to improve the socio-economic standards of their people and to satisfy the most basic human needs, the countries of the Wider Caribbean must vigorously pursue the implementation of development activities in many economic sectors.

It has been found however that when serious consideration is not given to the interaction of particular major projects with the surrounding environment, other economic options and even the benefits that may have accrued from the project itself are either impaired or eliminated.

There exists a great need to provide environmental management training to the professionals and public officials in charge of designing, reviewing and constructing these major development projects. And to develop an interdisciplinary capability at a national, subregional or regional level to assist the Governments in assessing the environmental impact of major developmental activities.

ACTIVITIES

1. A survey of the principal environmental impact problems of major developmental activities in the Region will be carried out based on existing documentation and selected consultations with Government and industry.

2. Inputs from APCEP projects 1 and 3 will be used to determine the planning and review process currently applied in the Region for major projects.

3. A two-week training seminar on environmental planning for planning officials and engineers will be held. The seminar will focus on problems specific to the Region and will highlight with the use of specific examples, the environmental and economic cost of poorly planned projects and the benefits that can be accrued from incorporating environmental criteria in the project's design.

4. Training activities at the managerial and technical levels will be undertaken as necessary in environmental related fields where experts are lacking in the Region. Special short-term training courses in beach protection, coastal mining, coastal engineering, solid waste management, tropical ecology and coastal zone management will be conducted in the Region. These activities will be carried out in conjunction with APCEP projects 6, 13/3, 14, 16, 17, 18, 19, 29, 30 and 35.

   In addition, individual fellowships will be arranged for attendance at existing medium and long-term courses. Arrangements will also be made for exchange programmes between governmental institutions to provide on-the-job training in environmental management fields.

OUTPUTS

(a) First Phase

1. Report identifying the principal environmental impacts of development projects by means of matrices showing the relationship between different types of projects and effects on the environment.

2. Report analysing the existing mechanisms for developmental project review and recommending practical measures to develop or strengthen such inclusions in the form of a standard handbook for environmental impact assessment.

3. Seminar for public officials (planners) and engineers in environmental planning and impact assessment.

4. Programme for short-term training courses in environmental related fields of priority to the Region such as:

   health protection
   coastal mining
   coastal engineering
   solid waste management
   tropical ecology
   coastal zone management

5. Programme for fellowships in medium and long-term training in environmental sciences.

6. Programme for intercountry exchange of professionals engaged in planning and environmental management for on-the-job training.

(b) Second Phase

1. Publication and development into audiovisual teaching-aid packages and standard manuals of the subject matters discussed and developed for the short training courses in environmental related fields.

2. Award of fellowships.

3. Implementation of intercountry exchange programme for on-the-job training of public officials in charge of environmental management and planning.

4. Short-term training courses held in specific subject areas of high priority for environmental management in the Region.

148. WORKPLAN AND TIMETABLE
149.
150. | Activities | Starting and ending (from month 0) | Responsible organization |
151. |---|---|---|
152.
153.
154.
155. 1. Survey of principal environmental impact problems — 0 - 3 — RCU
156.
157.
158. 2. Analysis of environmental review process — 0 - 3 — RCU
159.
160.
161. 3. Preparation of two-week training seminar for planning officials and engineers — 0 - 6 — UNESCO
162.
163.
164.
165. 4. Training seminar for planning officials and engineers — 6 — UNESCO
166.
167.
168. 5. Development of programme for specialized short courses in the environmental sciences — 0 - 10 — various agencies
169.
170.
171.
172. 6. Specialized short courses in the environmental sciences held — 8 - 24 — various specialized agenci
173.
174.
175. 7. Preparation of standard manuals and audiovisual packages for short-term training on environmental impact assessment — 8 - 16
176.
177.
178.
179.
180. 8. Fellowships on environmental studies (medium and long-term) awarded — 8 - 24
181.
182.
183. 9. Development and implementation of inter-country exchange programme — 8 - 24
184.
185.
186.
187.
188. Estimated cost of total project $235,000 US dollars

jlt526; 29 May 1980

APCEP 3 - PROMOTION OF INCREASED TECHNICAL AND FINANCIAL SUPPORT FOR SOUND ENVIRONMENTAL MANAGEMENT PRACTICES WITHIN ON-GOING NATIONAL, REGIONAL, AND INTERNATIONALLY-SUPPORTED ECONOMIC DEVELOPMENT ACTIVITIES, SO THAT THEY WILL HAVE A DEMONSTRATION EFFECT (Reference paragraph xxx of the Action Plan)

OBJECTIVES

To support and expand the most significant national, regional or internationally supported development projects already under way in the Region which have beneficial environmental effects in such a way that they can serve as regional demonstration and training sites.

BACKGROUND

The countries of the Caribbean Region have experienced unprecedented rates of growth during recent years, particularly in urbanization, industrialization, agriculture, transport, trade and the exploration for and exploitation of the Region's natural resources. Continuous socio-economic development without adverse affects can only be achieved on a sustainable basis if environmental considerations are taken into account.

There are in the Region several development projects which have beneficial environmental effects, fisheries projects on rational exploitation of fish and shrimp stocks, projects for mariculture, environmental sanitation and industrial waste treatment projects under the auspices of national Governments and in collaboration with international organizations.

These, or other similar projects, should be strengthened and expanded through the Action Plan. Because of their beneficial consequences they could serve as demonstration and training sites for the Region.

ACTIVITIES

National, regional and internationally supported projects of the Region which have beneficial environmental effects will be identified. This will be accomplished by the co-ordinating unit through collaboration with nominated focal points and participating international organizations.

Visits will be made to the headquarters of selected projects about which insufficient information is available. Arrangements will be made to utilize environmentally beneficial projects as part of a regional training programme. The training programme will be organized in conjunction with these projects and countries will be asked to nominate participants. This project will provide inputs for APCEP project 2.

OUTPUTS

1. List of national, regional and internationally-supported projects with beneficial environmental effects.

2. Identification of prototype activities that should be expanded for demonstration and training purposes.

3. Training courses associated with ongoing projects.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Identify national, regional and internationally supported projects which have beneficial environmental effects	0 - 3	UNEP(RCU)
Visits to the headquarters of the selected projects to compile data and arrangements for using these projects for training	2 - 3	UNEP(RCU)
Report of findings and recommendations	3 - 5	UNEP(RCU)
Prepare a training programme in conjunction with the concerned projects	3 - 6	UNEP(RCU)
Training courses	6	UNEP(RCU)

Total cost of project $20,000 (to be financed from the RCU budget)

jlt527 ; 13 May 1980

APCEP 4 - PROMOTION OF A FULLER UTILIZATION OF EXISTING MECHANISMS FOR CONTINUOUS EXCHANGE OF ENVIRONMENTAL DATA AND OTHER RELEVANT INFORMATION BETWEEN THE COUNTRIES AT THE REGIONAL AND SUBREGIONAL LEVEL (Reference paragraph xxx of the Action Plan)

OBJECTIVES

To ensure adequate flow of environmental data between corresponding national institutions in the Region.

To strengthen or develop regional and subregional mechanisms for dissemination of scientific information pertaining to common environmental concerns.

To ensure that internationally financed and promoted environmental projects and activities are made known to focal points within national institutions to make sure there is an awareness of the multiple activities they undertake in the Region and thus avoid unnecessary duplication.

BACKGROUND

The pursuit of economic development is common to all the countries of the Region. Acting many times within the same environmental and socio-economic constraints these countries frequently face the same issues and management questions regarding environment and development. Thus gathering of basic data and implementation of a course of action on one particular State might follow the same basic methodology which is needed in order to solve the same problem in another country.

There are within the Region several mechanisms already in operation which are designed to ensure exchange of scientific and socio-economic data. However, in the relatively new field of environmental management there is a marked paucity of basic data and mechanisms to exchange experiences between countries facing similar environmental situations.

ACTIVITIES

1. Survey of existing mechanisms for data exchange operating within the Region.

2. Preparation of a matrix of countries in the Region with similar types of environment and which might benefit from the exchange of experiences on handling of environmental management problems.

3. Identification of those existing data exchange mechanisms that would be suitable to provide an adequate route for environmental data exchange on a subregional or regional grouping according to the results from the above.

4. Design of appropriate media for ensuring periodical communication between participant countries on environmental developments. These could include, inter alia, periodic newletter, periodic meetings of environmental experts and computerized data systems.

OUTPUTS

1. List of data exchange mechanisms currently operating in the Region.

2. Developed networks of corresponding national institutions with agreements and facilities to ensure continuous data exchange of environmental data (with inputs from APCEP project 1).

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
(a) First Phase		
1. Survey of existing data exchange mechanisms	0 - 2	RCU
2. Preparation of common environmental data matrices	0 - 2	RCU
3. Design of programmes to ensure flow of environmental data	2 - 8	RCU

Cost of project $5,000.

This project will be performed by the RCU and will require no extra-budgetary funding.

jlt528; 29 May 1980

APCEP 5 - A SURVEY OF POTENTIAL AREAS FOR NATIONAL PARKS AND MARINE RESERVES THAT COULD SERVE AS TOURISM RESOURCES, AND AT THE SAME TIME TO PROTECT FRAGILE ECOSYSTEMS AND AREAS OF SCIENTIFIC INTEREST (Reference paragraph xxx of the Action Plan)

OVERALL OBJECTIVES

To preserve the natural genetic variability of the Region's ecosystems.

To protect the most vulnerable ecosystems of the Region from destruction.

To determine the best uses to which conservation areas can be put.

OBJECTIVES

To identify and survey those areas in the Region which have the best potential to, or should become, national parks or marine reserves and to determine the use to which they should be put (i.e. scientific investigation, tourism resources, natural wilderness, etc.).

BACKGROUND

Several of the background information documents prepared for, or used for, the development of the Action Plan have emphasized the delicacy and fragility of many of the ecosystems of the Region; the dangers inherent in the rapid deforestation being experienced; the possible repercussions from the reduction of genetic variability; and the importance of coastal ecosystems such as mangrove swamps, estuaries and coral reefs to the Region's fisheries (see for example references 2, 3, 7).

Various countries of the Region have developed a system of national parks/reserves and have designated conservation areas, generally in the interior of the countries. However, the majority of the countries have not designated marine reserves and many of them do not have any form of conservation strategy or policy.

Generally there is a dearth of readily available information on the ecology of the various ecosystems in the Region. This makes it difficult to determine the best locations for national parks and marine reserves. It is, however, essential that the designation of conservation areas should not be undertaken without predeterminating, as far as possible, the importance of the area with respect to its role in the environmental stability and long term benefits to the country or Region.

This project aims to identify the most important potential areas for national parks and marine reserves in the Region and to survey some of them with a view to recommending conservation and management strategies.

ACTIVITIES

A Region-wide and international search of the literature will be made to determine the extent of the quantitative knowledge of the ecosystems of the Region.

Based on the results of the literature search and the essential inputs from other APCEP projects, especially from APCEP projects 13/1, 13/3, 14, 18, 20, 28 and 29, and limited field surveys, the preliminary data maps prepared by the IUCN (1979) and ECNAMP (1980) will be revised.

In addition, satellite data will be used to provide quantitative data. The use of satellites in the coastal zone and marine areas is still only experimental. Nevertheless, through experience in application of satellite remote sensing it is possible, to some extent, to quantify and monitor some habitats with a resolution of 25 - 80 m.

Five phases will be necessary:

1. Ground truth. This is part of the inventory process and involves the identification of "ground truth" sites of 12-20 hectares in size for analysis of satellite imagery.

2. Classification. This is the preparation of false colour images of the Region which are coded according to the reflectances of various bandwidths.

3. Categorization. Ground truth is compared with the classified image to provide data for computer processing of the image so that habitats may be mapped directly from taped digital information.

4. Reliability. Maps produced from images based on reflectance are checked against ground truth and reliability and a correction coefficient is derived.

5. Quantification. Each habitat type may now be measured for total area coverage to ($\pm$) 1 hectare.

The output will then be a base for measuring habitat alteration seasonally or over longer periods of time, depending on ecological processes or the impacts of socio-economic activities or both.

The analyses should provide strategic tools for conservation action. Through their use several categories of areas for management should be identifiable:

- areas with multi-resource value;

- areas required for support of migratory species (i.e. functional areas for breeding, feeding, etc.);

- areas of special significance;

- areas of probable significance, but requiring further investigation;

- areas important for ecological process protection (i.e. wetland or delta inputs of detritus, nutrients, etc.).

Therefore, a conservation strategy for the Region can be derived from a broad ecological analysis, following which, identified areas can be overlaid by a map showing legal and political jurisdictions, which will point to the need for:

- regional action;

- bilateral or multilateral action;

- country action; or

- local action.

OUTPUTS

1. Refined set of data maps.

2. False colour satellite habitat maps.

3. Identification of areas which should be designated as national parks or marine reserves.

4. Recommended management plan for conservation action.

142. WORKPLAN AND TIMETABLE
143.
144. | Activities | Starting and ending (from month 0) | Responsible organization (tentative) |
145.
146.
147.
148.
149. | Initiate activities | 0 - 1 | CCA/IUCN |
150.
151. | Field survey | 2 - 3 | CCA/IUCN |
152.
153. | Refining of preliminary data maps | 4 - 6 | CCA/IUCN |
154.
155. | Analysis of Landsatt data | 4 - 6 | |
156.
157. | Identification of best areas for
158. conservation | 5 - 12 | CCA/IUCN |
159.
160. | Development of management plan for
161. conservation action | 7 - 12 | CCA/IUCN |
162.
163.
164.
165. Cost of project $200,000.

jlt529; 29 May 1980

APCSP 6 - DEVELOPMENT OF REGIONAL AND SUB-REGIONAL NETWORKS OF COASTAL, MARINE AND TERRESTRIAL PROTECTED AREAS, IN SUCH A WAY AS TO HELP MAINTAIN THE LIVING NATURAL RESOURCES VITAL TO DEVELOPMENT. TO FURTHER EXISTING EFFORTS AND AGREEMENTS INVOLVING COUNTRIES OF THE REGION, DEVELOPMENT OF CO-OPERATIVE ACTIVITIES FOR THE PROTECTION OF ENDANGERED AND THREATENED SPECIES SO AS TO HELP MAINTAIN THE REGION'S WEALTH OF GENETIC RESOURCES; AND THE HARMONIZATION OF NATIONAL POLICIES FOR THE MANAGEMENT OF WILDLIFE, GENETIC RESOURCES, AND NATURAL HABITATS. (Reference paragraph xx of the Action Plan)

OVERALL OBJECTIVES

To establish regional and sub-regional networks of protected areas to encourage regional co-operation in the maintenance of habitats and ecosystems vital to the general well-being of the Region.

OBJECTIVES

To propose a network of conservation areas for living natural resource conservation, based on:

- maps of habitats, species and ecological processes;

- potential socio-economic conflicts;

- legal and jurisdictional considerations.

BACKGROUND

The Action Plan states that "The key to environmentally-sound development is the management of the resources on a sustainable basis. Such environmental management should take into account the carrying capacity of the environment, the goals of development as defined by the pertinent national authorities, and the economic feasibility of implementing them".

In recognition of the above, the Governments of the Region have recommended the establishment of networks of regional and sub-regional conservation areas.

UNESCO's Man and the Biosphere (MAB) programme is concerned with coastal area development through interdisciplinary research on man-environment relationships. Several countries of the Region have established MAP biosphere reserves and/or programmes and a major project, headquartered in Barbados is currently in progress and covers the Eastern Caribbean Islands.

ACTIVITIES

Based on the analyses undertaken in APCEP projects, a feasibility study will be conducted in order to identify the best biosphere reserve sites in such a way that they will cover major samples representative of the ecological diversity found in coastal and terrestrial ecosystems of the Region and offer possibilities for inter-disciplinary research, biological monitoring, environmental education and training. Consultations will be held with Government agencies in conjunction with the feasibility study so that regional considerations will be included in the implementation of this multi-purpose long-term protective network.

The results of the study will be discussed at a workshop of regional experts and Government officials with a view to finalizing and delineating plans for the establishment of the networks of biosphere reserves as part of UNESCO's Man and the Biosphere Programme. The recommendations of the workshop will then be forwarded to the Governments for endorsement.

OUTPUTS

Recommended regional and sub-regional networks of biosphere reserves giving justification for selection of sites and networks and a recommended management plan.

Recommendations from workshop of regional experts and Government officials.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization (?)
Preliminary identification of suitable reserve locations	0 - 1	
Field surveys to determine potential of sites for reserves and analysis of findings	2 - 4	
Consultations with Government agencies and finalization of feasibility study	5 - 7	
Preparation and convening of workshop	6 - 8	
recommendations to Governments	8 - 9	

Total cost of project $80,000.

jlt530; 29 May 1980

APCEP 7 - ANALYSIS OF DEVELOPMENT TRENDS IN THE REGION, PARTICULARLY IN COASTAL AREAS, IN ORDER TO DETERMINE POSSIBLE AREAS OF ENVIRONMENTAL STRESS RESULTING FROM MULTIPLE DEMANDS ON LIMITED RESOURCES (Reference paragraph xxx of the Action Plan)

OBJECTIVES

To determine those areas in the Region which already suffer, or are likely to suffer, the greatest environmental stress as a result of the many competing demands on the natural resources being made at present, or being proposed in the future.

To suggest appropriate measures to reduce or eliminate damaging environmental effects brought about by multiple demands on limited resources.

BACKGROUND

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 (14).

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 co-operation.

The identification of environmental and socio-economic characteristics that may influence development programmes or their impact is a difficult exercise. 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. Apart from the creation of such multidisciplinary teams, however, there is a clear need to incorporate the environmental sciences and basic ecology into the training programmes for planners (14).

As the experience of many highly industrialized countries demonstrates, 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.

Several factors are interacting to increase the environmental stress of the Region. These can be summarized as follows:

(i) All of the countries of the Region are pursuing policies of industrial diversification, albeit at different levels. For example, those countries with fairly extensive hydrocarbon resources are planning to develop heavy, energy intensive industries such as: petrochemicals, iron and steel smelting, aluminium smelting and caustic/chlorine production. These industries are potentially highly polluting of water and air; the LDC's, on the other hand, may continue to attract large enclave, non-resource based, potentially hazardous industries;

(ii) The Central American countries, which possess borders on the Caribbean Sea, and which are presently Pacific oriented, have development plans for their Caribbean coastal areas. This will lead inevitably to environmental stress in a hitherto essentially unstressed area;

(iii) The continuing process of urbanization, although at a reduced rate, coupled with the high rate of natural population growth, will continue to cause severe environmental health problems in the absence of carefully planned and controlled urban development;

(iv) As the Region develops, the consumption of energy will inevitably rise. In addition to the increased environmental stress brought about by the consumption itself, many of the States and Territories are about to embark on programmes to develop alternative indigenous sources of energy. Without due care and attention serious environmental consequences could result;

(v) The fairly high dependence on fish protein is likely to be maintained, and there are plans (especially within the Central American countries) to expand the fishing industry within the Caribbean. Intensive fishing coupled with increasing marine environmental stress could lead to a situation of over-exploitation;

(vi) Intensification of development, especially in the island States, could lead to increased rates of deforestation, leading to the associated problems of soil degradation, erosion, water-shed destruction, reduction in the rate of acquifer recharge, siltation of rivers and climatic changes;

(vii) Further development of tourism, particularly in the island States, could place severe stress on the coastal areas and the natural resources.

All of the above considerations are closely interrelated. They serve to illustrate the need for careful study of the environmental consequences of development strategies and their evaluation in the context of their social and economic objectives.

In order to achieve the aims of this project, a survey will be made of the major existing, ongoing and planned development activities and their possible consequences in each of the States and Territories of the Region. Special attention will be given to:

(i) assessing the socio-economic implications of development activities which are being initiated and expanded more rapidly than the necessary supporting infrastructure - especially that concerned with ensuring environmental quality;

(ii) examining coastal area development which is consistent with the objectives of stabilizing social gains, protecting the environment and conserving marine resources; and

(iii) constructing and applying a simple model for projecting future industrial pollution in the marine environment which would occur with or without waste treatment. This model will utilize results of the project on land-based sources of pollution (APCEP projects 10 and 13) as well as the results of this study.

ACTIVITIES

A team headed by a regional or interregional advisor in development planning (from UN/ECLA or UN/UNCTAD) and consisting of a development economist (specialist in industrial economics), a chemical engineer, a mechanical engineer or environmental systems analyst and a sociologist will be appointed.

The team leader, who will be nominated first, will use existing information prepared by the specialized United Nations agencies for the Caribbean Environment Project and the development plans of the States and Territories of the Region, to prepare a background paper for briefing the team.

The team will carry out two field missions during which they will meet with development authorities and will conduct industrial site studies. They will amass information portfolios on development activities which should be considered, with respect to environmental impact, assessment and management, on a regional basis. The information gathered will concern technology, as well as legal and administrative aspects of development, a groundwater specialist will study the impact of development on groundwater systems. The missions will be carried out in co-ordination with other Action Plan projects, e.g. APCEP 3, through the Regional Co-ordination Unit and in collaboration with national authorities or institutions concerned with development.

OUTPUTS

(a) First Phase

1. Inventory of present industrial activity.

2. Assessment of present and planned development activities for present and potential environmental impact (jointly with APCEP project 2).

3. Tabulation of regional regulations and administrative practices for industrial and coastal development (with inputs from APCEP project 1).

4. Maps of industrial distribution for use in seminar (see APCEP project 2).

(b) Second Phase

1. Recommendations for methods to reduce or eliminate damaging effects of development activities.

2. Guide to pollution control devices in relevant industries.

3. Identification of requirements for industrial and coastal development including site location and spatial planning, and impact on coastal resources and other activities.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Phase I		
Collection of available data and preparation of briefing document	0 - 2	UN/UNIDO or ECO/PAHO/WHO
First Field Mission to national development agencies	3 - 4	UN/UNIDO or ECO/PAHO/WHO
Groundwater study	0 - 7	UNESCO or PAHO/WHO
Data Analysis	4 - 5	UN/UNIDO or ECO/PAHO/WHO
Report	6 - 7	UN/UNIDO or ECO/PAHO/WHO
Phase II		
New data analysis and workshop (jointly with APCEP 2)	7 - 8	UN/UNIDO or ECO/PAHO/WHO
Second Field Mission. Industrial site visits	12 - 14	UN/UNIDO or ECO/PAHO/WHO
Data analysis	15 - 16	UN/UNIDO or ECO/PAHO/WHO
Report	17 - 18	UN/UNIDO or ECO/PAHO/WHO

Total cost of project $200,000.

jlt531; 29 May 1980

Pollution Control

APCEP 8 - ASSESSMENT OF THE ORIGIN AND MAGNITUDE OF POLLUTION IN THE REGION WITH SPECIFIC REFERENCE TO HYDROCARBONS AND OTHER HAZARDOUS SUBSTANCES INCLUDING SUB-PROJECTS 8/1, 8/2, 8/3, 8/4 AND 8/5 DESCRIBED BELOW (Reference paragraph xxx of the Action Plan)

OVERALL OBJECTIVES

To provide the necessary scientific and legal information on the sources, pathways, levels and fate of oil and petroleum hydrocarbon pollution and other hazardous substances for the protection of the Region from pollution and from its effects.

BACKGROUND

Contamination by petroleum hydrocarbons seems to be the most serious marine pollution problem of the Region. The production, conversion and transportation of petroleum products are the most significant economic activities in the Wider Caribbean Region.

The Region is potentially one of the largest oil producing areas in the world and offshore production, at present, accounts for nearly one-third of the total production. This proportion is expected to grow significantly in the future (8).

At present there are 73 refineries, with a total refining capacity of over 12 million barrels of oil per day, located within the Region. Some of the largest refineries are located in island States and Territories (8).

Consequent upon the intensive production and refining activities within the Region, an intensive tanker traffic is generated both in east-west and north-south directions. Tanker movements through restricted channels and in the vicinity of some ports increase the possibility of shipping accidents in those areas (8).

The transport, distribution and ultimate fate of oil as well as other hazardous pollutants in marine waters are controlled by physical, chemical and biological oceanography. Therefore, in order to understand the capacity of the marine environment of the Region to support oil or other pollutants without adverse effects, one must first understand the oceanography affecting them.

The general dynamics of the water masses and related phenomena are fairly well known and have incorporated into the information documents prepared as supporting documentation for the preparation of the draft Action Plan for the Caribbean Environment Programme (2, 7, 8).

The most striking hydrographic feature in the Region is the continuous flow of water through the area from east to west in the Caribbean Sea proper, followed by a movement from south-east to north-east in the Yucatan Basin, and finally, in the Gulf of Mexico, a strong flow to the east again through the Straits of Florida, after an anticyclonic movement of most of this water in the western area of the Gulf. This picture, however, is a time-averaged annual pattern (7).

Smaller currents or eddies develop seasonally such as the Gulf of Panama and the Gulf of Mexico loop currents. Therefore, a general estimate of the transport of material, including pollutants, by currents should be made only cautiously, because the large spatial and temporal variability which has been observed in the Caribbean may lead to serious errors if only prevailing current systems are taken into account. As an example, the westerly inflow of water through the island passages of the Lesser Antilles barrier is disturbed in its passage. This results in the generation of turbulent wakes and eddies of large diameter which can concentrate pollutants because of the associated current patterns (7).

The Region contains 4 major basins separated by sills of comparatively shallow depth when compared to the average depth of the basins. The deepest of the sills (Windward sill, 1.600 m) is much shallower than the shallowest basins: therefore most of the water in the Caribbean is below sill depth. This raises the question of how much exchange or renewal of this water takes place across the sills. Preliminary analyses indicate that very little renewal or flushing occurs in the deeper zones of the Caribbean and that therefore pollutants that find their way into these waters will not be easily flushed out. The lack of flushing is also illustrated by the example of the deep Venezuelan Basin where natural processes caused dissolved oxygen to be depleted by 6 per cent in about 20 years. This being the case, it is not unreasonable to expect that the addition of large amounts of oxygen-consuming waste into the depths of this basin could increase the rate of oxygen depletion and possibly lead to anoxic conditions. Unfortunately, present knowledge about the fragility of the Caribbean deep-water system does not permit a reliable estimate of its waste assimilation capacity (7).

Although it is possible to make these generalizations they are based on relatively few systematic observations. Much work still needs to be done to further characterize the water masses in the sea area and to determine its variability, particularly in coastal waters.

The most important task is to gather physical, chemical and biological oceanographic data which can be used to determine and predict circulation and water residence time. This is most important because upon these two factors is based the ability of the sea area to flush itself clean of

polluting substances. If the water residence time is very long, then, barring other factors, polluting substances such as oil which are being injected into the water column will have a tendency to build up over time. If exhcange of water is rapid, then build-up of substances will perhaps be less important.

Other factors affecting the treatment and fate of oil pollution include, of course, loss of volatiles due to high water temperatures and wind, adsorption of oil on sinking particles such as dust or organic detritus, accumulation and metabolism of oil by organisms and other processes. These must also be considered in making an oceanographic assessment of the Region.

When oil enters the sea, it usually spreads over the surface and forms a thin layer or slick. The fate of the slick is dependent on oceanographic and climatic conditions as well as the physical and chemical properties of the components which make up crude oil. The slick may wash ashore or gradually become dispersed in the open sea.

Certain components of crude oil are soluble in sea water and will gradually diffuse from an oil slick into the water column. The more volatile compounds will tend to evaporate, the degree to which this occurs depending mostly on water temperature, wind velocity, air temperature and wave action. As the soluble and volatile fractions are lost, the remaining fractions gradually begin to congeal and, as this process continues, tar balls can form. These may eventually wash up on beaches.

With wind and wave action the oil that would normally float on the surface is forced to mix, sometimes violently, with water so that microscopic globules of oil become dispersed in the water column. It is possible for these to remain submerged for long periods of time, especially where continuous mixing overcomes their natural buoyancy.

Dissolved and dispersed components of crude oil may be taken up by marine organisms through ingestion, adsorption or absorption. Alternatively, they may be adsorbed to sinking particulate matter and as a result be transported rapidly to the sediments where they become available to the benthos.

Thus the movements of spilled oil in the sea water of the Region can be, and probably are, complex. The purpose of this project is to determine the sources of pollution from hydrocarbons as well as other hazardous substances in the Region, to establish the present baseline distribution of these substances and to elucidate the transport processes, fluxes, fate and effects of hydrocarbons and other hazardous substances within the Region ecosystems.

The project has been subdivided into five sub-projects as follows:

APCEP 8/1 - DETERMINATION OF TECHNICAL KNOWLEDGE AS WELL AS EXISTING MEANS AND ECONOMIC CAPABILITIES AT THE NATIONAL OR REGIONAL LEVEL FOR PREVENTING, COMBATING, LIMITING AND, INSOFAR AS POSSIBLE, ELIMINATING POLLUTION AND OTHER ADVERSE EFFECTS DUE TO THE EXPLORATION, EXPLOITATION, REFINING AND TRANSPORTATION OF HYDROCARBONS AND OTHER HAZARDOUS SUBSTANCES

APCEP 8/2 - STUDIES ON THE SOURCES OF POLLUTION BY HYDROCARBONS AND OTHER HAZARDOUS SUBSTANCES

APCEP 8/3 - IDENTIFICATION AND MONITORING OF EXISTING AND POTENTIAL DIRECT AND INDIRECT EFFECTS OF EXPLORATION, EXPLOITATION, REFINING AND TRANSPORTATION OF HYDROCARBONS AND OTHER HAZARDOUS SUBSTANCES

APCEP 8/4 - STUDIES OF THE DESTINATION AND EFFECT OF OIL POLLUTION, ESPECIALLY OIL SPILLS, ON TROPICAL COASTAL ECOSYSTEMS, PARTICULARLY THOSE OF ECONOMIC IMPORTANCE, SUCH AS MANGROVE SWAMPS, CORAL REEFS, BEACHES AND COASTAL FISHERIES BY USING AND TAKING ADVANTAGE OF ACCIDENTAL SPILLS

APCEP 8/5 - IDENTIFICATION AND MONITORING OF POTENTIAL AND EXISTING HAZARDS FROM THE TRANSPORTATION OF HAZARDOUS SUBSTANCES OTHER THAN OIL AND PETROLEUM HYDROCARBONS

APCEP 8/1 - DETERMINATION OF TECHNICAL KNOWLEDGE AS WELL AS EXISTING MEANS AND ECONOMIC CAPABILITIES AT THE NATIONAL OR REGIONAL LEVEL FOR PREVENTING, COMBATING, LIMITING AND, INSOFAR AS POSSIBLE, ELIMINATING POLLUTION AND OTHER ADVERSE EFFECTS DUE TO THE EXPLORATION, EXPLOITATION, REFINING AND TRANSPORTATION OF HYDROCARBONS AND OTHER HAZARDOUS SUBSTANCES (Reference paragraph xx of the Action Plan)

OBJECTIVES

To determine the present capability and needs of the States and Territories of the Region to control oil, petroleum hydrocarbon and other hazardous substance pollution.

To collate the existing laws and contingency plans in force in the various States and Territories dealing with the monitoring, characterizing, preventing and combating of oil and other hazardous substance pollution.

ACTIVITIES

In conjunction with APCEP projects 1/2, 9 and 16, visits to those institutions and agencies with responsibility for pollution monitoring and control, will be undertaken to determine inter alia: their institutional role; trained manpower, facilities and equipment for monitoring, containment and clean-up operations. The survey of equipment and facilities will include private companies operating within the Region.

It is intended that no part of this survey should in any way duplicate the work at present being undertaken by any existing projects within the Region, specifically the IMCO/OAS/CARICOM project, reported on in document UNEP/ECLA/IG.X INF.xx. The activities within this project proposal are complementary to the above mentioned one.

In conjunction with APCEP project 1/3, those environmental laws and regulations specifically relating to pollution control, containment and clean-up, will be collated. The relevant regional and international agreements and conventions appearing in document E/CEPAL/PROY.3/L.INF.15, UNEP 1979, will be included in this survey.

OUTPUTS

1. Catalogue of institutions and agencies responsible for pollution monitoring and control, to include:

   a) institutional role;

b) manpower and facilities for monitoring;

c) manpower and equipment for containment and clean-up operations.

2. Annotated catalogue of existing legal and administrative instruments for pollution control including applicable regional and international agreements and conventions.

3. Summary report of the capabilities and needs for dealing with oil and other pollution in the waters of the Region.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Phase I		
1. Catalogue of institutions and agencies	0 - 4	IMCO
2. Survey of legal and administrative instruments	0 - 4	IMCO
3. Report on needs and capabilities	4 - 6	IMCO

Estimated cost: 25,000 US Dollars

APCEP 8/1/1 - DETERMINATION OF THE NEED FOR AND ADEQUACY OF OILY WASTES RECEPTION FACILITIES IN SELECTED PORTS OF THE WIDER CARIBBEAN REGION

OBJECTIVES

The immediate objective of the project is to assist the Governments of the Region, in particular developing countries, in providing adequate reception facilities for oily wastes necessary for the effective implementation of the relevant international agreements for the control and prevention of the intentional discharge of oily wastes from ships into the sea.

BACKGROUND

Although accidental oil spills caused by ship casualties (such as collisions and groundings) receive the greatest publicity because of the massive pollution which can be caused by a single incident, many times as much oil is deliberately discharged into the sea from ships during routine operations such as deballasting, tank washing, discharging of bilge water and preparation for drydocking and ship repair.

The basic principle for the control of discharge of oil into the seas from ships as prescribed in the International Convention for the Prevention of Pollution of the Sea by Oil, 1954, is that residues and oily mixtures which remain on board the ships and for which discharge is prohibited should be retained on board and transferred to shore-based reception facilities for treatment and disposal or re-refining. This Convention provides that each Contracting State must take all appropriate steps to promote the provision of adequate reception facilities according to the needs of ships using them.

The International Convention for the Prevention of Pollution from Ships, 1973, contains more positive and specific provisions regarding reception facilities. In particular, it obliges each Contracting State to ensure the provision and maintenance of adequate reception facilities at oil loading terminals, repair ports, and in other ports in which ships have oily residues to discharge.

In the early 1960s, the oil industry introduced a procedure known as the Load-on-Top (LOT), sometimes referred to as Retention on Board (ROB), whereby washings and oily water from ballast are retained on board the ship for settling and separation of oil from water and the separated oil is then incorporated into the next shipment of oil.

Although the full use of this procedure would considerably reduce the need for the disposal of oily residues to reception facilities, such facilities would, for example, in any case be needed for tankers engaged on short haul voyages (less than 72 hours and not more than 1,200 miles) where there is insufficient time at sea for oil to separate from ballast water, and hence for dirty ballast to be discharged in compliance with the appropriate

international rules for Combination carriers which would present special problems in bulk cargo loading ports and for disposal of sludges and oily bilge water which cannot be discharged in accordance with applicable criteria.

More recently, there are clear indications that considerable difficultires are being encountered by shipmasters in complying with the 1954 Oil Pollution Convention as amended in 1969 due to the inadequacy of reception facilities for oil residues in certain ports. In this connection, it is recognized that the availability of adequate reception facilities for oily wastes in ports is a prerequisite for the effective implementation of the above-mentioned international rules.

Cost and uncertainty as to the long term requirement are often cited as major impediments to the commitment of the necessary funds to build and maintain adequate reception facilities. Taken as a whole, a reception facility should not represent an added cost in the operation of a port or a shipyard, because the cost or part of the cost for reception facilities can be included in the port charges for ships and also because of the income derived from the sale of oil separated from ballast water discharged and treated at such facilities.

Certain countries in the Region, in addition to requiring technical assistance in determining the adequacy and long-term need for reception facilities, require advice on the most cost effective means of providing and operating such facilities.

ACTIVITIES

Study of the immediate and long-term need for reception facilities in the Wider Caribbean Region for oily wastes in order to enable ships to comply with the International Convention for the Prevention of Pollution of the Sea by Oil, 1954 as amended and regulation 12 of annex I of the 1973 MARPOL Convention by assessing the throughput load of oily wastes on an annual basis:

(a) obtain from selected ports in the area information on ship traffic and mix (e.g. tankers, freighters, etc.);

(b) establish on a per ship basis the amounts of oily wastes to be handled in specific ports and establish capacity of reception facility;

(c) establish the availability of existing reception facilities in the ports;

(d) determine which ports could more effectively be provided with either a mobile or fixed facility or both;

(e) study the required turn-around time and permissible delay in ports;

(f) treatment technology:

- establish effluent discharge criteria;

- design facility:
  (i) technology of separations;
  (ii) disposal of wastes;
  (iii) tank storage capacity;
  (iv) pipeline interface;
  (v) terminal required;

(g) evaluate costs of proposed facility and advise on optimum method of recovering, construction and operation costs;

(h) study the feasibility of subregional facilities.

OUTPUTS

Survey and report on the adequacy of and need for the reception facilities in the Wider Caribbean Region, covering, inter alia, reception facilities, ballast disposal procedures, oily bilge water and other residues, effluent qual control, reception facility and construction and operation costs.

Preliminary technical advice to Governments on how best to provide adequate reception facilities where none exist and improve such facilities where they do exist. Recommend interim measures which can be taken pending the completion of reception facilities and optimum methods of degraying cost of construction and operation.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
1. Data collection and preparation for study and mission	0 - 4	IMCO
2. Data collection at source (each port visited) and data analysis	4 - 9	IMCO
3. Study preparation	9 - 12	IMCO
4. Final publication (printing, translation, etc.)	12 - 16	IMCO

Estimated cost: $150,000

APCEP 8/2 - STUDIES ON THE SOURCES OF POLLUTION BY HYDROCARBONS AND OTHER HAZARDOUS SUBSTANCES (Reference paragraph xx of the Action Plan)

OBJECTIVES

To determine the sources of hydrocarbon pollution and pollution from other hazardous substances in the Region.

To determine the zones at highest risk from spills.

To determine the coastal areas of economic and ecologic importance which would be threatened by spillages of hydrocarbons and other substances occurring within the high risk zones.

To recommend surveillance and monitoring systems for those areas at highest risk.

ACTIVITIES

The project will have three main phases:

(i) Determination of major sources of pollution from hydrocarbons and other hazardous substances in the Region;

(ii) Determination of high-risk coastal areas;

(iii) Designing of surveillance and monitoring systems.

Sources of pollution from hydrocarbons and other hazardous substances

Personnel from this project (including those from participating institutions) will visit production and loading and unloading areas, coastal refineries, municipal and industrial discharge sites (in conjunction with personnel involved in APCEP project 13), for the purpose of determining the input of oil petroleum hydrocarbons, and hazardous substances into the waters of the Region

Detailed information on the numbers, sizes, type and routes of oil-petroleum hydrocarbon-carrying tankers and hazardous substances transports will be obtained and mapped.

High-risk coastal areas

Based on existing literature and the surveys conducted during the first phase, the marine zones at highest risk from accidental and operational spills will be determined. An attempt will be made to establish different levels of risk for the various zones thus identified.

Based on existing knowledge of general surface water movements within the Region, the coastal areas of economic and ecologic importance which would

be threatened by oil and other spills occurring within the high-risk zones, will be determined. This information will be presented in the form of overlay maps and will be further refined based on the output of APCEP projects 8/3 and 8/4.

Surveillance and monitoring systems

Surveillance and monitoring systems will be designed for those zones identified as being at greatest risk. Close collaboration with APCEP projects 8/3, 8/4 and 13 will be maintained to ensure the highest efficiency and practicability of the systems.

OUTPUTS

1. Detailed maps showing high-risk zones for oil and other spillages associated with production, processing and transportation of oil petroleum hydrocarbons and other hazardous substances.

2. Overlay maps indicating coastal areas of economic and ecologic importance which would be threatened by spills within the high-risk zones.

3. Based on analysis of overlay maps, priorities will be established for continuous surveillance and monitoring of selected sites.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
1. Determination of major sources of pollution	0 - 6	IMCO
2. Determination of high-risk coastal areas (including preparation of maps)	3 - 10	IMCO
3. Design of surveillance and monitoring systems for high-risk zones	8 - 10	UNESCO(?)

Estimated cost: 40,000 US dollars

APCEP 8/3 - IDENTIFICATION AND MONITORING OF EXISTING AND POTENTIAL DIRECT AND INDIRECT EFFECTS OF EXPLORATION, EXPLOITATION, REFINING AND TRANSPORTATION OF HYDROCARBONS AND OTHER HAZARDOUS SUBSTANCES. (Reference paragraph xx of the Action Plan)

OBJECTIVES

To identify the major direct and indirect consequences of the exploration for, exploitation, refining and transportation of hydrocarbons and other toxic substances.

To establish monitoring systems to measure the consequences of the activities mentioned above particularly oil dispersant toxicity.

BACKGROUND

This project is complementary to APCEP projects 8/2, 8/4, 8/5 and 13/3 and differs from them in that the effects of the primary product, e.g. crude or refined petroleum, will not be under investigation.

For example: various studies following oil spills have produced evidence that the major threat may not necessarily result from the crude oil itself but from the combination of oil and oil dispersants. Several dispersants in use in previous spills proved more toxic to the ecosystem than the spilled crude petroleum.

In the Wider Caribbean Region, as one of the major areas of offshore exploitation, as well as of tanker traffic, oil spills are a continuous threat. Because of the prevailing hydrographic regime eventual spills are likely to be spread throughout extended areas and affect beaches and coastal sections of countries adjacent to the spill.

Combatement of oil pollution with dispersants can be highly desirable. Dispersant toxicity varies according to its chemical nature and the particular species involved. Out of the many species that are economically or ecologically important, only one or few can be tested in any one country. By co-ordinating test procedures and results, it should be possible to identify those dispersants which are of low toxicity to all species tested, and to make a list of products appropriate for use throughout the Region.

583. ACTIVITIES
584.
585. A list of all oil dispersants offered for sale and use should be prepared
586. for each participating country. From these lists, ten products should be
587. selected as reference standards for the Region. It is clear from previous
588. work that the toxicity of a dispersant, tested by itself, may be quite
589. different from its toxicity when mixed with oil. Therefore, tests should
590. compare the effects of oil alone with the effects of oil and dispersant
591. mixtures, that is the test should establish whether the addition of
592. dispersant does more damage than is done by the oil alone.
593.
594. A single standard reference species will be chosen for laboratory tests.
595. The species must be readily available throughout the Region, it must be
596. obtainable in large numbers at low cost, it must be resistant to laboratory
597. handling and should have an easily recognized death point. The reference
598. species does not have to be of economic importance itself, but it must be
599. possible to relate results obtained with it to results obtained with
600. important species.
601.
602. Species testing can be duplicated between countries provided that the
603. results are compared properly, but the intention is that each country can
604. test, say, 5 - 10 species of local interest which may then be compared with
605. the regional and subregional standards, and thus with other species
606. throughout the Region. Different development stages can be compared in the
607. same way.
608.
609. The standard test will determine percentage mortalities in the test species
610. following exposure to crude oil plus dispersant.
611.
612. Once the core data have been determined, using the standard oil, test
613. species, temperature and dispersants, all four variables may be changed,
614. one at a time, in the wider test programme.
615.
616.
617. OUTPUTS
618.
619. 1. Determination of the effects of specific dispersants used to clear up
620. oil spills, resulting from the exploration for, exploitation, refining
621. and transportation of hydrocarbons on marine organisms and their
622. populations, particularly on those of direct or indirect commercial
623. importance.
624.
625. 2. Determination of the combined effects of oil and specific dispersants
626. on selected types of marine communities and ecosystems.
627.
628. 3. Training and consultation on the establishment of facilities
629. for studies on marine pollution effects, particularly those
630. related to the petroleum hydrocarbon industry.
631.

633. WORKPLAN AND TIMETABLE
634.
635. | Activities | Starting and ending (from month 0) | Responsible organization |
636. |---|---|---|
637.
638.
639.
640. | Selection of typically affected and unaffected areas | 0 - 2 | |
641.
642.
643. | Review of the state of the knowledge of ecosystem research in the Region (APCEP project 5) | 0 - 2 | IUCN/FAO/UNESCO |
644.
645.
646.
647. | Selection of appropriate laboratories for implementation of studies | 3 - 4 | FAO |
648.
649.
650. | Laboratory bioassays and field tests | 7 - 21 | FAO |
651.
652. | Training | 8 - 12 | FAO |
653.
654. | Report of results | 20 - 21 | FAO |
655.
656. | Recommendations for future research and monitoring in the Region | 17 - 22 | FAO |
657.
658.
659.
660.
661. Total cost of project $400,000.
662.
663.
664.
665.
666.
667.
668.

APCEP 8/4 - STUDIES OF THE DESTINATION AND EFFECT OF OIL POLLUTION, ESPECIALLY OIL SPILLS, ON TROPICAL COASTAL ECOSYSTEMS, PARTICULARLY THOSE OF ECONOMIC IMPORTANCE, SUCH AS MANGROVE SWAMPS, CORAL REEFS, BEACHES AND COASTAL FISHERIES BY USING AND TAKING ADVANTAGE OF ACCIDENTAL SPILLS (Reference paragraph xx of the Action Plan)

(i) Destination

OBJECTIVES

To assess distributional and dispersion patterns of oil spills in the Region based on the existing general knowledge of the marine circulation model of the Region.

To derive predictive models for the transport and distribution of oil pollution in the Region.

To investigate the physical oceanography of restricted coastal developmental areas.

To measure petroleum hydrocarbons along the coastal zone and in sea water and sediment of the open sea, in a physical baseline survey of the Region.

To develop training programmes and to offer advice in these activities to Governments and their nominated participating institutions, as requested.

ACTIVITIES

Based on available studies on the fate of oil spills in the Region and the existing general knowledge of the marine circulation model of the Region, the transport patterns of oil spills will be investigated with a view to deriving preliminary models for the transport of oil pollution in the Region.

Gaps in existing information, as well as in the preliminary model, will be used to define a sampling programme which will provide the data needed to refine the model. The sampling programme will include some fixed stations such as moored buoy systems equipped with sensors for current speed and direction, temperature, chlorinity and, possibly, turbidity and dissolved oxygen. These stations will be clustered in or near the areas identified in APCEP projects 8/2 and 8/3. They will be visited periodically to retrieve data.

In addition to fixed stations, baseline oceanographic measurements will be made. Also, in collaboration with other projects, an attempt will be made to organize oceanographic cruises on which these baseline oceanographic measurements could be made.

The sampling programme will be carried out in co-operation with national institutions and Government or international organizations.

In co-operation with institutions from the Region, a survey will be made of the Region for the purpose of identifying coastal areas in which oil pollution such as tar balls can be quantified. Internationally standardized methods will be used so that the data obtained can be compared with results of surveys outside the Region. As far as possible, regional personnel will be used and/or trained in these methods.

Dissolved and dispersed petroleum hydrocarbons will be measured in samples of sea water collected from a network of coastal and offshore stations. In addition, sediment samples and marine biota will be collected from these stations and subjected to analysis. These collections will be made using internationally adopted procedures, keeping in mind the problems of contamination.

Because the sampling programmes for the oil baseline study involve many of the same logistic problems as the sampling programmes in APCEP projects 8/2, 8/3 and 10, they will be carried out in conjunction with each other, especially where offshore cruises are involved. It is hoped that at least one major oceanographic cruise can be organized for these projects otherwise sampling will be done off chartered vessels available in the Region.

Qualitative and quantitative analysis of petroleum hydrocarbon pollution will be by spectrofluorometry, infra-red spectroscopy, gas chromatography and mass spectrometry, as appropriate. In addition, visual observations of oil and collection of tar balls with neuston nets will be carried out according to standard procedures, e.g. those developed for the IGOSS pilot project. Analytical procedures will be intercalibrated with internationally accepted standard procedures where they exist.

Wherever possible, national institutions will be encouraged to participate in the sampling and analytical aspects of this project. Specifically, one or two institutions will be given training and advice on establishing an oil pollution analytical laboratory.

Large-scale transport processes of large-scale oil pollution in the Region will be deduced from the results of the survey of oil pollution sources, the baseline survey and the results of APCEP 8/2.

An effort will be made, in collaboration with one or two national institutions to carry out laboratory and field experiments designed to determine the flux rates and transport pathways of petroleum hydrocarbons due to evaporation, adsorption-desorption on particulate matter, and uptake, loss and metabolism by marine biota (from APCEP project 8/3). These will help to determine the effects of the special conditions of the Region, e.g. high salinities and temperatures which may alter the transport pathways and fluxes observed in other oceanic regimes.

On the basis of information gained and the model derived during the project, a long-term project will be proposed for implementation by institutions of the Region.

OUTPUTS

(a) First Phase

1. Institutional network and arrangements for the conduct of each specific item of study (in conjunction with APCEP project 8/2).

(b) Second Phase

1. Baseline physical oceanography of selected coastal zones, including a preliminary model of circulation and water exchange.

2. Report on oil pollution in the Region including:

   (i) Sources together with APCEP project 8/2;

   (ii) Transport;

   (iii) Distribution in coastal zones and off-shore water, sediments and suspended particulate matter.

3. Training programmes for scientists and technicians in oil pollution analytical techniques.

4. Training programmes in coastal physical oceanography.

5. Long term collaborative project proposal for institutions in the Region.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Development of institutional network	0 - 4	
Development of preliminary circulation model	1 - 6	
Development of sampling programme	3 - 9	
Sampling programme	9 - 12	
Training programme on analytical techniques (together with APCEP projects 8/5 and 11)	9 - 12	IOC(?)
Refinement of circulation model	9 - 12	
Development of long-term regional collaborative project	13 - 15	
Preparation of final report	13 - 15	

(ii) Effects on tropical ecosystems

OBJECTIVES

To assess the impact of oil pollution on the productivity of selected coastal ecosystems.

To develop guidelines for the protection of those ecosystems found to be the most vulnerable.

ACTIVITIES

Selection of coastal ecosystems to be studied on the basis of their ecologic and economic importance and their potential level of exposure to oil pollution. Areas under stress from oil pollution as well as pollution free zones of the same type of ecosystem will be chosen for comparative purposes.

Field studies and laboratory analyses will be conducted to determine marine and terrestrial inputs and outputs to the coastal ecosystem covering parameters such as salinity, temperature, oxygen content, currents, tides,

drainage patterns, sediment loads, food chains, etc. These baseline data will provide information in order to determine the biological productivity of the ecosystems and their social and economic output under natural conditions.

By comparative analysis based on data collected on field studies of both stressed and control systems, as well as simulations based on laboratory experiments, the impact of oil pollution on the productivity of selected coastal ecosystems will be determined.

The effect of oil pollution on species of direct or indirect commercial value within the ecosystems' food chains will be examined, through analysis of populations, size of individuals and other vital parameters. Factors such as concentration of PHC derivatives in the food chain and their potential damage to the food value of fish and shellfish will be studied.

Based upon the findings of the above activities, guidelines for the protection of coastal ecosystems vulnerable to oil pollution effects will be drafted.

OUTPUTS

(a) First Phase

1. Map showing coastal ecosystems selected for pilot studies.

(b) Second Phase

1. Preliminary reports on baseline studies on the physical, chemical and biological characteristics of selected ecosystems.

2. Preliminary report on the impact of oil pollution on the natural productivity of selected ecosystems.

3. Reports on the effects of oil pollution on biological species of commercial value which inhabit these coastal ecosystems during different stages of their life cycle.

4. Draft guidelines for protection of vulnerable coastal ecosystems from oil pollution.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Selection of sites for pilot studies	0 - 2	FAO
Field studies to obtain baseline data on ecosystems	3 - 9	FAO
Laboratory tests	6 - 12	FAO
Analysis of data	9 - 15	FAO
Drafting of guidelines for protection of vulnerable coastal ecosystems from oil pollution	14 - 17	FAO
Preparation of final report	14 - 18	FAO

Total cost of project US $650,000.

APCEP 8/4/1 - ASSESSMENT OF THE POTENTIAL IMPACTS OF OIL CONTAMINATION ON THE SOCIO-ECONOMIC CONDITIONS OF COASTAL COMMUNITIES

OBJECTIVES

To determine the socio-economic impact of oil pollution on fishing coastal communities.

BACKGROUND

There is a very substantial number of people living along the coastal zone who are dependent on coastal resources, either directly or indirectly. These people include the fishermen engaged in traditional and modern fishing activities, the fish farmers and those engaged in supporting activities such as the processing and distribution of fish and fish products, boat building, engine maintenance and repair, etc. In addition, there are the people employed in catering recreational facilities along the coast. Oil contamination, which may emanate from shore-based activities such as oil refineries and bunkering or from ships and offshore exploration/exploitation activities, can affect the livelihood of coastal communities to varying extents depending on the severity and nature of the contamination.

The project is aimed at assessing the impact of oil contamination on the coastal communities. Accordingly, a number of aspects listed below are considered important:

1. The effects of earlier incidences and existing sources of oil contamination;

2. The nutritional value of fish;

3. The levels of dependence of coastal communities on fish and fish products;

4. The value of the products, including foreign exchange earnings;

5. Employment (full time and part time or seasonal/direct and indirect); and

6. Socio-cultural aspects.

ACTIVITIES

The historical incidence of oil spills and contamination including chronic discharge of oil and their effects on the coastal communities will be studied.

The existing status of the socio-economic conditions of coastal communities will be examined to establish the degree of dependence of these people on coastal resources and to evaluate the development potential of such resources so that the pre-spill conditions of these communities are available to assist in the evaluation of the impacts of an oil spill.

Inputs from other APCEP projects and surveys of affected communities will assist in anticipating sensitive areas that are susceptible to oil spills and the problems that may arise in the event of a major oil spill. This will help the Government to adopt appropriate measures to minimize the impact of oil contamination, to quantify the economic losses sustained and the rate of compensation for such losses, as well as to find solutions and alternatives to help the people so affected.

OUTPUTS

Assessment of the sources and supply channels of fish protein for coastal communities and the level of dependency on fish and fish products.

Report describing the actual and potential value of fish, aquaculture and mangrove products and the contribution by coastal communities to the national economy.

Survey of the capital investments involved in the exploitation, processing and distribution of the products mentioned.

Survey of the supporting ancillary activities to the direct production of fisheries and mangrove products.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Survey of earlier incidences of oil spills and impact on coastal communities	0 - 6	
Assessment of level of dependency on fish and fish products by coastal communities	4 - 10	
Socio-economic analysis of the contribution of coastal-dependent fisheries and ancillary activities to the national economies	8 - 14	
Formulation of measures to mitigate negative impact of oil spills on coastal communities	14 - 20	
Data analysis and preparation of final report	20 - 24	

Estimated Cost: US $ 200,000.

APCEP 8/5 - IDENTIFICATION AND MONITORING OF POTENTIAL AND EXISTING HAZARDS FROM THE TRANSPORTATION OF HAZARDOUS SUBSTANCES OTHER THAN OIL AND PETROLEUM HYDROCARBONS (Reference paragraph xx of the Action Plan)

OBJECTIVES

To identify existing and potential hazards to the marine resources of the Region from the transport of substances other than oil and petroleum hydrocarbons.

To develop long-term monitoring systems for substances other than oil and petroleum hydrocarbons which because of their transport through the waters of the Region could have deleterious effects on its marine resources and on human health.

BACKGROUND

There is virtually no information available as to potential and existing hazards from the transportation of substances other than oil and petroleum hydrocarbons although isolated incidents of accidental spillages in ports and harbours of toxic chemicals have been reported. It is necessary to identify the nature of substances that can become hazards either through accidental spillages or operational losses and to determine the level of risks imposed by transportation of these substances, in order to develop appropriate control and monitoring mechanisms.

ACTIVITIES

The nature and magnitude of hazardous substances transported throughout the Region will be identified together with an indication of where because of intensified traffic and other factors, the risks of losses into the environment are greatest and therefore would require the establishment of monitoring and control programmes.

Once these "hot-spot" areas are identified, appropriate monitoring measures will be designed and contingency plans for large-scale spillages will be developed.

OUTPUTS

Report, including maps detailing type, quantity and movement of hazardous substances throughout the Wider Caribbean, including an assessment of the high risk zones and suggestions for monitoring measures.

Contingency plans for dealing with spillages of hazardous substances.

1104. WORKPLAN AND TIMETABLE

1105.

1106. Activities	Starting and ending (from month 0)	Responsible organization
1110.		
1111. (a) First Phase		
1112.		
1113. 1. Identification of hazardous substances transported through the Region	0 - 3	IMCO
1116.		
1117. 2. Preparation of report including recommendations for contingency planning	4 - 6	IMCO
1120.		

1121.

1122.

1123. Estimated cost: 20,000 US dollars

jlt532; 30 May 1980

APCEP 9 - DEVELOPMENT OF REGIONAL AND SUB-REGIONAL CO-OPERATION IN PREVENTING, COMBATING, DETECTING, CONTAINING AND CLEANING UP ACCIDENTIAL SPILLS OF HYDROCARBONS AND OTHER HAZARDOUS SUBSTANCES, PROMOTION OF NATIONAL, SUBREGIONAL AND REGIONAL CONTINGENCY PLANS TO CONTROL POLLUTION CAUSED BY HYDROCARBONS, AND CO-ORDINATION OF EXISTING NATIONAL, SUBREGIONAL AND REGIONAL PLANS (Reference paragraph xxx of the Action Plan)

Note: This element is divided into seven sub-projects (APCEP 9/1, 9/2, 9/3, 9/4, 9/5, 9/6 and 9/7)

OVERALL OBJECTIVES

To promote the development and improvement of national oil spill contingency arrangements to the extent feasible and the development and implementation, as appropriate, of joint contingency arrangements at the regional, subregional or sectoral level, or on a bilateral basis.

To assist in the development of manpower resources and the acquisition of equipment required to give effect to such arrangements.

To promote the enhancement of national capabilities and to instigate regional and subregional co-operative programmes aimed at the control of operational or deliberate pollution from ships.

BACKGROUND

Threat of a major oil spillage

The Wider Caribbean Region has become an area of intense oil production, a third of which is offshore, and refinery and tanker transport activity.

At present there are 73 refineries, with a total refining capacity of over 12 million barrels of oil per day located within the Region. There are over 50 tanker ports in the Region ranging in capacity to handle vessels from 10,000 to 500,000 deadweight tonnes. It has been estimated that there are approximately 100 loaded tankers in the Caribbean Region at any one time, 25 per cent of which are VLCC's (very large crude carriers).

The possibility of serious oil spills in the open sea, as well as those originating from terminal activities and offshore activities, has increased and with it the potential for crippling environmental and economic damage. A particular threat is posed to the ecology and economy of the small

islands of the Caribbean through activities such as tourism and coastal artisanal fisheries. The AEGEAN CAPTAIN - ATLANTIC EXPRESS collision off the island of Tobago in July 1979 where 250,000 tonnes of oil was at risk and partially spilled indicates the potential magnitude of the problem.

Although progress has undoubtedly been made in creating greater public awareness and improving scientific knowledge of the problem of marine pollution, there remains a pressing need in the Caribbean to develop or improve national oil spill contingency planning and develop regional or subregional joint arrangements to combat major incidents or threats of marine pollution.

In order to prepare for pollution emergencies, each country whose coastline is at risk should establish national contingency plans and identify availability of adequate trained manpower, equipment and material for combating pollution. In countries with insufficient resources and manpower, regional or subregional arrangements are an especially valuable and economical way of supplementing national capabilities in effectively combating major spillages of oil or other noxious substances. Governments should, therefore, give serious consideration to the benefits which they may obtain from entering into co-operative agreements with neighbouring countries.

To facilitate speedy action in this important field and avoid wasteful duplication of effort in the Caribbean Region, UNEP, IHCO and the OAS have joined forces to develop a programme of activities designed to assist in the formulation of (an) oil spill contingency plan(s) for the Caribbean. These activities are aimed at firstly identifying the special needs of the smaller islands and subsequently developing a framework for co-operation among Caribbean islands.

To facilitate implementation, the project will be divided into sub-projects which will be executed separately (see list of sub-projects given below). Sub-project 9/1 can be considered as a first phase in the realization of the overall objectives described above and the results of which will be integrated into sub-project 9/3 described below. Sub-project 9/2 will provide for training in methods of combating oil spillages.

Operational pollution

Although accidental oil spills caused by ship casualties such as groundings, strandings and collisions pose a considerable risk to the environment, it is the repetitive deliberate discharge of residues from oil cargo tanks and other oily wastes into the sea during the operation of tankers and cargo vessels which account for the greater volume of oil pollution associated with the transport of oil by sea.

There are in existence a formidable array of international codes for the construction, equipment and operation of tankers which, when adequately implemented and enforced, should serve to reduce the occurrence of operational deliberate discharges of oil from ships.

Regarding measures for preventing pollution from tankers, the onus for conducting operational procedures in conformity with internationally-agreed rules falls chiefly upon the officers of such ships. Frequent reports of beaches in the Region being heavily contaminated with tar balls would suggest that acceptable operational procedures are, in fact, not being complied with in a significant proportion of ballast voyages. One may speculate on possible reasons for non-compliance:

(a) The crew may see fit to take "the easy way out" and discharge oil residues with the ballast water, rather than to take the trouble to separate the residues and retain them on board. In a number of cases this attitude may be fostered by the fact that some refineries do not have facilities for treating "slop oil" (mixtures of oil and sea water) and would prefer the tanker to deliver a cargo which is 100 per cent crude oil. Lack of any serious surveillance of tanker routes is an open invitation to improper operation of tankers, since the possibility of a violation being detected does not really exist.

(b) Reception facilities at oil loading terminals may be inadequate to receive dirty ballast, or slop oil which the tanker does not wish to retain on board; and it may be considered by the master that there is no alternative to discharging oil residues overboard.

(c) In cases where facilities for reception of oil residues do exist, there may be an excessive charge for their use, thus creating a financial disincentive for ships or tankers to operate in conformity with internationally-agreed rules.

(d) A situation may exist where there is doubt in the terminal operators' mind as to which should come first; conformity with retention-on-board techniques by the tankers, or the provision of adequate reception facilities? For instance, the installation of expensive reception facilities by a terminal operator would be a wasted investment if tankers continued to discharge their oil into the sea. The operator would need some guarantee that the facility would be used, and that revenue from recovered oil would go some way to covering operating costs. On the other hand, the tanker operator may argue that until reception facilities are created, there is no alternative but to discharge oily ballast into the sea.

The three sub-projects 9/4, 9/5 and 8/1/1 provide a three-pronged attach on this problem, by surveillance of tanker routes to detect violations of discharge criteria; monitoring of oil residues retained on board; and determination of whether reception facilities at oil loading terminals are adequate. The results should lead to a proper evaluation of the causes of present chronic pollution of beaches by tar balls.

Whilst it is generally recognized that "international legislation" is currently adequate in scope of application and technical content, what is now of urgent concern is the enhancement of coastal and flag stage capability to implement such rules and exercise better control over ships

with a view to ensuring, as far as possible under existing international law, both customary and conventional, that ships comply with such rules.

The following sub-projects are contemplated:

APCEP 9/1 - FORMULATION OF A FRAMEWORK FOR REGIONAL CO-OPERATION IN OIL SPILL COMBATING WITH PARTICULAR REFERENCE TO ISLAND STATES AND TERRITORIES PARTICIPATING IN THE CARIBBEAN ACTION PLAN (UNDERWAY).

APCEP 9/2 - DEVELOPMENT AND IMPLEMENTATION OF AN OIL SPILL PREPAREDNESS TRAINING PROGRAMME.

APCEP 9/3 - DEVELOPMENT OF NATIONAL CONTINGENCY PLANS AND SUBREGIONAL ARRANGEMENTS FOR CO-OPERATION AND MUTUAL ASSISTANCE IN COMBATING OIL POLLUTION WITH PARTICULAR REFERENCE TO CENTRAL AND SOUTH AMERICAN COUNTRIES PARTICIPATING IN THE CARIBBEAN ACTION PLAN.

APCEP 9/4 - STUDY ON THE FEASIBILITY OF INSTITUTING SURVEILLANCE FLIGHTS OVER TANKER ROUTES TO DETERMINE THE EXTENT TO WHICH OIL IS BEING DISCHARGED BY TANKERS AND CARGO VESSELS IN VIOLATION OF INTERNATIONAL REGULATIONS.

APCEP 9/5 - DEVELOPMENT AND IMPLEMENTATION OF HARMONIZED PROCEDURES TO MONITOR TANKER SLOP TANK OILY RESIDUES AT TANKER TERMINALS IN THE CARIBBEAN.

APCEP 9/6 - STUDY ON THE DISPOSAL OF RECOVERED OIL AND OILY DEBRIS TO DETERMINE THE METHODOLOGY WHICH WOULD BE MOST ADAPTABLE TO THE ISLAND NATIONS AND RESULT IN THE LEAST LONG-TERM ENVIRONMENTAL DAMAGE.

APCEP 9/7 - STUDY OF BEACH CLEANING METHODOLOGY FOR RECREATIONAL BEACHES WHICH SUFFER FROM VARYING DEGREES OF EROSION.

APCEP 9/1 - FORMULATION OF A FRAMEWORK FOR REGIONAL CO-OPERATION IN OIL SPILL COMBATING WITH PARTICULAR REFERENCE TO ISLAND STATES AND TERRITORIES PARTICIPATING IN THE CARIBBEAN ACTION PLAN (UNDERWAY).

OBJECTIVES

To assist the Governments, in particular island States and Territories of the Caribbean Region, in formulating plans for mutual co-operation in combating oil spills through the organization of missions, meetings and a training course.

BACKGROUND

As mentioned above, this project is underway and is being implemented by IMCO, UNEP and the OAS with the financial assistance of UNEP, OAS and USAID. The output of this project will be integrated into projects 9/2 and 9/3 described below.

ACTIVITIES

Expert mission to smaller islands of the Region	April 1980
Meeting of Government representatives from smaller islands	June 1980
Meeting of a task force for the preparation of an Action Plan for oil spill control in the Caribbean with special reference to the problems of island countries	November 1980
Follow-up expert mission to selected countries of the Region to discuss the Action Plan	December 1980
Orientation and training course for national on-site co-ordination from Caribbean islands who are responsible for the implementation of oil spill control plans	January/February 1981

OUTPUTS

- Development of a plan of action for oil spill control in the Caribbean Region;
- Greater awareness and understanding of smaller islands of the Caribbean in the problems of oil pollution and oil spill contingency planning;
- Preliminary review of feasibility of siting subregional centre for oil spill combating.

APCEP 9/2 - DEVELOPMENT AND IMPLEMENTATION OF AN OIL SPILL PREPAREDNESS TRAINING PROGRAMME.

OBJECTIVES

To ascertain the training needs and resources of the Region.

To train the various levels of personnel in the techniques needed to effectively implement a national oil spill contingency plan.

To thereby provide participating countries with a nucleus of trained personnel in the abatement of marine pollution of the marine environment by oil and to ensure that Governments of the States and Territories of the Wider Caribbean Region whose coasts are likely to be polluted or threatened by oil pollution arising from marine emergencies, will be prepared to take the necessary counteraction through, inter alia, the availability of trained personnel.

BACKGROUND

Background information on the status of oil pollution and oil pollution control in the Wider Caribbean Area is contained in the IMCO/UNEP study entitled "Status of Oil Pollution and Oil Pollution Control in the Wider Caribbean Region" (E/CEPAL/PROY.3/L.INF.5).

The development of workable regional and subregional co-operative arrangements and national contingency plans to combat oil spills are, to a great extent, dependent on the availability of equipment and trained personnel.

Hence, training figures largely in ensuring the effective use of any plan such as an oil spill contingency plan, designed to bring physical and manpower resources to bear on a problem in the shortest possible time. The fact that a number of Governments have decided to give oil spill clean-up responsibilities to the Navy, Coast-Guard or Fishery Protection Services, is an indication of the degree of reliable organization which is required to mobilize resources in the event of a marine emergency.

Training in the field of oil pollution control and abatement can be achieved through various means. Regional workshops and training courses concerned have been found particularly effective by IMCO and UNEP in bringing together participants with similar problems from a specific geographic area. Such courses and workshops are primarily useful in familiarizing key officials with the nature and degree of the oil pollution problems and the basic techniques for dealing with spillages. A workshop of this nature was organized by IMCO and UNEP for the Caribbean Region in Cartagena, Colombia, in October 1978.

However, places can also be made available on a number of existing courses for first-line supervisers engaged in oil spill clean-up operations to be trained in the deployment and correct use of anti-pollution materials and equipment.

Courses and workshops, while useful, need to be followed up by more intensive training exercises organized at the subregional level and geared to existing national and subregional contingency plans, local conditions and availability of equipment. Such courses should be tailor-made to the needs and capacity of the countries participating and concentrate on problems likely to be encountered in activating a contingency plan and the sources of assistance from outside the country or subregion which can be used in such a situation. Like contingency planning, training should be "site specific" and geared to the type and magnitude of spill which is likely to concern the countries participating in the training programme.

In any training programme there should also be a place for fellowships or study tours. As mentioned above, there are at present training courses held periodically in a few countries which offer the participants the opportunity to learn of the "state of the art" in oil spill containment and dispersion. Such activities are particularly useful for personnel who will be expected to purchase and use oil spill clean-up equipment and dispersants.

In order to ensure that a training programme is developed for the Caribbean Region, it will be necessary to survey the Region and obtain, inter alia, the views of the Governments concerned on their training needs and the type of training activities in which they would be most interested in participating.

The training programme will be in two phases and integrated with the ongoing APCEP 9/1 which already contains a very modest training component. Likewise, any other training initiatives undertaken by other international organizations, and where possible by national agencies in the Region, should be closely co-ordinated within the context of the implementation of this project. The potential for wasteful duplication of effort in the field of training is not inconsiderable and should, where possible, be avoided.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
First Phase		
1. Survey of training requirements and resources, and development of regional long-term training strategy and plan	0 - 4	
2. In conjunction with the final phase of APCEP 9/1, conduct one regional or two subregional training courses for oil spill control officers	3 - 24	
Estimated Cost: $66,000/70,000		
3. Fellowships/study tours	12 - 36	
Estimated Cost: $100,000		
4. Technical support to national training courses and workshops	12 - 24	
Estimated Cost: $50,000		
TOTAL COSTS: $220,000		

APCEP 9/3 - DEVELOPMENT OF NATIONAL CONTINGENCY PLANS AND SUBREGIONAL ARRANGEMENTS FOR CO-OPERATION AND MUTUAL ASSISTANCE IN COMBATING OIL POLLUTION WITH PARTICULAR REFERENCE TO CENTRAL AND SOUTH AMERICAN COUNTRIES PARTICIPATING IN THE CARIBBEAN ACTION PLAN.

OBJECTIVES

In the light of progress achieved by APCEP 9/1, assist Governments in the formulation of subregional co-operative arrangements in combating oil pollution arising from a marine emergency and enhancement of national capabilities to deal with a major oil spill and participate in any existing regional (subregional) plans for mutual assistance.

ACTIVITIES

- Survey of existing or planned contingency plans in the Region.

- Assessment of national capabilities, in particular of Central and South American countries participating in the Caribbean Action Plan, and level of exposure to oil spill risks.

- Subregional meetings/workshops on the basis of suggested groupings resulting from the above and APCEP 9/1 activities.

- Assistance will be provided to the countries in developing their contingency plans and strengthening their national institutions through training and equipment stockpiles.

- The desirability and feasibility of establishing subregional Oil Combating Centre(s) in the subregion will be discussed through individual consultation with Government experts and at the subregional workshops.

OUTPUTS

1. Evaluation of progress made in developing Caribbean Oil Spill Control Plan (APCEP 9/1).

2. Development of subregional arrangements for co-operation and mutual assistance in combating oil pollution.

3. Establishment of links for assistance and co-operation with major oil producers and oil importers.

4. Development and enhancement of national contingency planning.

5. Recommendation on institutional framework for implementation of co-operative and mutual assistance arrangements including feasibility of setting up a permanent subregional Mutual Aid Centre(s).

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Survey of existing plan and measure and valuation of progress	0 - 2	
Survey of needs, risk level and potential	2 - 4	
Preparation of subregional workshop for Central and South American countries and contiguous Island States and Territories	4 - 10	
Assistance to countries through advisory services and analyses of equipment requirements	10 - 16	
Where equipment is totally lacking provision of basic equipment for containment and dispersal of oil spills	10 - 20	

Estimated cost: $200,000 (excluding last activity)

APCEP 9/4 - STUDY ON THE FEASIBILITY OF INSTITUTING SURVEILLANCE FLIGHTS OVER TANKER ROUTES TO DETERMINE THE EXTENT TO WHICH OIL IS BEING DISCHARGED BY TANKERS AND CARGO VESSELS IN VIOLATION OF INTERNATIONALY-AGREED REGULATIONS GOVERNING THE OPERATION OF OIL TANKERS

OBJECTIVES

To determine the technical, economic and political feasibility of arranging a short programme of tanker surveillance flights, perhaps at the subregional level, through consultation with Governments participating in the Caribbean Action Plan and analysis of existing information on tanker traffic and availability of properly equipped aircraft. The purpose of such flights is to determine the extent to which oil is being discharged by tankers in violation of applicable international regulations and provide information which may be useful to port and flag States in implementing a regional programme of enforcement of such rules.

ACTIVITIES

- Analyse existing tanker traffic data and available information on location and severity of chronic oil pollution of coastlines.

- Obtain information on aircraft availability.

- Prepare over-flight programme and consult with Government authorities on the desirability of instituting such a programme and on the possible sources of technical and/or logistical and financial assistance to execute it.

OUTPUTS

- Draft tanker surveillance programme.

- Recommendations on overall feasibility of instituting surveillance programmes.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Analyses of data and preparation of draft surveillance programme	0 - 1	
Consultation with Government authorities and other experts	0 - 2	
Preparation and issue of feasibility study	0 - 6	

Estimated cost: $20,000

APCEP 9/5 - DEVELOPMENT AND IMPLEMENTATION OF HARMONIZED PROCEDURES TO MONITOR TANKER SLOP TANK OILY RESIDUES AT TANKER TERMINALS IN THE CARIBBEAN.

OBJECTIVES

To develop approach by Governments of the Region to the monitoring of oily residues retained on tankers at tanker terminals in the Caribbean as a means of ensuring compliance of tankers with discharge criteria laid down in the 1954 OILPOL Convention as amended in 1969.

BACKGROUND

The procedure, known as Load-on-Top (LOT) or Retention-on-Board (ROB), whereby tank washings and oily water from ballast are retained on board the ship, is in wide use and is recognized as an effective menas of limiting the amount of oil residues discharged into the sea by tankers.

Applicable international regulations impose a total prohibition on the discharge of oil or oily mixtures from a tanker within 50 miles from the nearest land and the flow rate, concentration and quantity discharged elsewhere at sea is strictly limited. Compliance with the oil discharge limits is primarily achieved by adherence to procedures for the retention of oil on board.

Monitoring of tanker performance of the retention of oil residues and procedures is a valuable tool in ensuring that LOT procedures are being carried out properly. It would be desirable to institute a monitoring programme at Caribbean oil loading terminals whereby common procedures would be implemented in the Region and terminal personnel trained, in particular, in the techniques of gauging, calculating the contents of slop tanks and evaluation of data obtained.

The oil and shipping industries whose co-operation is essential in the prevention of discharges of oil and oily residues into the sea, have, through the Oil Companies International Marine Forum (OCIMF) and the International Chamber of Shipping (ICS) respectively, produced valuable guides to the use and monitoring of LOT or ROB which would provide a useful basis for instituting such procedures in the Caribbean.

ACTIVITIES

- Review of current LOT/ROB monitoring procedures in the oil loading terminals of the Caribbean.

- Development of a common aproach to the monitoring of LOT procedure in the Caribbean Region.

- Two-year pilot project to establish central reporting systems and a data bank for the results of monitoring of LOT at a number of selected oil loading facilities in the Region.

- Conduct on-the-job instructional programmes for terminal personnel in the use of monitoring procedures and evaluation of results obtained.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Survey current practice	0 - 2	
Develop common monitoring approach	2 - 24	
Develop reporting system and data bank	2 - 24	
Training course	6 - 8	

Estimated cost: $100,000

APCEP 9/6 - STUDY ON THE DISPOSAL OF RECOVERED OIL AND OILY DEBRIS TO DETERMINE THE METHODOLOGY WHICH WOULD BE MOST ADAPTABLE TO THE ISLAND NATIONS AND RESULT IN THE LEAST LONG-TERM ENVIRONMENTAL DAMAGE.

OBJECTIVES

To assist the Governments, in particular island States and Territories of the Caribbean Region, in selection of disposal methods for recovered oil and oily debris.

BACKGROUND

The great importance of tourism to the economy of the islands means that recreational beaches must be cleaned of all oily residues and oil saturated debris. During previous spillages it has been found that this frequently requires removal of large quantities of oily debris and sand with the subsequent problems of disposal.

Many possible methods have been reviewed by various scientific agencies and they include burning, burying, land farming and land fill. Some of these methods would not be suitable, in particular for islands which have porous soils, limited land area, or whose land fill operations are not suitable for oily waste disposal.

During the OAS/IMCO mission to selected smaller Caribbean islands (April 1980), it was found that some of the landfill disposal sites were either in close proximity to fresh or salt water or little was known regarding the porosity of the surface soil and leaching could be detected by visual observation. On site study would be required to determine the preferred disposal method(s) for each of the island States and Territories.

A further consideration is the disposal of any recovered oil or oil in water emulsions which accumulate from countermeasures operations with booms, skimmers and vacuum trucks. Providing that refineries have the necessary storage, treatment and processing facilities, they can accept recovered products. It must be established which refineries* will accept oil or oil in water emulsions together with the terms, conditions and any related costs.

ACTIVITIES

The project will have three main phases:

- Determination of the various methods which can be used for disposal of oil, oily residues, oil in water emulsions and oily debris by literature review and meetings with operators of such facilities.

- Determination of those refineries which will accept recovered oil and oil in water emulsions by expert mission to those islands which have refineries.

- Expert mission to small islands to examine current garbage disposal methods, assess sites, soil porosity and determine other areas which would be suitable for oily waste disposal.

OUTPUTS

1. Identification of disposal sites and methods in the small Caribbean islands for oil and oily debris.

2. Identification of refineries which will accept recovered oil and emulsions.

3. Identification of preferred disposal methods for individual islands giving due consideration to all environmental factors.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Determination of disposal methods	0 - 2	
Determination of terms and conditions under which refineries accept recovered oil	2 - 3	
Identification of disposal methods for oily debris on each island	3 - 6	

Estimated cost: $35,000

*West Indies Oil Refinery, St. Lucia, Mobil Oil Barbados, Barnados Ste Anonyme de la Raffinerie des Antilles, Fort de France Martinique, Hess Oil Virgin Islands Coro. St. Croix, Lago Refinery Aruba and Shell Antilles Curacao.

APCEP 9/7 - STUDY OF BEACH CLEANING METHODOLOGY FOR RECREATIONAL BEACHES WHICH SUFFER FROM VARYING DEGREES OF EROSION.

OBJECTIVES

To assist the Governments, particularly island States and Territories of the Caribbean Region, in determining the preferred methods for cleaning tourist beaches subsequent to a major oil spillage.

BACKGROUND

Many of the tourist beaches in the Region are experiencing varying degrees of erosion and there appears to be little information available on the net transport of sediment around the shoreline of the individual islands. In the event of a major oil spillage, with subsequent shoreline contamination, there could be a requirement to remove oiled sand and to reduce the possibility of accelerating the erosion process, this material must be replaced. Again the selection of the source of the replenishment sand must be such that it is taken from a beach which will be naturally replenished by the sediment transport cycle.

It is felt that a pilot project could be undertaken in an island which has a large number of white sand beaches and is largely dependent on tourism.

ACTIVITIES

- Determination of those areas where coastal erosion is taking place.

- A study of sediment transport around the coastline with a review of current circulation, wind velocities and direction and storm patterns.

- Establishment of monitoring points to measure sediment transport, with particular emphasis on those areas which are experiencing shoreline erosions.

OUTPUTS

1. Identification of those beach areas which are experiencing the most severe erosion.

2. Identification of those beach and nearshore areas which can be utilized as a source of replenishment sand in the event of an oil spillage.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Identification of problem areas	0 - 1	
Study of sediment transport	1 - 2	
Field monitoring programme	0 - 24	

Estimated cost: $25,000

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APCEP 10 - ASSESSMENT OF THE SOURCES, QUANTITIES AND ROUTES OF INDUSTRIAL AND AGRICULTURAL WASTES AS WELL AS DOMESTIC AND MUNICIPAL WASTES REACHING THE MARINE ENVIRONMENT AND THEIR EFFECTS ON HUMAN HEALTH, MARINE ECOSYSTEMS (IN PARTICULAR FISHERIES RESOURCES) AND COASTAL AMENITIES (Reference paragraph xxx of the Action Plan)

Note: The survey of the sources, quantities and routes of industrial, agricultural, domestic and municipal wastes will be covered by APCEP project 13/2.

The effects of land-based sources of pollutants on marine ecosystems and coastal amenities will be covered by APCEP project 13/3.

This project is therefore only concerned with studies on the effects of industrial, domestic and municipal waste, including microbiological agents on human health.

OVERALL OBJECTIVES

To survey and assess the effects of pollutants (other than oil) on human health in the Wider Caribbean Region.

OBJECTIVES

To provide the national authorities responsible for environmental management in the Region with specific information about agents potentially hazardous to human health by:

- establishing a regional priority list of human exposure problems to environmental pollutants;

- assessing on a regional level, the extent of human exposure to health hazards from microbiological, chemical, physical and other environmental agents;

- evaluating the health hazards resulting from contamination of marine and other food products;

- reviewing and assessing the epidemiological situation in all countries of the Region, particularly with regard to communicable diseases;

- developing specific health criteria for the quality of the human environment in the Region, particularly as concerns air, water, food and the occupational environment;

- proposing corrective and remedial measures aiming at the reduction of health impairment due to microbiological and chemical pollutants;

- identifying institutions dealing with studies on the effects of pollution on human health in the Region; and

- establishing linkage with ongoing environmental exposure monitoring programmes (e.g. GEMS, Air, Water and Food projects).

BACKGROUND

Industrialization of the Region has undergone tremendously rapid growth during the past few years, particularly in the petrochemical sector. Mobile and stationary air pollution sources in urban areas have also experienced a similar increase. As a consequence, the urban environment has deteriorated markedly.

In spite of the growing concern over the increasing environmental impact of chemical pollutants, microbiological agents such as bacteria, viruses and parasites still constitute the predominant environmental hazard of most countries in the Region (1).

Gastro-intestinal diseases are responsible for high mortality rates among infants under five years of age and the incidence of hepatitis is high in many parts of the Region. Concomitantly with increasing industrialization there has also been a significant rise in respiratory illnesses and death due to cancer. The extensive development presently taking place in all industrial sectors has rapidly increased the exposure of certain industrial workers and large segments of the population to new environmental hazards. In most cases no regional precedent exists so that there is much uncertainty concerning the present risks involved. A thorough and critical evaluation is therefore needed.

This project will be closely co-ordinated with APCEP 34.

ACTIVITIES

1. Human exposure assessment

In collaboration with countries of the Region, the potential impact of environmental hazards will be evaluated on a regional level through in-depth studies of major pathways and media through which exposure may occur. In particular, the comprehensive survey will include:

(a) freshwaters: microbiological, chemical and physical quality of drinking water supplies.

(b) marine waters: microbiological quality of coastal bathing waters and shellfish growing areas.

(c) waste waters: microbiological and chemical quality of municipal and hazardous industrial effluents.

(d) solid wastes: hygienic quality of refuse disposal; secondary air and water pollution due to handling and disposal.

(e) food: microbiological quality of seafood and other basic food and chemical additives.

(f) air pollution: urban air quality in city, residential and industrial areas.

(g) occupational exposure: industries known to affect workers' health.

(h) hazardous chemicals: selected potentially toxic chemicals, their distribution and residuals (carcinogens, etc.).

(i) existing information: collection of all relevant information from specialized national institutions, data from ongoing programmes.

2. Epidemiological situation

The existing national and regional epidemiological records will be integrated and evaluated to identify the impact of environmental hazards on the health of the population in the Region. Of particular interest are improved statistics on:

(a) communicable diseases, e.g. those associated with domestic waste disposal;

(b) deseases aggravated by air pollution;

(c) characteristic occupational diseases;

(d) impact of desalinated water on health.

An attempt will be made to provide epidemiological evidence for the close linkage between waste disposal practices, environmental conditions and the health situation.

3. Environmental health criteria

The results of the exposure assessment and the epidemiological situation along with already available scientific findings (e.g. the WHO Environmental Health Criteria Documents) will be used to develop the following regionally valid practical criteria for various sectors of the human environment: microbiological quality criteria for coastal waters, shellfish growing areas and various seafoods; coastal

water quality criteria related to municipal and inustrial waste discharges and leading to the basis for effluent standards and other pollution control regulations; urban air quality criteria for the establishment of air pollution emission standards; commonly applicable technical criteria for solid wastes handling and disposal.

OUTPUTS

1. Comprehensive evaluation report on environmental health hazards of the Region;

2. Study report on the potential risks from seafood contamination;

3. In-depth verification of the regional epidemiological situation with particular emphasis on communicable diseases;

4. Logitudinal study on occupational exposure in collaboration with national institutions in the Region.

5. Environmental health criteria documents on the specific levels of human exposure to hazards from environmental contamination including:

   (a) microbiological and physio-chemical quality of food and drinking water;

   (b) effluent standards for municipal, industrial and pathogenic wastes;

   (c) urban (city, industrial, residential) air quality criteria;

   (d) guidelines for hygienic solid waste handling;

   (e) occupational exposure to hazardous chemicals, gases, dusts etc. and their control;

   (f) human heaath impact of marine geological processes (input to project APCEP 15).

200. WORKPLAN AND TIMETABLE
201.
202. | Activities | Starting and ending (from month 0) | Responsible organization |
203. |---|---|---|
204.
205.
206.
207. | Development of methodology which is relevant to the regional programme | 0 - 4 | PAHO/WHO |
208.
209.
210. | Field surveys on country-to-country basis to evaluate existing data (1) | 4 - 11 | PAHO/WHO |
211.
212.
213. | Data evaluation and preparation of directory | 12 - 14 | PAHO/WHO |
214.
215.
216. | Collaboration with national institutions on expanded monitoring and data collection | 12 - 23 | PAHO/WHO |
217.
218.
219. | Conduct of toxicological and epidemiological field studies in collaboration with scientific institutions | 12 - 23 | PAHO/WHO |
220.
221.
222.
223. | Preparation of environmental health criteria documents on the subjects listed above | 12 - 20 | PAHO/WHO |
224.
225.
226.
227. | Government expert meeting to review regional situation in environmental and public health (2) | 21 | PAHO/WHO |
228.
229.
230.
231. | Finalization of reports on all studies and surveys undertaken | 22 - 23 | PAHO/WHO |
232.
233.

234. ---
235.
236. Cost of project $200,000.
237.
238. ---
239.
240. (1) In conjunction with APCEP projects 13/2, 29, 34 and 35.
241.
242. (2) In conjunction with APCEP projects 34 and 35.

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APCEP 11 - STRENGTHENING OF NATIONAL CAPABILITIES FOR POLLUTION CONTROL AND MONITORING THROUGH TRAINING AND HARMONIZATION OF METHODOLOGIES (Reference paragraph xxx of the Action Plan)

OBJECTIVES

To arrange for training of regional counterparts and to consult with regional institutions on the establishment of laboratory facilities that are necessary for pollution control and monitoring.

To promote intra-regional programmes for monitoring selected pollutants, especially heavy metals, and intercalibration techniques.

BACKGROUND

Many of the projects, to be undertaken within the context of the Action Plan, involve the measurement of pollutants, bioassays and the establishment of permanent monitoring systems to be carried out by national institutions in the Region and to be co-ordinated on a regional basis.

Many of the national institutions in the Region do not have this capability at present. Additionally, in order that the data generated by different institutions be compatible it is necessary to have common methodologies including intercalibration of equipment.

The objective of the project described here is to develop the required regional capability.

ACTIVITIES

In consultation with Governments of the Region, one or two regional laboratories will receive training and consultation in the establishment of laboratory facilities for analysis of pollutants, particularly heavy metals and other toxic substances such as chlorinated hydrocarbons. This may include overseas training in an internationally-recognized institution and provision of equipment. These institutions may then become centres for training personnel from other States and Territories of the Region.

Institutions of the Region will be encouraged and advised on the establishment of an intra-regional monitoring network. This will include sampling sites, species to be monitored, contaminants to be monitored, frequency, analytical procedures and intercalibration of techniques. Intercalibration will be carried out in collaboration with an internationally-recognized institution.

The training and monitoring networks envisaged will be closely related to the activities to be carried out in other projects, particularly APCEP 8/3.

OUTPUTS

1. Training and consultation on the establishment of monitoring facilities for selected pollutants, in particular heavy metals and chlorinated hydrocarbons.

2. Recommendations for establishment of an intra-regional network for monitoring selected pollutants, including intercalibration.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization (tentative)
Training and consultation on the establishment of monitoring facilities for selected pollutants, in particular heavy metals and chlorinated hydrocarbons	0 - 12	UNESCO
Intercalibration exercise	0 - 12	IAEA
Recommendations for establishment of intra-regional monitoring network	6 - 12	RCU

Cost of project $150,000.

jlt535; 30 May 1980

APCEP 12 - STRENGTHENING OF NATIONAL CAPABILITIES TO DEVELOP OR IMPROVE PROGRAMMES FOR WATER QUALITY CONTROL IN COASTAL AREAS (Reference paragraph xxx of the Action Plan)

OBJECTIVES

To provide assistance to national institutions in assessing water quality in coastal areas in order to develop standard quality criteria and programmes for control of degradation and restoration of such resources.

BACKGROUND

Although pollution of coastal waters is still not a widespread problem in the Caribbean Region there has been, in the recent decades, a marked deterioration of the quality of coastal waters around port cities or industrial centres.

High organic load effluents from untreated or primary-treated sewage and industrial waste discharges are responsible for increasing abiotic conditions and environmental degradation of coastal lagoon systems and embayments adjacent to large urban and industrial centres. The countries of the Region are becoming increasingly aware of the dangers to public health and coastal based activities which ensue from severe degradation of water quality. In most instances however, appropriate monitoring programmes are lacking as well as criteria for water quality.

ACTIVITIES

1. A workshop will be held to discuss the problems associated with degradation of coastal water resources. Inputs from ongoing research projects such as the UNESCO/UNEP/UNDP Havana Bay project will be presented as well as background papers assessing the situation in the coastal waters adjacent to port cities in the Region such as Kingston, Cartagena and San Juan. Inputs will also be provided by APCEP projects 3, 10, 11, 13, 34 and 35.

2. On the basis of specific needs assistance programmes will be developed to strengthen the national capabilities for water quality control in terms of legislation, development of monitoring capacity (through training and provision of equipment to national institutions), development of water quality criteria and guidance in the design of low-cost waste water disposal and treatment systems.

OUTPUTS

1. Assistance programmes for improvement of legislation, monitoring capability, water quality criteria and other factors related to water quality control.

2. Guidelines for the design of low-cost waste-water disposal system which minimize the contamination of coastal waters adjacent to urban and industrial centres.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization (tentative)
Preparation of materials for workshop	0 - 3	PAHO/WHO
Organization and convening of workshop	2 - 5	PAHO/WHO
Finalization of guidelines for the design of low-cost wastewater disposal systems	5 - 6	PAHO/WHO

Cost of project $50,000.

jlt536: 4 June 1980

Coastal Areas

APCEP 13 - ASSESSMENT OF THE IMPACT OF COASTAL AND LAND-BASED ACTIVITIES ON COASTAL MARINE RESOURCES COMPRISING: (APCEP PROJECTS 13/1, 13/2, 13/3, 13/4, 13/5 and 13/6) (Reference paragraph xx of the Action Plan):

APCEP 13/1 - IDENTIFICATION OF CRITICAL COASTAL AREAS WITHIN THE REGION (Reference paragraph xx of the Action Plan)

OBJECTIVES

To identify the coastal areas within the region which possess valuable and unique natural resources and which are actually or potentially under stress due to multiple and conflicting demands upon its natural resources.

BACKGROUND

The tropical ecosystems which ribbon the coasts of the Region provide multiple services to the Caribbean people. Besides being the basis for most of the coastal fisheries in the Region they also provide natural barriers to storm tides and valuable habitats for a great diversity of species. The increased urbanization and industrial development in the Region, particularly in the insular Caribbean has already degraded many habitats to a point where their life-supporting capacity has been severely impaired or totally lost. Recent studies by IUCN and the Eastern Caribbean Natural Areas Management Programme (ECNAMP) (a joint programme of Rockefeller Brothers Fund, IUCN, WWF, CCA and the University of Michigan) have mapped the Coastal Resources of the Wider and the insular Caribbean, as well as the developmental and population pressures providing an excellent background information for the identification of critical coastal areas in the region (13).

ACTIVITIES

Convene a small workshop of experts from the region with the participation of IUCN, CCA and ECNAMP to develop criteria for selection of critical coastal areas using the existing information and maps. This project will provide essential inputs to APCEP projects 5, 6, 7 and 15.

OUTPUTS

Catalogue of critical coastal areas in the region and criteria for selection.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Organization and convening of workshop	0 - 3	UNEP(RCU)
Guidelines for selection of critical natural areas	0 - 3	UNEP(RCU)

Cost of project $50.000.

APCEP 13/2 - STUDIES ON THE CHARACTERISTICS OF INDUSTRIAL AGRICULTURAL AND DOMESTIC WASTE DISCHARGED INTO COASTAL AREAS (WASTE DISCHARGE PROFILE).

(Reference paragraph xx of the Action Plan)

OBJECTIVES

To provide a comprehensive picture of major pollution sources affecting human health and the marine environment and to lay the groundwork for a regional approach to remedial measures and pollution control by:

- compiling a comprehensive inventory of major sources of waste discharges into the sea;
- assessing the nature and quantity of selected pollutants entering the sea from most of the important land-based sources;
- establishing unit discharge and effluent coefficients for major sources of pollution;
- developing a format for data collection of major types of pollution sources;
- reviewing present waste treatment and disposal practices;
- evaluating legal instruments and regulations for waste disposal;
- identifying Government institutions in each country dealing with pollution source control.

BACKGROUND

Uncontrolled disposal of untreated solid and liquid wastes into the marine environment can contribute to the loss of irreplaceable resources and also to the rapid deterioration of the fragile ecosystems of the Region. This is particularly true of the coastal zones. Unless remedial action, followed by concerted international efforts at pollution prevention is undertaken, the environment of the area could be seriously damaged and, as a result, development and progress thwarted. In addition, the health of the human population is jeopardized and such practices can have a negative impact on economic activities such as tourism.

Since in many cases satisfactory technology for waste treatment, recovery and re-use is available, it is desirable to strive to decrease the practice of discharging untreated wastes into the marine environment. A rational programme would encourage recycling to the terrestrial ecosystem. Valuable resources such as water, sewage sludges and biologically stabilized solid wastes can be used profitably, thereby preventing the unnecessary contamination of the marine environment as is now largely the case.

ACTIVITIES

1. Pollution source inventory

An inventory will be taken of major land-based pollution sources including solid, liquid and gaseous wastes from domestic, municipal and industrial activities. The location, magnitude and pollution characteristics will be determined for each individual source. The survey will also describe the method of waste disposal, such as on-land discharge, off-shore dumping, discharge from ocean outfalls and discharge into canals. The potential of atmospheric transport of pollutants will also be investigated. The pollution sources which will be studied follow:

A. Industrial residues

(i) liquid waste

(ii) sludges and slurries

(iii) solid wastes

(iv) emission of air pollutants

B. Municipal wastes

(i) sewage (domestic and industrial components)

(ii) sewage sludges (nightsoil and treatment residuals)

(iii) solid waste

(iv) urban air pollution (mobile and stationary sources)

C. Rivers and agricultural run-off

D. Nuclear facilities

E. Pollutants transported via the atmosphere

2. Pollution load assessment

An assessment of waste loads for each major source category will be undertaken. It will be based upon the pollution source inventory. This assessment will allow for an evaluation of the contribution of each source to the total pollution load of the sea. Thus, a comprehensive picture of pollution by type, quantity and geographical distribution will become available.

The point of departure for activities 1 and 2 above will be the information documents prepared as background for the Action Plan.

3. Assessment of factors relevant to pollution control and waste management

A. Waste management practices

An in-depth study of waste handling, treatment and disposal practices will be carried out. This will include industrial, municipal and other significant pollution sources.

B. Waste management regulations

The legal instruments and administrative regulations governing waste handling, treatment and disposal in all countries of the Region will be reviewed and analyzed. This activity will be carried out in conjunction with APCIP project 1/3.

C. Legal instruments and administrative structures

The presently existing organizational and administrative arrangements for environmental pollution control and in particular for waste disposal will be studied and evaluated on a country-by-country basis. This will include an evaluation of existing national legislation and regulations. This activity will be carried out in conjunction with APCIP projects 1/3 and 3/1.

D. Facilities and manpower

The presently available technical installations for pollution control will be reviewed as well as the manpower, at all levels, assigned to pollution control services. Both public and private sectors will be included in the study.

This activity will be carried out in conjunction with APCIP projects 1/1, 1/2, and 3/1.

E. Assessment of needs

These in-depth sector studies on environmental management for each country will allow identification of gaps and deficiencies which in turn will lead to suggestions of possible improvements. The need for effluent monitoring services will be studied with particular attention to pollution source inventory (1) and load assessment (2).

4. Waste handling methods

Presently available technical solutions for waste treatment and disposal for municipal sewage and industrial effluents will be critically evaluated and their regional applicability studied.

5. Waste utilization alternatives

Possibilities for the re-use of certain waste materials will be studied. The groundwork for a regional residue utilization model will be developed taking into consideration the following:

(a) industrial effluents (cooling and process)

(b) industrial residues (liquids, solids, slurries)

(c) sewage sludges

(d) municipal solid wastes

This will form an essential input for APCEP project 31.

6. Economic aspects

Socio-economic considerations of waste management and pollution control will be studied and wherever possible cost-benefit calculations will be made. This will assist in the assessment of investment and operational expenses for pollution control programmes. These studies relate in particular to items 3, 4 and 5. This will form an important input to APCEP project 26.

OUTPUTS

(a) First Phase

1. Directory of Government institutions in each country dealing with pollution source control.

2. Complete set of data collection forms for major types of pollution sources.

3. Compilation of unit discharge values, effluent coefficients and other relevant data for the calculation of type-specific pollution loads.

4. Guidelines for the assessment of waste treatment and disposal techniques.

(b) Second Phase

1. Completed inventory of major land-based pollution sources discharging directly and indirectly into the sea; data presentation in tabular and graphical form as well as maps locating each source.

2. Results of a complete pollution load balance calculation for selected hazardous pollutants from major land-based pollution source categories.

3. Integrative model presenting the most important municipal, industrial or other residues in the Region indicating possibilities for their re-use.

4. Report on the waste management situation in the Region including administrative structures, technical facilities and manpower availability and needs in each country.

5. Survey report of national legislation and regulations, both technical and administrative, governing waste discharges into the sea.

6. Study report on the requirements for meteorological and oceanographic observational network needed for the assessment of airborne pollution loads.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Establishment of procedures for data gathering taking into account regional conditions	0 - 4	UNIDO/PAHO*
Prepare survey questionnaire	0 - 4	UNIDO/PAHO*
Contact Governments through official channels	0 - 4	UNIDO/PAHO*
Contract UNIDO consultants	0 - 4	UNIDO*
Contract PAHO consultants	0 - 4	PAHO*
Joint UNIDO/PAHO field mission to assess industrial, domestic and agricultural wastes on a country-by-country basis	4 - 11	UNIDO/PAHO*
Preparation of wastes inventory	12	UNIDO/PAHO*

Total cost of project US $200,000.

*UNIDO will be responsible for the industrial waste survey. PAHO will be responsible for the domestic waste survey.

APCEP 13/3 - STUDIES ON THE EFFECTS OF POLLUTANTS AND COASTAL DEVELOPMENT ACTIVITIES ON IMPORTANT BIOLOGICAL COMMUNITIES AND HABITATS PARTICULARLY THOSE CONNECTED WITH COASTAL FISHERIES AND OTHER COASTAL-DEPENDENT ACTIVITIES. (Reference paragraph xx of the Action Plan)

OBJECTIVES

To determine the effects of selected pollutants on key marine organisms.

To strengthen research capabilities of some national research centres so they can perform pollution effects studies, including bioassays.

To provide scientific data needed to assess and predict effects on populations of ecosystems exposed to various kinds of pollutants.

BACKGROUND

The Wider Caribbean Region will experience many developmental activities in the future. More than half of the countries in the area are island countries, and are, therefore, closely affected by marine resources and environment. This applies to the larger, non-island countries surrounding the Wider Caribbean, although to a lesser degree.

Countries with extensive petroleum resources plan to develop energy-intensive heavy industries such as petrochemical processing,. iron, steel and aluminium smelting, caustic soda and chlorine production. Some countries without natural resources are trying to attract non-resource-based refineries, pharmaceutical industries, as well as light industries and tourism. For a variety of reasons such as ease of trans-shipment, easy waste disposal, availability of cooling water etc., much of the development will take place in the coastal zone. Almost all of the Wider Caribbean tourist development has, and will be, oriented towards the coast. Concomitant with coastal development is coastal urbanization (14).

These development trends will carry the risks of increased pollution of the Wider Caribbean waters and, as a result, threaten the delicate coastal marine ecosystems upon which most of the marine biological productivity of the Region depends. At present there is a marked paucity of data concerning the environmental impact of the existing and planned development processes in the marine environment of the Region. The lack of information on possible environmental impacts of development activities helps to aggravate the problem of marine pollution because, without information to verify possible environmental consequences, there is no motivation to control or alter a development activity. For example, an island endowed with extensive mangrove may, as a consequence, have a shrimp fishery.

Without knowing the extent to which the shrimp fishery depends on the existence of a healthy mangrove, a decision may be made to destroy the mangrove to construct harbours or tourist centres etc., or even to harvest the mangrove for its peat-like material for fuel, as has been proposed in some countries. The consequence may be a ruined shrimp fishery.

ACTIVITIES

The project will consist of two parts:

(i) field studies on the effects of pollution on communities and ecosystems; and

(ii) laboratory tests of the toxicity of pollutants and the assimilation and loss of pollutants in organisms (on these, chronic, low-level effects studies can be based).

Field studies of ecosystems

Based on the background documents prepared as a basis for the Action Plan (1, 2, 6, 7, 8), an inventory will be made of typical areas where marine communities could be affected by discharges, dredging, or similar activities in order to identify the types of communities involved.

Some representative development areas will be selected for pilot studies along with similar unpolluted areas of the same structure. To the maximum extent possible, regional institutions will be encouraged to collaborate in these studies and training will be provided.

The parameters to be studied will vary somewhat, depending on the community and ecosystems, and the pollutant or activity involved. Some examples are:

Community structure. Structural indices, such as species diversity, measures of abundance and trophic relationships. Also, biological interactions will be studied in order to assess changes.

Functional indices. Carbon assimilation, plant pigments and ATP. Also, total organic carbon in the organisms and growth determination, to obtain information on primary and secondary productivity and on the functional state of the communities.

Physical and chemical properties of the environment such as irradiation, light attenuation, temperature, salinity, oxygen and nutrient concentration, redox potential of sediments, total organic carbon, suspended matter and granulometry of the sediments.

Toxicity, assimilation and loss experiments

On the basis of results from the baseline survey of selected pollutants, particularly heavy metals, a few important pollutants and marine organisms will be chosen for toxicity tests and for assimilation and loss studies. Acute bioassays will be carried out to determine toxicity limits and if facilities are or become available in the Region chronic sub-lethal tests will be started in order to assess morphological, physiological, biochemical and behavioural changes in test organisms and their populations. Whenever possible, field observations and tests will be performed to verify the results of the laboratory investigations.

An effort will be made to carry out these experiments and field investigations in collaboration with nationally nominated institutions. Training will be given where necessary as well as consultation on the establishment of facilities necessary to carry out such studies.

OUTPUTS

1. Determination of the effects of some pollutants, particularly toxic metals, on marine organisms and their populations, particularly on those of commercial importance.

2. Determination of the effects of some pollutants, particularly toxic metals, on selected types of marine communities and ecosystems.

3. Contribution to development of environmental pollution criteria for protection of the marine environment and its living resources.

4. Training and consultation on the establishment of facilities

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization (tentative)
Inventory of typically polluted and reference areas	0 - 4	UNESCO
Survey of pollution research capabilities of laboratories in the Region	0 - 4	UNESCO
Review of the state of knowledge of ecosystem research in the Region (APCEP projects 5, 8/4, 13/1, 16 and 17)	0 - 5	UNESCO
Selection of appropriate laboratories for implementation of studies	4 - 5	UNESCO
Laboratory bioassays and field tests	8 - 9	UNESCO
Training	9 - 13	UNESCO
Report of results	20 - 21	UNESCO
Recommendation for future research in the Region	17 - 22	UNESCO

Cost of project $200,000.

APCEP 13/4 - DEVELOPMENT OF A BASIS FOR ENVIRONMENTAL QUALITY CRITERIA APPLICABLE FOR THE TROPICAL COASTAL WATERS OF THE REGION. (Reference paragraph xx of the Action Plan)

OBJECTIVES

To develop guidelines and criteria for the quality of coastal waters of the Region, appropriate to the tropical conditions obtaining in most of the Region.

To develop appropriate analytical techniques for determining the quality of the waters of the Region.

BACKGROUND

A determination of the carrying capacity of coastal waters for physical and chemical by-products introduced as a result of man's activities is necessary in order to enable an optimum management of the resource.

Although a large volume of information already exists, most of it relates to temperate climates.

The indiscriminate transfer of criteria from the more developed countries with temperate climates, to the less developed and basically tropical ones, has been generally unsatisfactory. A careful search is required to develop criteria relevant to the climatological conditions and the ecosystems predominant in the Caribbean.

ACTIVITIES

Based on a thorough review of the results of the field surveys conducted within the context of APCEP projects 8/3, 8/4, 10, 13/2, 13/3 and 34, preliminary guidelines and criteria for the quality of coastal waters of the Region will be drafted.

The appropriateness of the analytical techniques used during those projects will also be assessed.

A workshop for marine scientists will be convened at which the preliminary guidelines will be discussed and recommendations will be made with regard to the need for further investigation or their adoption at a regional level.

OUTPUTS

(a) First Phase

1. Report assessing analytical techniques used in other APCEP projects.

2. Guidelines and criteria for coastal water quality of the Region.

(b) Second Phase

1. Recommendations of a regional workshop for further action.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization (tentative)
Analysis of reports of field surveys from APCEP projects 8/3, 8/4, 10, 13/2, 13/3 and 34	0 - 3	PAHO/WHO
Development of guidelines and criteria for coastal water quality	0 - 3	PAHO/WHO
Evaluation of analytical techniques used for other APCEP projects	3 - 8	PAHO/WHO
Workshop for marine scientists	9	PAHO/WHO
Recommendations from workshop	9 - 10	PAHO/WHO

Cost of project $20,000.

APCEP 13/5 - STUDIES OF LAND USE, CONSERVATION AND RECOVERY OF COASTAL SWAMPS AND COASTAL LAGOONS. (Reference paragraph xx of the Action Plan)

OBJECTIVES

To determine the impact of coastal development activities and land use on the ecological integrity of coastal swamps and lagoons in order to develop guidelines for conservation, management and recovery of these resources.

BACKGROUND

Coastal swamps and lagoons play a significant role in supporting coastal fisheries by providing nutrients, shelter and breeding grounds for many commercial species of fish and shellfish. Furthermore, these ecosystems serve as habitat for many bird species and offer shelter to migratory birds.

The expansion of urban and industrial areas into these coastal lowlands through land reclamation, port development and other coastal activities has already destroyed substantial areas of swamplands.

Dredging, disposal of domestic and industrial waste and indiscriminate deforestation around their shores has already severely degraded several of the coastal lagoons of the Region. With increasing developmental pressures it is imperative, in order to salvage the vital ecologic and economic services rendered by these ecosystems, to formulate guidelines for their conservation and management and to assess the feasibility of restoring damaged areas.

ACTIVITIES

Using available information and the results of APCEP 13/1, the most productive and unique lagoon and swamp areas of the Region will be identified and guidelines for conservation and management strategies will be developed.

Existing information on the restoration of tropical coastal ecosystems will be compiled and reviewed.

One or two representative areas where extensive ecological damage is present will be examined for possibilities of recovery. The source of the negative environmental stresses will be investigated, as well as alternatives which could result in the minimization or elimination of them. The scientific and economic feasibility for lagoon clean-up procedures, reafforestation with indigenous species, and repopulation with fish and shellfish species will be determined.

OUTPUTS

1. List of most productive and important coastal lagoons and swamp areas in the Region and their present status in terms of health of the ecosystem.

2. Compilation of information pertaining to the restoration of tropical coastal ecosystems with an analysis of the applicability to certain areas of the Region.

3. Models for conservation and management of coastal lagoons and swamps including matrices of environmental impacts.

4. Feasibility study of coastal lagoon and swamp restoration including recommendations for sites where demonstration projects could be carried out.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization UNESCO? FAO?
Identification of most productive areas	0 - 2	
Development of guidelines for conservation and management	2 - 4	
Compilation of information on restoration of coastal tropical ecosystems	0 - 3	
Feasibility study on ecologic and economics of restoring coastal ecosystems	2 - 6	
Preparation of final report with recommendations for site selection	5 - 6	

Total cost of project: $ 40,000.

694. APCEP 13/6 - STUDIES ON THE EFFECTS OF PESTICIDES USED FOR BANANA
695. AND OTHER MAJOR PLANTATION CROPS AND THE POSSIBILITIES
696. FOR BIOLOGICAL CONTROLS. (Reference paragraph xx of
697. the Action Plan)
698.

jlt537; 30 May 1980

APCEP 14 - ASSESSMENT OF THE COASTAL DYNAMICS WHICH HAVE A SIGNIFICANT IMPACT ON HUMAN HEALTH, MARINE ECOSYSTEMS AND HUMAN ACTIVITIES BY MODIFYING THE FATE OF WASTES, SEDIMENT AND SAND TRANSPORT AS WELL AS THE CONFIGURATION OF THE COASTS (Reference x of the Action Plan)

OBJECTIVES

To make recommendations for the regulation of coastal area development activities.

To develop guidelines for assessing the implications of coastal contruction and mining and to identify applicable methods for erosion control and protection.

To identify selected critical coastal areas in terms of present or projected use and the impact of geological processes and coastal mining on their resources.

BACKGROUND

The rapid development of industry and the expanded growth of natural resource exploitation in the Region places considerable stress upon the environment. There are natural geological processes that affect man's activities but are independent of them, such as earthquakes, and there are those that are caused or modified by man, such as surface subsidence or coastal erosion.

In the coastal area, dynamic changes due to storm waves and littoral drift can rapidly alter the coastline. Any marine engineering project such as channel dredging, construction of jetties or deep-water ports can have serious consequences if they change previously established sediment transport regimes. Major pollution hazards are oil spills, industrial wastes, thermal enrichment, faecal coliform, and solid waste. Indiscriminate dumping of large amounts of debris from demolition or construction may pose serious problems in certain parts of the Region. This may include household refuse, tyres, steel rods and wire, boxes and cans which not only adversely affect the appearance of the shoreline but also give little protection in the form of landfill. In addition the leaching of hazardous substances from landfill may degrade the water quality of the nearshore environment.

Mining takes place in offshore and on coastal areas of some countries of the Region. One important onshore activity is dredging of sand mainly for the construction industry (6). With the removal of sand dunes for construction, natural storm tide protection is reduced.

Although the environmental degradation and erosion caused by sand mining will in most cases be local, the effects of sand and gravel dredging on the spawning and feeding grounds of fish must be kept in mind. Sedimentation and turbidity changes may have harmful or beneficial effects depending on the seabed material, the frequency of dredging and oceanographic parameters.

Dredging to create, deepen or maintain navigation channels to ports and harbours, may require continuous or periodic operations. Consequently, the long-term effects on living resources should be studied both locally and regionally. In addition, dredging next to sewage outfalls or dumping areas could re-suspend pollutants adsorbed in the sediments and allow toxic substances to be more widely distributed, thereby degrading recreational areas, affecting desalination intakes, etc.

ACTIVITIES

The project is essentially a field activity preceded by the collection of existing information. The results of these will provide not only input into the scientific and physical data base but will also supply a major part of the socio-economic information required for coastal area development planning. In addition they will contribute to producing a geological, biological and land use inventory of the coastal areas and littoral zone and delineate critical areas most sensitive to environmental changes.

A multidisciplinary team approach is suggested using a coastal geologist/engineer as project leader. The principal components of the programme are:

A. <u>Regional coastal survey</u>

Accomplished by a team consisting of a coastal enigneer or geologist, hydraulic engineer, coastal ecologist, land use/regional planner, fisheries biologist and environmental/sanitary engineer. The major steps in the survey include:

1. Collection, compilation, analysis of all existing data, maps, satellite imagery and information on coastal geomorphology, sediments and relevent coastal processes and human activities.

2. Survey of coastal uses including mining or dredging activities, and engineering structures and their effect on coastal processes and the fate of pollutants.

3. Survey of regional intertidal ecology with particular reference to living resources

4. Aerial reconnaissance of shoreline types (geomorphology) as well as land use.

5. Spot surveys of coastal areas in selected countries to make detailed studies.

6. Data analysis and assessment of relationship between natural geologic processes and human activities.

7. Integration of data with those collected from other project activities especially the coastal circulation studies.

8. Choice of base maps in co-operation with other programmes.

B. Specific site studies programme

As a follow-up to the regional coastal survey, the specific site studies programme focuses upon those activities and areas identified as both environmentally sensitive and representative.

In many of the States bordering the Wider Caribbean Seas, there is activity in mineral exploration and exploitation. Consequent on this, there is, or will be, activity at coastal points in connection with the import of supplies and the export of minerals and mineral products. Additionally, metallurgical industries are being set up which will involve the use of both indigenously mined minerals and imported minerals and which will produce environmental impacts not yet assessed.

Elements of these studies will be:

1. Identification of representative sites and critical land-use areas based on the results of the regional coastal survey (in conjunction with APCEP projects 5, 6, 7, 13/1 and 13/2).

2. Detailed studies of such activities as coastal mining which may affect the protection of the coast or alter conditions such as sand supply, nutrient concentration, turbidity or long-shore drifts.

3. Examination of the local and regional effects of dredging with respect to suspended sediment; disruption of fish spawning, nurseries and feeding grounds; effects on shorelines and redistribution of toxic substances.

4. Development of guidelines for assessing the implications of coastal construction, dredging and mining and identification of methods for erosion control and protection.

5. Study of mineral production, its inland and overseas transport, and its local utilization in order to assess the environmental impact on coastal zones which may eventually result.

The initial stages of each programme will also be used to identify national institutions, experts and on-going activities which can co-operate in the implementation of the project. This will be carried out in conjunction with the activities of the co-ordinating unit. At all stages of the field

studies, a training programme will be included which will provide participants with on-site experience which may be combined with fellowships to universities, laboratories or other institutions to follow up the training and develop the Region's capabilities to continue the studies. Regional experts will be included in team work.

The work of the coastal survey team will need very close co-ordination with many other relevant elements of the Action Plan.

OUTPUTS

(a) First Phase

1. Compilation of data and maps of:

   coastal classification and resource inventory;

   coastal geomorphology and sediment classification;

   regional beach and intertidal ecology;

   land use including engineering structures and coastal mining;

   assessment of the general importance of geological processes.

(b) Second Phase

1. Identification of representative critical coastal areas.

2. Guidelines for environmental impact assessment for selected coastal development activities such as coastal construction, dredging and mining.

3. Recommendations for regulating coastal construction and associated development activities.

4. Recommendations for coastal protection and erosion control.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Phase I		
Data compilation	0 - 2	UN/UNESCO/PAHO/WHO/FAO
Field study	2 - 5	Interagency team
Data analysis	5 - 7	UN
Phase II		
Identification of representative sites	9	UN
Field studies	11, 14, 17	Interagency team
Data analysis	18 - 20	Interagency team
Report and map preparation	21 - 22	UN

Cost of project $350,000.

jlt538; 30 May 1980

APCEP 15 - FORMULATION OF ADVISORY COASTAL ZONE MANAGEMENT SCHEMES WITH PARTICULAR REFERENCE TO THE PREPARATION OF GUIDELINES FOR LAND USE, RESOURCE MANAGEMENT AND ENVIRONMENTAL PROTECTION AND SUPPORT FOR NATIONAL ENDEAVOURS IN THIS AREA. (Refernece paragraph xx of the Action Plan)

OBJECTIVES

To establish guidelines for coastal area development and natural resources management including the assessment of environmental implications.

To demonstrate methods of integrated planning.

To identify information media and data gathering techniques available elsewhere that could be applied in the Region, e.g. satellite imagery and mapping and other remote sensing techniques.

To apply methods of critical coastal area identification.

To examine intra-regional administrative requirements for integrated planning of human settlements and environmental assessment.

To study and report on cost/benefit analysis in coastal area development as applicable to the Region.

BACKGROUND

It has been estimated that over the next few years development activities along the coastal zone of the Caribbean Region will increase significantly. These activities will be centred on petroleum resources, sea transport, industrialization tourism, urbanization and ancillary services. Such extensive development over such a short period and in a relatively limited area must be accompanied by equally extensive threats to the coastal environment. The impact of these various activities must, of course, be considered individually, but because of their strong technical and geographical links they must also be considered on an intra-regional basis. The concepts of integrated planning and environmental management have not yet been generally applied in the Region or included in national programmes.

Because of the extent and diversity of existing and planned coastal development activities by most countries in the Region, there is an urgent need for them to select priority subjects for immediate attention. For this purpose, two workshops will be convened to deal with national coastal

area development planning which is related to elements of the Action Plan. The objective of the workshops will be to introduce planners and decision-makers to the methods and requirements for national development as well as assist them to more clearly identify the relationships between national and regional concerns.

ACTIVITIES

Preparatory workshop activities will include a survey of administrative arrangements in each country. Also, a compilation of data in the form of small-scale maps with overlays which can be used for modelling will be produced.

Two workshops will be held. The first will include three participants from each country whose expertise lies in a different coastal development activity such as: planning, transport, industrial development, waste treatment, environmental health, fisheries, agriculture, natural resources, or other.

In nominating participants the objective will be to form national working teams. Therefore, each team should represent a broad range of the expertise needed for planning coastal development activities, e.g. a regional (national) planner, an urban or industrial development specialist and a coastal (civil) engineer or marine-oriented scientist.

The first two and a half days of the workshop will be devoted to the presentation of coastal area management guidelines including needs for oceanographic, climatic, geological, biological and other relevant environmental data. A very broad range of activities related to coastal development will be presented and their independent impacts and interrelationships examined. These will include human settlements, industrial development, waste disposal, port and harbour siting and construction, fisheries and aquaculture, recreation, dredging, coastal mining and engineering. The objectives will be to introduce the participants to the concepts of integrated planning and the need for sound information and data bases, as well as to clarify the relation between regional and local environmental parameters and effects. In addition, administrative and legislative questions will be examined with regard to both local and regional issues.

After this introduction, methodology for planning across traditional sectoral boundaries will be discussed and applied by each national team to the specific administrative characteristics of its own country under the guidance and assistance of the workshop staff. This will take about six days.

Finally, the country teams will discuss with each other common problems and needs for information, training and co-operation. The future development of the Region will be examined with regard to the interrelations between regional and national planning and the common stake of all countries in the rational development of their common coastal and marine environment.

The second workshop will be formulated on the basis of results and experience gained in the first workshop. The second workshop will be similar to the first although the possibility exists that a separate workshop on more restricted topics such as remote sensing applications, human settlement planning or cost/benefit calculation may take place if requested.

Data for the second workshop will be derived not only from existing sources but also from the results of other components of the Action Plan such as outputs from APCEP projects 10, 13/1, 13/5, 18, 19, 20, 29, 30 and 33.

OUTPUTS

(a) First Phase

1. Guidelines and methods for integrated coastal area development and management.

2. Identification of training needs for coastal engineering and management.

3. Workshop and recommendations.

(b) Second Phase

1. Guidelines and methods for environmental impact assessment including:

human settlement planning;

remote sensing applications;

cost/benefit analysis;

coastal inventory and resource assessment.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization (tentative)
Pre-workshop data collections and identification of participants	0 - 2	UN
Map and overlay model preparation	3 - 5	UN
Nomination of participants	3 - 5	UN
Workshop preparation	6 - 7	UN
Workshop I	8	UN
Workshop recommendations	9 - 10	UN
Preparation for second workshop including: pre-workshop data collection; identification of participants; workshop tool preparations	12 - 18	UN
Workshop II		
Workshop recommendations	20 - 21	UN

Total cost of project $150,000.

jlt539; 30 May 1980

APCEP 16 - CATALYSIS OF ASSISTANCE TO NATIONAL INSTITUTIONS FOR THE RESTORATION OF DEGRADED COASTAL ECOSYSTEMS, ESPECIALLY MANGROVES AND CORAL REEFS, AS PART OF GENERAL COASTAL MANAGEMENT PLANS (Reference paragraph xx of the Action Plan)

OBJECTIVES

To develop appropriate mechanisms that will enable the Governments to speed up the restoration of degraded coastal ecosystems.

BACKGROUND

Because of the generally low level of mutrients in the marine waters of the Wider Caribbean, coastal mangroves, estuaries, coral reefs and turtle grass beds play a proportionately large (but undetermined) role in providing nutrients and breeding grounds for many species of marine life(2, 7).

Many of these coastal ecosystems have already been irrevocably destroyed in the Region, through land reclamation, port development, tourism development and coastal engineering projects. Others have been seriously damaged by the same activities and by industrial, agricultural and domestic pollution, while others remain relatively undamaged but are threatened by the continuous process of development.

The Action Plan explicitely recognizes the important role of these coastal ecosystems and calls for their protection and restoration where possible.

In the short-term, many of the Governments of the Region do not have the institutional capability to develop or implement programmes for the restoration of degreaded coastal ecosystems. This project is aimed at redressing the situation by developing mechanisms whereby assistance can be provided to national institutions to enable them to develop a capability in this field.

ACTIVITIES

In conjunction with APCEP 13/5 the feasibility of restoration of degraded coastal ecosystems will be determined as well as the methodologies to carry out such restoration.

Once this is established, representative coastal ecosystems, where experimental restoration programmes can be developed, will be identified.

Using the data forthcoming out of APCEP 1/1 and 1/2 as well as the information already compiled in the "Directory of Caribbean Marine Research Centres", appropriate national institutions will be identified and their capacity to implement this programme will be assessed.

Existing programmes, in the Region and elsewhere, which focus on the recovery of coastal ecosystems will be analysed.

Assistance will be provided in supplying pertinent information to interested national institutions by means of documentation, on-the-job training, participation in workshops and visiting experts.

Assistance will be provided in the development of specific project proposals requesting funds from national, regional or international organizations for restoration of degraded ecosystems.

OUTPUTS

(a) First Phase

1. Report identifying types of coastal ecosystems where experimental restoration programmes could be initiated.

2. List of national institutions that could undertake such activities.

3. Compilation of experiences in the Region and elsewhere applicable to the restoration of tropical coastal ecosytems.

(b) Second Phase

1. Development of networks of co-operating institutions in the Region.

2. Assistance in providing information and training.

3. Assistance in development of specific proposals for restoration of tropical ecosystems.

4. Mechanism for providing technical assistance to States and Territories of the Region.

93. WORKPLAN AND TIMETABLE
94.
95. | Activities | Starting and ending (from month 0) | Responsible organization |
96.
97.
98.
99.
100. | Assessment of feasibility of restoration and identification of potential sites for restoration | 0 - 4 | RCU |
101.
102.
103.
104. | Development of networks of co-operating institutions | 4 - 5 | RCU |
105.
106.
107. | Information exchange and training programmes | 4 - continuing | UNESCO |
108.
109.
110. | Provision of direct technical assistance | continuing | RCU |
111.
112.
113.
114. Cost of project $10,000.*
115.
116.
117.
118. *This is for the development of the training programmes only.
119. All other costs will be absorbed by the normal RCU budget.

jlt540; 2 June 1980

Fisheries

APCEP 17 - STUDIES ON THE LIFE-CYCLE OF COMMERCIALLY IMPORTANT SPECIES OF CRUSTACEANS, FISHES AND MOLLUSCS, WITH PARTICULAR REFERENCE TO THE ROLE PLAYED BY COASTAL ECOSYSTEMS SUCH AS MANGROVES, COASTAL LAGOONS, CORAL REEFS AND TURTLE GRASS BEDS (Reference paragraph xx of the Action Plan)

OVERALL OBJECTIVES

To determine the exact role played by coastal ecosystems such as mangrove, coastal lagoons, coral reef and turtle grass beds on the life-cycle of commercially important marine life.

OBJECTIVES

To assess the role that coastal ecosystems play on fishery reources.

BACKGROUND

Mangrove forests, coastal lagoons, coral reefs and turtle grass beds are very important habitats for several commercially important species of fish, crustaceans and molluscs. They also serve as nursery areas for many of the above species. Mangrove forests are linked upstream with the land and downstream with the sea so that nutrients are derived from upstream catchment or from tidal flooding, while organic materials are transported into the sea. This organic material forms the base of a complex detrital-based food web and represents a major source of food for a variety of marine and brackishwater organisms.

In recent years, however, stresses from coastal development activities on these ecosystems have increased. For example, certain areas of mangrove swamps have been totally cleared and reclaimed for various uses, such as housing, industries, agriculture and transportation needs (roads, harbours and airports). The effects of these actions on the Region's fisheries have not been determined. However, it is likely that the increasing disturbances by man's activities have contributed significantly to a decline of the fisheries which are dependent on the coastal ecosystems. This project attempts to fill this information gap in order to assess and quantify the role these ecosystems play in fisheries' productivity and propose appropriate management practices.

ACTIVITIES

A review of historical records and fisheries conditions surrounding the areas will be made.

Species of commercial importance associated with the coastal habitats will be identified from existing literature.

Criteria for selection of at least two study sites, one under developmental stress and another relatively undisturbed area, will be developed. One criterion of importance will be previous studies conducted in the area.

One or several species associated with the ecosystems will be studied and monitored at different stages of maturity. A sampling design for different stages of the selected species life-cycle as well as for the relevant physical and chemical environmental parameters will be developed. Existing information on the subject will be compiled and analysed.

As far as is feasible, the data will be supplemented by catch data from the fishermen operating in areas under study.

During the project, local personnel will be trained in the techniques of data sampling and analysis.

OUTPUTS

(a) First Phase

1. Review of existing literature on the subject of the role coastal ecosystems play in the life-cycle and productivity of commercial species of fish and shellfish.

2. Sampling methodology for biological, physical and chemical parameters.

3. Preliminary report assessing impact of man-made modifications on the biology of commercial species associated with coastal habitats.

4. Report on the impact of man-made modifications on the productivity of associated fisheries.

(b) Second Phase

1. Report describing interaction between fisheries productivity and coastal ecosystems, quantifying this relationship in terms of energy inputs, protection of larval and juvenile stages and assessing the impact of chemical and physical modifications on this interaction.

2. Recommendations for resource management.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization (tentative)
Compilation and review of existing data	0 - 4	FAO
Selection of sites and species to be monitored	4 - 6	FAO
Development of sampling methodology	5 - 8	FAO
Collection and analysis of data	8 - 22	FAO
Preparation of final report	22 - 24	FAO

Total cost of project $200,000.

jlt546; 2 June 1980

Watersheds

APCEP 18 - ASSESSMENT OF THE EFFECTS OF DISTURBANCES ON THE RELATIONSHIP BETWEEN FOREST COVER AND WATER AND SOIL RESOURCE UTILIZATION WITH A VIEW TO INTRODUCING ENVIRONMENTAL PLANNING CONCEPTS IN MANAGEMENT OF WATER SHEDS, PARTICULARLY ON SMALL ISLANDS AND COASTAL AREAS (Reference paragraph xx of the Action Plan).

OBJECTIVES

To determine the dynamics of the watersheds of the smaller Caribbean Islands and the coastal zones of the Wider Caribbean.

To assess the effects of disturbances on watersheds brought about by human activity, particularly in so far as water and soil utilization are concerned.

To provide scientific information to enable the introduction of sound environmental planning concepts to be introduced in to the management of watersheds.

BACKGROUND

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.

The overwhelming majority of the fresh water discharged into the sea is carried by comparatively few large rivers, remote from locations which require water supplies. 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 (2).

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

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.

Deforestation and development activities have resulted in severe erosion problems throughout the Region. The costly effects of erosion, apart from other problems mentioned below, is exemplified by the experience at the Archicaya Dam in Colombia. After only 21 months the reservoir was one quarter full of erosion sediment and after 10 years silt occupied three quarters of its capacity (2).

Deforestation throughout the Region has been rapid over the past ten years and the rate shows no signs of diminishing in the near future.

The total area under forest was 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 (2). 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 led to serious environmental damage. Nevertheless, reallocation of forest land may be beneficial if its consequences are considered and found acceptable.

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.

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 (3).

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 reafforestation efforts if the two activities are not undertaken at the same time (2).

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.

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.

Because studies of watershed dynamics are of a long-term nature, the project described here will only provide the basis and justification for long-term studies to be conducted.

ACTIVITIES

Previous studies which may have been conducted in the Region will be compiled and reviewed.

Methodologies which may have been successfully applied in the Region or elsewhere will be sought and an investigation will be made into the suitability of any predictive mathematical models.

Two study sites will be chosen for preliminary field studies. One will be in a relatively virgin area while the other will be in an area which has been developed. The choice of the locations will take into account, inter alia, the availability of historical meteorological, river flow records and land use records, and the topographical, climatological and geographical similarity of the sites.

The major variable relating to watershed dynamics will be measured over a twelve month period to enable a short-term comparative analysis to be made. The data will also be used to test one or more predictive models.

The variables to be measured will include:

(i) rainfall rates and temporal distribution;

(ii) temperature;

(iii) surface water run-off;

(iv) evapotranspiration;

(v) soil erosion rates;

(vi) sedimentation rates;

(vii) soil nutrients.

A comprehensive report will be prepared at the end of the project. The report, in addition to presenting the results of the project, will present recommendations for long-term studies including suggested methodologies including the use of predictive models, recommendations for training of field personnel and watershed management officials and the type, location and use of monitoring equipment.

OUTPUTS

(a) First Phase

1. Review of existing literature in watershed studies in tropical forest areas.

2. Preliminary predictive mathematical model(s) to be tested during the field studies.

3. Identification of field study sites.

(b) Second Phase

4. Comparative analysis of the dynamics of the two watersheds studied over a twelve month period.

5. Comparison of measured data with that predicted by model.

6. Report as described under activities section.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization (tentative)
Literature search	0 - 2	FAO
Analysis of methodologies and mathematical models	3 - 5	FAO
Selection of study sites	0 - 6	FAO
Field work (data collection)	7 - 18	FAO
Analysis of data	19 - 21	FAO
Preparation of final report	22 - 24	FAO

Total cost of project $100,000.

jlt547; 2 June 1980

APCEP 19 - DEVELOPMENT OF WATERSHED MANAGEMENT GUIDELINES ESPECIALLY FOR DRAINAGE AREAS SURROUNDING THE CARIBBEAN SEA WITH PARTICULAR REFERENCE TO:

- control of floods, soil erosion and sedimentation;
- prevention of the destruction of tropical forests and establishment of reafforestation programmes as appropriate;
- protection of the hydroelectric potential of the rivers;
- maintenance and improvement of adequate fresh water management on the surface and underground;
- maintenance of wildlife habitats;
- prevention of the pollution of the catchment from domestic, agricultural and industrial wastes.

(Reference paragraph xx of the Action Plan)

OVERALL OBJECTIVES

To reduce erosion and other highly detrimental effects from agricultural, forestry, urban and industrial development.

To develop and implement resource management systems.

OBJECTIVES

To develop, locally acceptable, appropriate guidelines for watershed management systems, especially for the coastal drainage areas surrounding the Wider Caribbean.

BACKGROUND

Deforestation and its attendant side effects such as erosion, sedimentation of rivers and estuaries, flooding, reduction in the hydro-electric potential of the rivers and destruction of wildlife habitats, has been recognized as one of the more serious environmental problems throughout the Region.

The viability of agriculture is dependent on the protection of the soil resource from erosion. The Region is largely dependent on imports for most of its food. Any reduction in its capability to produce portions of its

own food needs will have substantial adverse economic and nutritional impacts.

The quantity and quality of water supplies is dependent on good management of the watersheds and aquifer recharge zones.

Destruction of forest in the watersheds leads to a reduction in the water regulation capacity of the land and leads to increased surface run-off which often causes frequent and costly flash-flooding of the low-lying agricultural and urban areas.

This project aims to provide appropriate guidelines which the policy-makers of the Region can use to implement sound watershed management plans.

ACTIVITIES

In co-operation with the Governments of the Region, a regional search for comprehensive watershed management plans which have proven to be successful in their implementation in the tropical forest areas, will be undertaken. Plans from outside of the Region where the geographic, climatic and vegetation is similar, will also be obtained.

In the light of the outputs from APCEP project 18, the various plans will be assessed as to their suitability to the various conditions existing in the Wider Caribbean.

Guidelines for the development and management of watersheds and the training requirements for personnel will be developed for presentation to, and discussion by, regional planners and senior forestry and water resources personnel from the Region, at a seminar/workshop. If possible, the meeting should be held in a State or Territory which already has a well developed watershed management programme so that field visits can be undertaken by the participants.

The participants at the workshop will be requested to provide material related to manpower, skill levels and administrative procedures, and training programmes and methods used in their own countries.

Following the workshop, the guidelines will be further refined, training programmes will be developed and suitable training institutions, preferably within the Region, will be identified.

OUTPUTS

(a) First Phase

1. A compendium of existing watershed management programmes from the Region and from similar geographical and climatological regions of the world.

2. Guidelines for the development of comprehensive watershed management plans, including the recovery of degraded watersheds.

3. Identification of training requirements for personnel involved in watershed management.

4. Seminar/workshop on watershed management.

(b) Second Phase

1. Revised guidelines for the development of comprehensive watershed management plans, including the recovery of degraded watersheds.

2. Training programmes.

3. List of institutions at which training may be undertaken.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization (tentative)
Collection of existing watershed management plans	0 - 2	FAO
Analysis of plans to determine their suitability for application in the Region*	3 - 5	FAO
Development of planning guidelines and identification of training requirements	0 - 7	FAO
Preparation and convening of workshop/ seminar	7 - 8	FAO
Revised guidelines, finalization of training programmes and identification of suitable training institutions. Distribution of final report	9 - 12	FAO

Cost of project $75,000.

*Requires outputs from APCEP project 18.

jlt548; 2 June 1980

Natural Disasters

APCEP 20 - SURVEY AND EVALUATION OF THE DISASTER POTENTIAL OF NATURAL PHENOMENA (RISK ANALYSIS) IN ORDER TO DEVELOP AN ADEQUATE SHORT-TERM STRATEGY AND MEDIUM AND LONG-TERM PLANNING FOR THE PREVENTION AND MITIGATION OF RISKS (Reference paragraph xx of the Action Plan)

OVERALL OBJECTIVES

To conduct risk analyses of the disaster potential of natural phenomena such as earthquakes, volcanoes, hurricanes and tropical storms, and to survey and evaluate the existing national disaster preparedness plans and prevention measures with a view to developing stronger regional and/or sub-regional co-ordination and co-operation.

OBJECTIVES

To conduct risk analyses for geological and meteorological phenomena in the Region.

To determine the capabilities and needs in the Region for monitoring equipment, trained manpower and logistical support.

To analyse the resistance of typical housing and commercial building designs in the Region to geological and meteorological phenomena.

To develop low-cost building technologies which are resistant to natural disasters, based on indigenous building materials, where possible.

To investigate the feasibility of establishing a regional or sub-regional Task Force for volcanic emergencies.

To develop training programmes, particularly for earthquake monitoring personnel.

To survey and evaluate existing legislation and regulations in the Region relevant to disaster prevention policies.

BACKGROUND

The States and Territories of the Wider Caribbean Region are exposed to the most violent kinds of geologically and atmospherically induced natural phenomena, namely: earthquakes, volcanic eruptions, hurricanes, tropical

storms, and landslides. The worst examples of disasters resulting from such phenomena in the Region have caused loss of life running into tens of thousands and property and agricultural losses amounting to many hundreds of millions of dollars (3).

Almost every capital city around the Region has been devestated at least once during the last three hundred years by major earthquakes. Destructive eruptions of volcanoes in the Lesser Antilles and in Central America have caused large-scale loss of life and property. Hurricanes and tropical storms cause, annually, massive destruction of agriculture, loss of life and property damage.Landslides and floods are a common occurence throughout the Region (3).

Although there is no means of preventing the occurrence of most of these events, it is now possible through careful monitoring and planning to reduce, considerably, the scale of the disasters they may cause, and especially the loss of human lives. In many parts of the Region, relatively little progress has been made towards carrying out monitoring, particularly of seismological phenomena, along modern lines, or where basic monitoring exists, towards analysing the data thus obtained, for prompt and detailed risk evaluation.

The most important aspects to be covered by effective disaster prevention measures include:

(a) hazard risk analysis and the preparation of risk micro-zoning maps taking into account all hazards existing in given locations;

(b) land-use and zoning laws to restrict and/or prevent industrial and/or residential development in areas where risk is high, such as: flood plains and low-lying coastal areas subject to storm surges; or geological fault lines subject to earthquakes or tremors;

(c) building codes setting out minimum safety standards in areas vulnerable to tropical cyclones and/or earthquakes;

(d) soil and plant conservation measures to guard against erosion and landslides;

(e) engineering measures relating to the management and control of rivers, canals and other areas vulnerable to flooding or storm surge;

(f) public health measures concerned with sanitation (air, water and waste disposal) and related matters.

To be effective, the above aspects must be embodied in appropriate legislation and they must be in the context of the prevailing socio-economic conditions of the countries.

The purpose of these activities is: to review those aspects of hazard assessment and mitigation which are judged to be capable of reducing environmental risks of seismic, volcanic and meteorologic origin in the

Region; to co-ordinate on a regional level and, where necessary, strengthen ongoing programmes and activities; and to encourage regional co-operation for the development of response mechanisms by civil and governmental authorities to ensure the full use of scientific information.

ACTIVITIES

1. General

In consultation with Governments of the Region, and by using existing surveys/studies and in co-operation with international, regional and subregional bodies such as UNDRO, WMO Region IV Hurricane Committee, Caricom, etc., legislation and regulations relating to the development of sound disaster prevention policies, will be compiled, and reviewed.

The results of the survey together with recommendations for further action, where deemed necessary, will be placed before the Governments of the Region for their consideration.

2. Risk analysis for geological phenomena

(a) Analysis of existing earthquake data for medium- and short-range prediction in the Region.

The parameters, location, time and energy, of recent earthquakes will be analysed with a view to identifying areas of anomalous activity, such as seismicity gaps, to assist with longer-range prediction.

For short-range prediction, searches will be initiated for distinctive activity patterns prior to recent major earthquakes. Computer-based techniques will be developed for characterizing such foreshock sequences and for recognizing comparable future recurrences.

(b) Analysis of needs for data collection in those parts of the Region where no specific monitoring programme has been implemented or planned. Through visits to selected States and Territories in the Region, a plan for the installation and operation of national and regional networks of modern equipment will be developed. This will be designed to enable the collection of comprehensive, relevant data on earthquake locations and energy. Equipment, personnel and logistical support needs will be determined. Based on field trips, specific sites for field stations will be identified, and assessments of the most appropriate types of equipment will be made.

The most suitable techniques for data processing will be outlined. Training programmes will be developed for permanent national staff who will operate and maintain the network.

Where the data base is sufficient seismic micro-zoning maps will be established. (This activity is to be carried in conjunction with and will be integrated with the activity outlined in III(a) below, the objective being to establish, wherever possible, composite vulnerability maps, i.e. maps taking into consideration all types of risks in each location).

(c) Analysis of the resistance of typical housing and commercial building designs in the Region to strong earthquakes. Emphasis will be placed on existing low-cost and rural housing.

A survey will be made of the availability and comparative cost of various local building materials.

Consultants with experience in earthquake engineering, regional seismicity and earthquake damage analysis will be engaged to collect and analyse data for the more popular types of construction in the Region.

The project report will compare the performance of each type of building in theory and, wherever possible, in practice. It will discuss the respective merits and disadvantages of each type of construction in terms which can be readily understood by local planning authorities, architects and small builders.

Recommendations for disaster resistant building technologies will be made. These will also be based on a survey of building designs which have proven to be satisfactory in other areas of the world.

An investigation will also be made into the applicability of housing systems developed by UNIDO using reinforced plastic. Such systems are in use in Cyprus, Uruguay, Ecuador and Upper Volta where local materials are used as the reinforcing material.

Recommended designs for disaster relief housing will also be drafted.

(This activity will be undertaken in conjunction with and will be integrated with the activity outlined in 3(b) below).

(d) Feasibility study on the establishment of a volcanic emergencies task force for Central America and the Lesser Antilles.

Consultants will be recruited, with combined experience in instrumentation and techniques for volcano monitoring, in management of field operations on active volcanoes, and in liaising with civil authorities for risk assessment.

The consultants will prepare a report identifying the potentially dangerous volcanoes of the Region and reviewing the particular risks involved. They will describe and assess the various methods for volcano monitoring and give specific recommendations, with costs, for the establishment of a pool of portable monitoring equipment and the formation of an international (preferably regional) panel of specialists who will be on call to participate at short notice in emergency operations.

3. Risk analysis for meteorological phenomena

(a) Vulnerability to winds, storm surges and flooding. At the macro-level risk analysis will involve the determination on a country by country basis, of each country's historical susceptibility to hurricane or tripical storm strikes.

At the micro-level, the most vulnerable parts of each country will be ascertained. This will include vulnerability to damage from winds and storm surge and the magnitude and extent of flooding to be expected from heavy and sustained precipitation. Risk maps will be produced. (This activity will be carried out in conjunction with, and will be integrated with, the activity outlined in 2(b) above).

Long-term meteorological and hydrological records will be used, and where found lacking an attempt will be made to use data from neighbouring countries if it can be established that their climatological patterns and physio-geographic characteristics are similar.

Incorporating appropriate modifications, the methodology used will be similar to that used in the WMO/UNEP Project on "Flood Forecasting and Hurricane Early Warning Systems for Central America" which was completed in September 1978.

(b) Analysis of the resistance of typical housing and commercial building designs in the Region to the effects of hurricanes and tropical storms.

This activity will be undertaken in conjunction with, and will have the same terms of reference as, item 2(c) above.

OUTPUTS

1. Identification of States and Territories and individual areas of States and Territories most vulnerable to the disastrous effects of earthquakes, volcanic eruptions, hurricanes and tropical storms, particularly in the form of composite vulnerability or risk maps.

2. A review of the regional manpower, equipment and logistical support capabilities and needs for operating and maintaining national and regional networks of field stations required to provide a sound scientific basis for disaster prevention planning.

3. Identification of specific sites for seismological field stations.

4. Development of suitable methodologies for the processing of data to be collected on a continual basis.

5. Development of training programmes for the regional personnel who will operate and maintain the seismological field station networks.

6. Comparative analysis of the resistance of housing and commercial building to severe natural phenomena, and recommendations for low cost improvements to vulnerable structures.

7. A review of national legislation and regulations relevant to the prevention of natural disaster.

8. Manual on designs and production methods for low-cost disaster-resistant housing.

283. WORKPLAN AND TIMETABLE
284.
285. | Activities | Starting and ending (from month 0) | Responsible organization |
286. |---|---|---|
287.
288.
289.
290. | Compilation and review of legislation | ongoing in the Eastern Caribbean | UNDRO |
291.
292.
293. | Analysis of existing earthquake data | 0 - 9 | UNESCO |
294.
295. | Preparation of seismic micro-maps | 10 - 12 | UNESCO |
296.
297. | Analysis of needs for seismic data collection | 10 - 12 | UNESCO |
298.
299.
300. | Analysis of resistance of buildings to earthquakes and hurricanes | 0 - 9 | UNIDO/UNDRO/ UNCHS |
301.
302.
303. | Feasibility study for volcanic emergency task force | 0 - 2 | UNESCO/UNDRO |
304.
305.
306. | Risk analysis for meteorological phenomena | 0 - 12 | WMO |
307.
308.
309. | Preparation of meteorological risk maps | 13 - 15 | UNDRO/UNESCO/ WMO |
310.
311.
312. | Preparation of final report | 16 - 18 | UNDRO/UNESCO/ UNIDO/WMO |
313.
314.
315. | Preparation of design manual and preparation of prototype structures | 11 - 24 | UNIDO |
316.
317.
318.
319.
320. Total cost of project $550,000.

jlt549; 2 June 1980

APCEP 21 - CONTINUED CO-OPERATION WITH THE PERTINENT AGENCIES, IN THE SURVEY AND EVALUATION OF EXISTING STRATEGIES AND PROCEDURES OF PREPARATION FOR NATURAL DISASTERS AND OF THE INTRINSIC EFFECTS OF DISASTERS WITH A VIEW TO DEVELOPING MORE APPROPRIATE NATIONAL, SUB-REGIONAL AND REGIONAL RESPONSE MECHANISMS IN A FORM COMPATIBLE WITH ENVIRONMENTAL PROTECTION. (Reference paragraph xx of the Action Plan)

OBJECTIVES

To survey and evaluate the existing national disaster preparedness strategies and plans in the Region.

To compile lists of agencies and organizations responsible for developing and implementing such strategies and plans.

To determine the capabilities and needs of the States and Territories in the Region in the area of plan preparation and implementation.

BACKGROUND

The countries of the Caribbean are subjected to various types of natural phenomena which can have disastrous affects causing extensive loss of life and severe economic losses. Although there is no means of preventing these natural occurrences, it is possible, through appropriate planning and preparedness strategies, to reduce the magnitude of its disastrous affects. The countries of the Region have developed, to various degrees, preparedness strategies and contingency plans to deal with disaster emergencies.

Still there is an urgent need to incorporate additional measures in these strategies and to develop improved national and regional response mechanisms. One particular area which requires strengthening is that of education and public awareness. Loss of life during hurricanes or floods, for example, is largely due to the lack of public awareness as to the real dangers associated with these natural phenomena, and failure to reach isolated communities once an event has been forecasted.

ACTIVITIES

In co-operation with international regional and sub-regional bodies such as UNDRO the World Meteorological Organization's Region IV Hurricane Committee, the CARICOM disaster preparedness committee and other relevant

agencies and organizations, comprehensive surveys and subsequent evaluations of all existing national disaster preparedness strategies and plans will be carried out.

Based on the surveys, comprehensive lists will be compiled of agencies and organizations, responsible for developing and implementing such strategies and plans, on a country by country basis.

Through field missions and discussions with selected agencies and organizations responsible for developing and implementing plans, the capabilities and needs of the States and Territories of the Region to prepare, revise and implement disaster preparedness plans in the light of constantly changing circumstances, will be evaluated, and recommendations for action will be made. Particular emphasis will be placed on the capability to determine evacuation routes, evacuation times and safe refuges in the face of approaching hurricanes and tropical storms and the organization of relief in a fast and effective manner once disaster has struck.

As a tool for helping the authorities, an investigation will be made of the feasibility of establishing/designating one or two centres to prepare audio-visual and other literature for use in public awareness campaigns aimed at alerting the public to the real dangers associated with earthquakes, volcanic eruptions, hurricanes and tropical storms, and impressing upon them the need to keep themselves fully informed of the procedures to be followed before, during and after such eventualities.

OUTPUTS

1. Lists of agencies, organizations, etc. responsible for disaster preparedness planning and implementation.

2. Evaluation of the plans in existence in the Region with recommendations (where appropriate) for changes.

3. A review of regional manpower capabilities and needs for effective plan preparation.

4. A report on the feasibility of establishing a regional centre for the production of public awareness campaign material.

5. Recommendations on the desirability of establishing regional disaster response mechanisms taking into account inter alia, the specific responsibilities of UNDRO in this field at the international level.

99. WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Survey of existing national disaster preparedness strategies and plans	ongoing commenced in 1979	UNDRO
Design of regional response mechanisms.	0 - 8	UNDRO
Organization of technical experts meetings	as needed	UNDRO
Development of recommendations for establishing a permanent mechanisms for regional disaster preparedness, relief and prevention at the regional level	9 - 15	UNDRO
Development of training programmes	9 - 15	UNDRO
Organization of technical experts meetings	as required	UNDRO
Preparation of final report	16 - 18	UNDRO

Total cost of project $408,000.*

*Because of substantial overlap with APCEP project 20 the total cost for projects APCEP 20 and APCEP 21 will be significantly less than the total combined cost given in this document.

j1t550; 2 June 1980

APCEP 22 - STRENGTHENING OF EXISTING REGIONAL OR SUB-REGIONAL CO-OPERATION FOR NATURAL DISASTER PREVENTION AND RELIEF, AND FOR ENVIRONMENTAL RECOVERY FOLLOWING DISASTERS. (Reference paragraph xx of the Action Plan).

OBJECTIVES

To build on existing and planned co-operation within the Region for the prevention of, relief and recovery from natural disasters.

BACKGROUND

A number of co-operative activities have been undertaken in the past and a number are ongoing at present in the Region, related to the disastrous effects of natural meteorological and geological phenomena.

Virtually the entire Region is at risk from the devastating effects of earthquakes, hurricanes and tropical storms. Nevertheless, there are no well-developed, co-ordinated mechanisms for providing the urgent relief needed after a disaster has struck. Even less developed are co-operative mechanisms for preventive measures and environmental recovery.

This project aims to strengthen and, where absent, foster co-operation at the regional and subregional evel, drawing on the results of previous work and relying on the outputs generated by APCEP projects 25 and 26.

ACTIVITIES

A regional meeting of Government officials concerned with natural disaster prevention, relief and recovery, will be convened to discuss a plan of action for regional co-operation. The meeting will be provided with a document outlining the existing arrangements for co-operation between different groups of countries such as, for example, the WMO Region IV's plans for hurricanes and tropical storm preparedness. The participants at the meeting will draw up a draft plan for mutual co-operation for recommendation to their Governments for implementation. The outputs from APCEP project 21 will be used as a guide for a Region-wide plan.

OUTPUTS

Plan of action for regional co-operation on natural disaster prevention, relief and recovery.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Collection, review and summarizing of existing arrangements for co-operation within the Region (with inputs from APCEP 21)	0 - 3	UNDRO
Drafting of Region-wide plan (concurrently with relevant activity of APCEP 21)	4 - 6	UNDRO
Organization and convening of meeting of Government officials	5 - 7	UNDRO
Preparation of master plan of action for submission to Governments	7 - 9	UNDRO

Total cost of project $50,000.

jlt551; 2 June 1980

Energy

APCEP 23 - ASSESSMENT OF MAJOR SOURCES OF NON-CONVENTIONAL ENERGY AND THEIR POTENTIAL FOR UTILIZATION. (Reference paragraph xx of the draft Action Plan)

OVERALL OBJECTIVES

To assess in detail the energy potential of the major resources of non-conventional energy in the Region, their location and availability.

To assess the viability of the available technologies for maximum utilization of all non-conventional energy resources in the Region.

BACKGROUND

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.

At present oil and gas provide most of the energy required for development. Petroleum accounted for nearly 55 per cent of regional energy consumption in 1977, natural gas for 12 per cent, solid fuels 20 per cent, hydro 13 per cent and nuclear less than 1 per cent (4).

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 per cent of the domestic energy used in rural areas. It is likely that several countries will increasingly turn their attention 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 (4).

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 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 combustion engines (automobiles), while the latter could easily meet many of the local energy needs of farms and small communities (4).

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 (4).

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 reiver valleys can contribute to the spread of certain tropical diseases by providing habitats for disease vectors, to climatic and ecosystem changes and 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.

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.

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 dyring and solar pumps could, in many instances, be considered as economically and environmentaaly-sound alternatives.

During the past five years, spurred on by the severe economic consequences of the rapidly increasing cost of imported fossil fuels (mainly oil), a not inconsiderable amount of research has been conducted by the States and Territories, and by individuals in the Region. A fair degree of co-operation between countries has been achieved, and some preliminary institutional networks have been established, particularly between the island States and Territories and Guyana. Such activities need fostering, strengthening and expanding to cover the entire Wider Caribbean Region.

Based on a preliminary assessment of the energy situation in the Region, table 8.1 was developed for the Caribbean Environment Programme Action Plan by UNIDO (4). It is a first attempt to put in matrix form, the potential

of various energy resources and their present state of exploitation. From the table it is possible to determine the commonality of interests of different groups of States and Territories, thereby indicating the areas in which they may benefit through mutual co-operation both vertically - between countries with similar problems, but different experiences in the same sectors - and horizontally - between countries with similar problems and experiences in the same sectors.

Since it is not anticipated that non-conventional energy will be able to replace conventional energy to any considerable degree during this century, conservation is expected to play a significant role for that period. However, this aspect will not be covered by this project, but has been included in APCEP project 29.

This project has been sub-divided, for convenience, into two action elements:

APCEP 23/1 - SURVEY OF NON-CONVENTIONAL ENERGY SOURCES IN THE REGION

APCEP 23/2 - ASSESSMENT OF THE POTENTIAL OF THE MAJOR SOURCES OF NON-CONVENTIONAL ENERGY IN THE REGION

APCEP 23/1 - SURVEY OF NON-CONVENTIONAL ENERGY SOURCES IN THE REGION

OBJECTIVES

To make as comprehensive as possible an inventory of the major sources of non-conventional energy resources under the general classification of: hydrological, geothermal, biomass, solar and others.

To map the resources in as great a detail as possible.

ACTIVITIES

Starting from the available surveys and reports obtained by, and for, the Caribbean Environment Project during the period 1976 to 1979, and in consultation with the Governments of the Region, the gaps in information will be filled and existing data further refined.

Particularly with regard to the availability of biomass, cost-benefit analyses will be carried out to ensure that competing beneficial economic uses for the resources are fully accounted for.

Inventories of the known resources, their quantities and locations will be compiled, and maps prepared. These inventories and maps will be presented to the Governments of the Region together with suggestions as to the sectors in which it is considered that they could concentrate their efforts and collaborate with other States and Territories.

OUTPUTS

A comprehensive inventory of major non-conventional energy resources giving their magnitude and location with comments where appropriate as to their best use.

A map set indicating the location of major non-conventional energy resources.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Contact Government and non-governmental institutions	0 - 4	UNIDO
Contract UNIDO consultant	0 - 4	UNIDO
Field missions to area to assess location and quantity of non-conventional energy sources and to determine alternative uses (in conjunction with relevant activity of APCEP 23/2)	4 - 11	UNIDO
Preparation of maps and assessment of socio-economic benefits	8 - 12	UNIDO

Total cost of project US $30,000.

APCEP 23/2 - ASSESSMENT OF THE POTENTIAL OF THE MAJOR SOURCES OF NON-CONVENTIONAL ENERGY IN THE REGION

OBJECTIVES

To assess the viability of the available technologies for maximum utilization of all non-conventional energy resources in the Region.

To make a comprehensive inventory of ongoing projects in the energy sector in the Region.

To recommend: those aspects of the technologies that show the most promise for short- and medium-term application; those which require further development primarily through the construction of pilot projects; and appropriate mechanisms for collaboration between groups of States and Territories for the efficient development of the most promising technologies.

ACTIVITIES

For convenience, the activities are presented under separate sub-headings according to the type of energy resource. These sub-headings are: hydrological; geothermal; biomass; solar; and others.

1. Hydrological Resources

Although some countries within the Region have potential for large-scale hydropower, this project will be concerned only with small-scale mini- and micro-hydropower systems which are more applicable for local applications and are the only hydropower sources available to the smaller Caribbean Islands.

An international search of the literature on the subject will be undertaken and a limited number (2 or 3) of suitable sites will be identified for the establishment of pilot/demonstration plants.

Training programmes will be developed and a workshop/seminar on the subject will be organized.

2. Geothermal Resources

Geothermal electricity production could be a good alternative form of energy, particularly in some States and Territories with limited energy resources, such as the smaller islands. However, prospecting normally takes a long time and, depending on the geology of the Region, calls for major capital investment and sophisticated technology. On the other hand, the capital and management costs of the power plants appear to be competitive with other energy sources.

Nevertheless, some problems connected with the operation of these plants have yet to be solved. In many cases, the release into the environment of heavy metals, sulphuric acid, ammonia, and other pollutants, can give rise to serious environmental problems if adequate precautions are not taken. Moreover, the presence of corrosive compounds in the gases requires meticulous equipment design. However, studies and research devoted to geothermal exploitation and the solution of subsequent technological and environmental problems is highly desirable.

The major activity envisaged in this project is the establishment of a multinational research programme to study the technical problems of plant operation and ways to ameliorate the deleterious environmental impact of geothermal energy utilization.

This will be achieved by mounting a workshop/seminar bringing together all those persons from within the Region who have been involved in the development of this technology, together with other interested technicians from the Region and personnel with field experience from other parts of the world.

Specific problems related to the technical and environmental aspects will be undertaken by institutions in the Region with technical assistance being provided, where necessary, from the international system.

3. Biomass Resources

Since the economies of many Caribbean countries are, to a large extent, based on export agriculture, the possibility of utilizing agricultural products and/or residues for the production of energy in principle is very high. However, other studies have still to be conducted before biomass can be utilized on a large scale. Furthermore, the social impact of the use of this energy should be considered, since it involves not only the introduction of different technologies, but it also touches upon the question of local acceptance.

In any event, the exploitation of biomass could be a positive alternative for most of those countries which, for reasons of geography, history, energetics and economics, have limited prospects of being self-sufficient in terms of their energy supplies. Biomass has been, and still is being, used to meet some basic energy needs in the developing countries. It is hoped that this alternative form of energy will be more efficiently utilized in the future, replacing other commercial forms of energy that are more expensive, non-renewable, and unevenly distributed.

Biomass can be utilized in different ways depending on the input and the final forms of energy desired. Three different uses are: direct combustion; aerobic fermentation; and anaerobic fermentation.

(a) Direct Combustion:

Recommendations will be made for the establishment of one or two pilot/demonstration plants for research, development and training in areas where the resource is known to be abundant. Emphasis will be placed on the following aspects:

furnace design, combustion efficiency and

scale-up parameters; and

environmental impact.

(b) Aerobic Fermentation (production of industrial alcohol for use as fuel):

The feasibility of the establishment of one or two pilot/demonstration plants in the Region will be investigated after an analysis has been made of the existing technologies available. Project proposals will focus on the use of different types of feedstock and scale-up as well as other technical problems.

Simultaneously, proposals for applied research on the uses of alcohol as fuel and its impact on existing technological and economical structures will be made, after a comprehensive literature search on the subject has been completed.

(c) Anaerobic Digestion (generation of biogas from vegetable and animal wastes):

A fairly significant amount of research is already on-going in the Region on anaerobic digestion. The first activity envisaged for this programme element will be the identification of all on-going research on the subject in the Region.

Following an analysis of these activities, a co-ordinated research and development programme will be developed focusing on the following technological problems: collection of raw material, disposal of sludge, distribution and use of gas, control of reactor conditions (such as pH, temperature, concentration), scale of operation and capital investment.

Detailed socio-economic studies will be proposed for selected countries particularly those with very limited alternative energy resources.

The results and proposals will be presented before a meeting of technical Government experts from those States and Territories from the Region, interested in participating in the project.

4. Solar Energy Resources

The geographic location of the Caribbean Region is conducive to the exploitation of solar energy. The problems are strictly technological and economic since solar technology is still underdeveloped and non-competitive. Even though it is unlikely that solar energy will replace conventional forms of energy in the near future, it can already be used on a small scale in the domestic and agricultural sector (e.g. water heating, crop drying, solar pumps). Other more sophisticated applications, such as air conditioning or the production of electricity, will emerge in the medium or long term.

In many of the Caribbean countries, much of the basic work has still to be done in order to determine the exploitable potential. This first step should be followed by applied research in the field into larger scale applications, primarily in the agricultural sector and in areas where solar energy offers major prospects of development for want of other forms of energy.

A comprehensive inventory of on-going research and development work in the Region will be undertaken. An international literature search of solar energy systems presently being used in the tropical countries of the world will be carried out.

Recommendations will be made with regard to extensive field testing of those solar devices which appear to offer the best returns.

An assessment will be made of the problems associated with scaling up of prototype devices.

Meteorological data collecting systems and networks, essential to the efficient planning of the use of solar energy, will be recommended.

5. Other Energy Resources

Preliminary studies on the technologies and feasibility of using potential energy resources such as wind, waves and ocean thermal gradients will be undertaken.

Various types of energy storage systems will also be investigated with a view to recommending research programmes for the most feasible.

OUTPUTS

A system for co-ordination of non-conventional energy research and development in the Wider Caribbean Region.

An inventory of on-going projects and other activities on non-conventional energy research in the Region.

Technical manual presenting the most viable technologies for the utilization of non-conventional energy resources, together with an assessment and recommendations for the most appropriate research and development which should be undertaken.

Proposals for pilot projects which can form the basis for continuing research, development and training programmes within the Region.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Contact Government institutions through UNIDO SIDFA's	0 - 4	UNIDO
Contact non-governmental institutions - extension to earlier contacts from Energy and Environment Overview (4)	0 - 4	UNIDO
Contract consultants	0 - 4	UNIDO
Field missions to area to assess work on non-conventional energy utilization (jointly with relevant activity in APCEP 23/1)	4 - 11	UNIDO
Preparation of catalogue, technical manual and overall survey report	8 - 13	UNIDO
Organization and convening of workshops	9 - 13	UNIDO

Total cost of project US $200,000.

jlt552; 2 June 1980

APCEP 24 - CO-OPERATION AND TECHNICAL ASSISTANCE IN THE APPLICATION OF ENERGY ACCOUNTING SYSTEMS WHICH MAY BE USED AS THE BASIS FOR THE FORMULATION AND IMPLEMENTATION OF SOUND NATIONAL ENERGY POLICIES AND PROGRAMMES. (Reference paragraph xx of the Action Plan).

OBJECTIVES

To assist the States and Territories of the Region to develop and implement energy accounting systems to enable them to formulate and implement sound energy policies.

To promote the collection of relevant energy statistics so as to allow compatibility of data between the States and Territories of the Region.

BACKGROUND

The majority of the States and Territories of the Region are dependent on imports for their energy supplies. Petroleum and, to a lesser extent, natural gas dominate the energy scenario of the Region and this picture is unlikely to change within the next two decades. As a result, most of the countries are seeking alternative (non-conventional) energy sources.

However, it is felt that energy conservation can be a valid partial alternative solution to some of the problems, particularly in the short- to medium-term (4).

In order to implement rational and meaningful energy conservation policies or to ensure that fruitful research into alternative energy systems is carried out, it is necessary to develop energy accounting systems.

At the national level, this involves the identification of the relevant institutions which should become involved and of the type and methods for collection and processing of data.

In order to allow for regional co-operation and TCDC activities, it is essential that common methodologies be adopted in the Region.

Through the initiative of the Commonwealth Science Council and with assistance from the Commonwealth Fund for Technical Co-operation, a programme for the English speaking Caribbean States and Territories has already been established. Further stimulus has been provided through funding by the USAID programme which is being adminsstered and managed by the Caribbean Development Bank and CARICOM. A similar programme is being developed for the Central American countries.

UNSO has been engaged in drafting guidelines for energy statistics on a worldwide basis and has recently held two workshops (Port-of-Spain, 7 - 11 January 1980 and Santiago, April 1980) to receive the inputs of member countries' technical government officers.

This project aims to bring together the participants in all the programmes currently ongoing or being planned by and for the States and Territories of the Region, with a view to ensuring compatibility, providing cross-referencing and providing technical assistance where necessary.

ACTIVITIES

A workshop will be convened to which all States and Territories from the Wider Caribbean will be invited, together with personnel from the relevant international, regional and sub-regional organizations.

The participants will identify ongoing and planned programmes and will develop a common methodology for designing and maintaining energy accounting systems.

Areas in which technical assistance is required will be designed and suitable mechanisms for its provision will be identified.

A plan for future co-operation and data exchange will be formulated.

OUTPUTS

1. Common methodology for data collection and analysis for energy accounting.

2. Mechanism for regional co-operation for the development of energy accounting practices.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization (tentative)
Preparation of material for workshop	0 - 3	UN
Workshop	4	UN
Preparation of report and finalization of plan for data exchange network	4 - 6	UN

Cost of project $50,000.

jlt553; 14 May 1980

APCEP 25 - REINFORCEMENT OF REGIONAL AND SUB-REGIONAL INTEGRATED NON-CONVENTIONAL ENERGY ACTIVITIES WITH THE OBJECTIVE OF A FULLER EXCHANGE AND DISSEMINATION OF ALL AVAILABLE INFORMATION AND PROVISION OF TRAINING OPPORTUNITIES. (Reference paragraph xx of the Action Plan).

OBJECTIVES

To create a mechanism whereby all research activities on the development and use of non-conventional energy may be co-ordinated. Such a mechanism is to enable a fuller exchange and dissemination of information thereby: helping to eliminate unnecessary duplication of effort; providing training opportunities on pilot projects; and leading to a more efficient research and development effort.

BACKGROUND

A considerable amount of research is at present being conducted in the Region on non-conventional energy technologies. Generally speaking, the work is fragmented and unco-ordinated and there is evidence to suggest that there is a significant amount of duplication of effort, particularly with regard to solar energy and biogas research.

The main objectives of APCEP project 23/2 is to identify all ongoing research in the Region, to assess the existing technologies and to suggest the establishment of pilot projects for the most viable technologies for short- to medium-term development.

This project will be concerned with the creation of a mechanism for regional collaboration and the provision of training courses for personnel from within the Region.

ACTIVITIES

Starting with the outputs from APCEP project 23/2, a regional experts meeting will be organized.

A plan of action for regional co-operation on alternative energy research and development will be discussed and the participants will elaborate on:

(a) a mechanism for co-ordination of effort;

(b) training programmes for personnel from within the Region;

(c) the establishment of regional pilot projects;

(d) a mechanism for information dissemination.

OUTPUTS

Plan of action for regional co-operation on alternative energy research and development.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Receive information from APCEP 23/2	0 - 3	UNEP(RCU)
Development of draft Action Plan	4 - 6	
Workshop for energy experts	7	
Preparation of final Action Plan	8 - 9	

Cost of project $75,000.

jlt554; 2 June 1980

APCEP 26 - DEVELOPMENT OF A CO-OPERATIVE PROGRAMME FOR THE IMPLEMENTATION OF APPROPRIATE TECHNOLOGIES AND PRACTICES FOR WASTE DISPOSAL WITH SPECIAL ATTENTION TO RECYCLING, ENERGY GENERATION AND THE SPECIAL PROBLEMS OF THE SMALLER ISLANDS. (Reference paragraph xx of the Action Plan).

OBJECTIVES

To develop safe, efficient waste disposal systems throughout the Region using the most appropriate technologies.

To encourage the recycling of waste materials.

To encourage, where feasible, the generation of energy from waste materials.

BACKGROUND

In the Wider Caribbean, the collection and disposal of solid waste constitutes a growing problem necessitating urgent attention. Apart from health and aesthetic considerations, problems of air, water and soil pollution arise from inadequate disposal methods. Economic considerations may also be an important parameter in tourist and resort areas (1).

Detailed and comprehensive information on a regional basis is not available, but analysis of existing data reveals that the management of solid waste lags behind all other public services. Studies in several countries confirmed that the administration of the services is generally deficient, collection and idsposal unsatisfactory, and most of the personnel untrained (1).

A recent study in the Commonwealth Caribbean estimated the situation with regard to final disposal as follows:

60% deposited in open dump;

2% incinerated;

5% sanitary landfill;

3% processed for recovery;

30% deposited on roadways, in rivers and canals and on beaches (1).

The Ten-Year Health Plan for the Americas (official document number 118, January 1973, PAHO) recommended that satisfactory and suitable systems for the collection, transportation, processing and disposal of solid wastes, in at least 70 per cent of the cities with more than 20,000 inhabitants, be established.

The HABITAT Conference (Vancouver, 1976) recommended "the prevention of pollution by minimizing the generation of waste ..... whenever possible (it should be) turned into a resource" and further that there should be "incentives and disincentives for location of waste generating enterprises and better use of technology to reduce the volume of waste generated."

The intention of this project is to stimulate the creation of a co-operative programme in the Region to investigate the possibilities and to establish appropriate technologies for waste disposal. Special attention will be paid to recycling, energy generation and the special problems of the smaller islands and other small communities, the size of which militate against the use of many existing technologies.

ACTIVITIES

APCEP projects 10, 13/2 and 34 will provide the essential inputs concerning the generation, collection and present disposal practices carried out in the Region.

An international search of the literature will be made for available technologies for waste disposal including recycling, composting and energy generation. Their viability for application within the Region will be assessed and recommendations made for the establishment of pilot projects.

Ongoing research and development work within the Region will be identified, and recommendations will be made for the establishment of a network of co-operating institutions.

A workshop will be organized at which the results of the studies and recommendations for future action will be discussed, after which a comprehensive programme, including technical assistance and training, will be implemented.

OUTPUTS

A manual of existing appropriate technologies for waste disposal, including recycling and energy generation.

Recommendations for the establishment of pilot projects.

A comprehensive co-operative programme for the Region.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization (PAHO?)
Identification of ongoing research and development in the Region	0 - 4	
International literature search	2 - 7	
Assessment of existing technologies	4 - 9	
Analysis of data from APCEP projects 10, 13/2 and 34	8 - 11	
Preparation of manual of appropriate technologies for waste disposal	8 - 12	
Report presenting recommendations for regional co-operative programmes including pilot projects	9 - 12	
Workshop	13	

Cost of project $75,000.

jlt555; 2 June 1980

Human Settlements

APCEP 27 - ASSESSMENT AND EVALUATION OF THE PRESENT CHARACTERISTICS AND FUTURE POPULATION TRENDS, CONSIDERING ELEMENTS OF GROWTH, DISTRIBUTION, DENSITY AND MIGRATION WHICH ARE OF ENVIRONMENTAL SIGNIFICANCE, WITH PARTICULAR ATTENTION TO THE SPECIAL PROBLEMS OF ISLANDS AND THE ENVIRONMENTAL IMPACT OF RELOCATION AND TEMPORARY HOUSING. (Reference paragraph xx of the Action Plan).

OBJECTIVES

To develop appropriate criteria, particularly for the island States and Territories, for preparing, analysing and presenting demographic statistics, with emphasis on suitable definitions for rural and urban areas.

BACKGROUND

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. Density is a measure of average distribution and of population per surface area. Dividing a country's total population by its surface area only provides an average number which does not reflect the inhomogeneous spatial concentrations of population in the different urban and rural environments. Hence the population density of a country is not equivalent to the degree of dispersion of its population. Thus, for example, low densities do not necessarily indicate disperse populations. A vast territory with one or two megacities and a reduced rural population would exhibit low density figures (5).

Averaged population density figures are even more meaningless for the smaller island States and Territories in the Region. With exception of Cuba and the Dominican Republic, all of the islands have average population densities exceeding 100 per km^2 - Barbados has more than 500 per km^2 (5). Nevertheless, most of them have a total population of less than 250.000. As a result of their small total land area and small total population, standard demographic statistics cannot be applied in the same way as they are for large countries although even in the latter case they are often not particularly useful. For example, the distinction between rural and urban population concentrations used by the United Nations leads to a situation in which many of the island States and Territories are classified as entirely rural, or, in one or two instances, entirely urban.

This results from the definition of urban being a town with a population exceeding 20.000, whereas any towns below that figure are considered rural. Some territories, such as Montserrat have a total population less than 20.000. Nevertheless, those countries do suffer many of the same type of problems associated with urban and rural areas of the large populous countries. In addition, many problems which are uniquely insular in character are experienced by those countries and to study them effectively requires new methodologies for the analysis of demographic statistics.

ACTIVITIES

Through the use of case studies, methodologies will be developed for the assessment and evaluation of the present characteristics of human settlements with particular emphasis on population growth, distribution, density, migration and the environmental impact of relocation and transitory housing, especially in the island States and Territories.

A demography specialist will be engaged to develop appropriate analytical methods for studying the special problems and needs of the smaller islands. These techniques will then be tested in one or two selected islands which are at different stages of development, to ensure that the new methodology enables a fair comparative analysis to be made between one territory and another and also enables more reliable predictions, of future trends and possible problems, to be made.

The activities involved in this project will be integrated with those of APCEP project 28.

OUTPUT

(a) First Phase

A methodology or methodologies for the analysis of demographic statistics, appropriate to the special needs of the smaller States and Territories of the Region.

(b) Second Phase

Case study reports on one or two island States demonstrating the use and advantages of the methodology or methodologies proposed for general adoption.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Identification of two islands to use for case studies	0 - 2	
Evaluation of existing methodologies as selection of appropriate models for testing	1 - 3	
Analysis of demographic data available for the test areas and determination of its suitability for demographic planning	3 - 6	
Development of recommendations for collection and use of demographic statistics for the island States and Territories	6 - 9	

Cost of project $40,000.

jlt556; 14 May 1980

APCEP 28 - ASSESSMENT OF EXISTING COASTAL URBANIZATION POLICIES AND HUMAN SETTLEMENTS TECHNOLOGIES APPLIED IN THE REGION, INCLUDING BUILDING TECHNOLOGIES APPROPRIATE TO THE REGION'S ENVIRONMENT (Reference paragraph 38 of the draft Action Plan)

OBJECTIVES

To analyse the prevailing coastal urbanization and building technology policies in existence in the Region from which preliminary projections may be made of the local and subregional impacts on the natural ecosystems and coastal habitats.

BACKGROUND

Several of the sectoral overview reports prepared as supporting material for the Action Plan have highlighted the limited productivity of the Caribbean Sea and Gulf of Mexico. The areas believed to be responsible for the bulk of the productivity are along the coastal zones especially associated with mangroves, sea grasses and coral reefs.

Intensive on-shore human activity in the coastal zones, associated with growing human settlements could lead to such interference with the natural ecosystems that marine productivity may be significantly impaired.

In order to provide essential statistics on which to base sound predictions on the likely impact of continuing settlement of the coastal zones and to suggest alternative environmentally-sound alternatives, a detailed analysis of existing coastal urbanization policies and practices is required.

Human settlements technologies are intimately related to the effects of human settlements on an area's environment and resource base. Broadly speaking, there are two main human settlements sectors in the Region. These may be termed as the informal sector and the formal sector. The former is exemplified by the rural and urban poor who generally construct their own shelter, using the cheapest construction materials available to them. The resulting settlements are typified by the urban "slums" and "squatter" settlements seen throughout the Region. The formal sector may be considered to be typified by the Government, private industry and individual members of the middle and upper income group. This sector uses a mix of building technologies and construction materials and is generally concerned about the aesthetic appearance of the settlements, as well as their functionalism.

In both of the sectors, there are several aspects of the technologies used which are environmentally unsound: building materials are often inappropriate to the natural resource base, often have to be imported and/or are based on energy intensive technologies; architectural design is more often than not inappropriate to the prevailing climatic conditions, being based very often on practices obtaining in the temperate regions of the world. Structures, particularly in the informal sector are highly susceptible to destruction from natural phenomena such as earthquakes, hurricanes and tropical storms; inappropriate technologies often lead to highly undesirable or disastrous effects such as deforestation, soil erosion, flooding, river siltation, reduction in underground aquifer recharge, beach and coastal erosion and contamination of water supplies.

It can be seen that building technologies are of national importance and can affect the national economy in many ways. However, very little attention has been paid to this aspect of human settlements policies in the past with the result that very little information is available in the Region.

This project, therefore, has been designed to redress the situation and to provide a body of information which can be drawn upon by the Region's planners and policy-makers.

ACTIVITIES

In collaboration with the Governments and relevant institutions and international agencies, an examination will be made of the existing and proposed coastal urbanization policies and processes, as well as coastal growth centres which are not necessarily "urbanized" in character. This will include trends in population growth, density, distribution, migration and other social characteristics in these areas, with special focus on slum and sub-standard areas caused by rapid migration. This activity will be undertaken simultaneously with, or will receive inputs from, the relevant activities in APCEP projects 13/3, 13/5, 15, 20, 27, 29, 30 and 31.

An expert in human settlements planning with training in demography will be engaged to analyse the information thus obtained and to make projections on the intensity of the use of the land in the coastal zones of the Region.

In conjunction with APCEP 13/3, 29 and 31, preliminary impact analyses of the projected human settlements will be made for selected areas of the Region.

The data will be used to provide inputs to APCEP 30.

A search will be made for existing literature and appropriate technologies which can be applied in the Region.

A comparative analysis of the energy flows for different human settlements technology systems will be undertaken with a view to highlighting the relative merits of various systems, given the general lack of indigenous conventional energy in the majority of the States and Territories of the Region.

Training courses/workshops in appropriate technologies will be developed, and applied research in the field, by the Region's institutions will be encouraged and supported.

Based on the analyses and projections, guidelines and alternatives will be drawn up and presented to the Region's planners and policy-makers, and a pilot model coastal settlement plan will be proposed for establishment somewhere in the Region, preferably on an island State or Territory.

This activity will be carried out in close collaboration with the relevant activities of APCEP project 20.

OUTPUTS

(a) First Phase

1. A report and maps giving the existing and projected use of the coastal zones in the Region for urban settlement.

2. Preliminary assessment of the combined environmental impact of the projected urban settlement of the coastal zones in the Region.

3. A bibliography of existing literature on technologies considered appropriate for the Region.

4. Material for a seminar/workshop on the environmental impact of urban settlement of coastal zones in the Region (joint activity with APCEP projects 29 and 30).

(b) Second Phase

1. A report assessing the possible environmental impacts of the continued use of prevailing human settlements technologies in the Region, together with a comparative analysis of the energy flows of various technology systems and options.

2. Training courses in appropriate technologies.

3. A network of institutions working on the development of different aspects of human settlements technologies.

4. A plan for a pilot model coastal settlement.

151. WORKPLAN AND TIMETABLE
152.

Activities	Starting and ending (from month 0)	Responsible organization (tentative UNHCS)
Collection of information and analysis of existing and proposed coastal urbanization policies (in conjunction with APCEP 27)	0 - 6	
Collection of literature on building technologies appropriate to the Region	0 - 3	
Analysis of various human settlements technology systems	4 - 8	
Preliminary impact analyses of projected human settlements projects (in conjunction with APCEP 29)	6 - 8	
Development of training courses and organization of workshop(s) on appropriate technologies	9 - 12	
Development of guidelines for planners and policy-makers	9 - 12	
Development of pilot model coastal settlement plan for an island State or Territory	9 - 12	

Total cost of project $150,000.

jlt557; 2 June 1980

APCEP 29 - IDENTIFICATION OF THE INTERACTIONS BETWEEN THE PRINCIPAL ECOSYSTEMS OF THE REGION IN ORDER TO DETERMINE POTENTIAL LONG-RANGE EFFECTS CAUSED BY HUMAN ACTIVITIES (Reference paragraph 40 of the draft Action Plan)

OBJECTIVES

To identify and describe the principal coastal and marine ecosystems.

To determine the relationship between the various representative coastal and marine ecosystems.

To provide training and assistance in ecological sciences to local institutions.

BACKGROUND

The coastal zones of the Region are characterized by a diversity of biotypes and ecosystems. These include rocky and sandy beaches, mangrove swamps, coral reefs, coastal lagoons and turtle grass beds.

A great deal of coastal development, settlement and industrialization is taking place in the Region, most of which could drastically affect these biological communities.

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 mans' 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 manager of ecosystems for sustainable development, but only if he is aware of their complexity and their reaction to his interventions (14).

However, it is not possible to gauge the impact of mans' activities if the biotopes in question are not well characterized before they become degraded. In addition, detailed knowledge of structure and diversity forms the basis for determining the stress of the particular community in question, and to what extent it can tolerate a permutation, e.g. injection of a pollutant. Furthermore, an understanding of the interactions between

different ecosystems in terms of material and energy flows is necessary to assess long-term effects induced by environmental modifications which block or alter these flows.

A fairly comprehensive literature survey describing the ecosystems of the Region, together with follow-up field surveys has already been completed for the Caribbean by the IUCN and a preliminary data atlas has been published, summarizing the results of the survey (IUCN and Maps).

A more detailed investigation of representative biotopes is now required. Such investigations would help determine how seemingly isolated biotypes might be linked; would serve as a baseline study for the effects of coastal development and pollution on representative biotopes; determine the role of various intertidal and subtidal communities in supporting exploitable marine resources; provide educational materials necessary for nations to appreciate their own coastal environment and the consequences of polluting it.

ACTIVITIES

Based on the findings of the previously mentioned IUCN study (13), detailed studies of several representative biotopes will be carried out. As far as possible these will be done in collaboration with marine biologists from nationally nominated institutions or Government departments.

The elements of each of the detailed studies will include:

(i) a description of the levels of biological organization present;

(ii) the kinds and numbers of organisms including their biomass;

(iii) a quantitative description of energy pathways and production rates;

(iv) analysis of factors limiting productivity;

(v) a description of species interactions, species diversity and stability;

(vi) micro-oceanography and micro-climatology of the study area.

In addition, the relationships between various biotopes and especially their inter-dependence will be studied with the aim of determining what undersirable repercussions would result from disturbing or degrading them, e.g. the possible loss of shrimp stocks resulting from dredging in nursery areas and breeding grounds.

This project will be co-ordinated with APCEP projects 5, 8/3, 8/4, 13/3, 13/4, 13/5 and 17.

OUTPUTS

1. Maps showing locations of selected biotypes chosen for detailed study.

2. Reports on detailed studies conducted on typical biotypes of the Region.

3. Training in marine and coastal ecology.

The outputs from this project will provide material for a seminar/ workshop covering APCEP project 30.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization (IUCN?)
Selection of study areas	0 - 2	
Detailed studies of typical biotopes	2 - 20	
Training in marine ecology	2 - 20	
Report of detailed studies	20 - 22	

Cost of project $225,000.

jlt558; 2 June 1980

APCEP 30 - ENCOURAGEMENT OF THE CONSIDERATION OF ECOLOGICAL VARIABLES AND ECO-DEVELOPMENT TECHNIQUES IN THE DESIGN OF NEW HUMAN SETTLEMENTS PROJECTS;

ENCOURAGEMENT OF THE FORMULATION OF HUMAN SETTLEMENTS PROJECTS LEADING TO ALTERNATIVE STYLES OF DEVELOPMENT;

PROMOTION OF POLICIES AND PRACTICES IN THE FIELD OF HUMAN SETTLEMENTS WHICH WILL GIVE SPECIAL ATTENTION TO THE ECOLOGICAL ASPECTS OF URBAN AND RURAL DEVELOPMENT AS WELL AS TO THE NEED FOR PROPER STRUCTURAL DESIGNS TAKING INTO ACCOUNT THE POSSIBILITY OF NATURAL DISASTERS. ATTENTION WILL BE GIVEN TO THE DEVELOPMENT OF APPROPRIATE BUILDING TECHNOLOGIES AND THE APPROPRIATE USE OF INDIGENOUS BUILDING MATERIALS ON A SUSTAINABLE BASIS.

(Reference paragraphs xx, xx and xx of the draft Action Plan).

OVERALL OBJECTIVES

The encouragement of continuous assessment and analysis by development planners with regard to the needs, potentialities and environmental realities of small island States and the coastal areas of the Wider Caribbean Region.

OBJECTIVES

The stimulation of exchange of ideas and information on the formulation and reformulation of human settlements, policy guidelines and training needs, geared to the peculiarities of tropical island States and coastal areas.

BACKGROUND

Small island States, such as those of the insular Caribbean have certain social, economic and physical peculiarities which necessitate special consideration in the human settlements process.

Historically, these islands have experienced a concentration of activities along their coastal areas, or more appropriately, within a close proximity to the seafront. This does not preclude recognition of the fact that there are inland activities, but, within the spatial framework of these island States, in essence, these activities may still be considered as coastal. Conceptually, these islands consist mainly of coast within the broader environmental context.

The whole conceptual approach to planning is still within the traditional "Town and Country Planning" framework. In contemporary planning nomenclature this approximates the "urban/rural" dichtomy, although most training institutions in industrialized countries now concentrate on urban planning.

However, with particular respect to developing countries, planners have been arguing that in many cases the brand of urban planning offered at institutions in the metropolitan countries are irrelevant to their needs.

Indeed, the emerging concept of "human settlements planning" which fully recognizes the interrelatedness of the life sustaining components of the human environment (which should determine the spatial paramaters of the "settlement") is slowly gaining acceptance. This school of thought does not, and rightly so, subscribe to the concept of "urban", "rural", "marginal", "slum" settlements etc., but sees these simply as areas within settlements which may require special focus. Human settlements, therefore, encompass both the man-made and natural components which are conducive to sustaining life and enhancing the living conditions and aspitations of its inhabitants. The interrelated and interdependent components interact in such a manner that the whole is different from the sum of its total parts. The concept does suggest some degree of self-sustenancy.

This project is not intended to carry further the debate on new conceptual approaches to planning. It however recognizes that traditional planning concepts are largely irrelevant to the needs of island States in the Caribbean and new approaches must be sought.

For instance, Caribbean planners are today pointing to the fact that the urban/rural dichotomy by comparison to larger States, is far less pronounced, while some sociologists in the Region claim that the distinction is totally irrelevant, particularly in the smaller territories.

There are also social, cultural and economic characteristics of these island States which warrant special consideration in the planning process.

Unfortunately, the planning machinery in many cases is not geared or staffed to undertake human settlements planning but instead proceeds in an unco-ordinated, segmented, piecemeal and incremental fashion, without consideration for the peculiarities of the area. This project will bring planners together to chart a new approach to planning in the Region.

ACTIVITIES

Through the use of questionnaires, information on the particular planning problems in the Caribbean will be derived from as large a sample of planners as possible.

Using the results of the questionnaires, together with the information outputs from APCEP projects 20, 27, 28 and 29, the special training needs required in the Region, with respect to island and coastal area development and building technologies, will be identified.

Policy guidelines for future planning, based on sound environmental and social management will be developed.

A regional meeting of planning experts will be convened to discuss, analyse and modify the proposed special training needs and policy guidelines and to make recommendations for special training programmes to be implemented in the Region.

OUTPUTS

1. Report on prudent planning problems in the Caribbean based on consultations with the planners of the Region.

2. Recommendations for special training needs particularly with respect to island and costal area development and building technologies.

3. Policy guidelines for future planning incorporating environmental dimension.

4. Meeting of planning experts of the Region.

132. WORKPLAN AND TIMETABLE
133.
134. | Activities | Starting and ending (from month 0) | Responsible organization |
135. |---|---|---|
136.
137.
138.
139. Preparation and distribution of questionnaire — 0 - 3 — UNHCS
140.
141.
142. Follow-up visits to complete questionnaire — 6 - 7 — UNHCS
143.
144. *Determination of special training needs — 8 - 10 — UNHCS
145.
146. Drafting of policy guidelines for future planning based on sound environmental management — 7 - 12 — UNHCS
147.
148.
149.
150. Organization and convening of expert group meeting — 11 - 14 — UNHCS
151.
152.
153. Recommendations of Region's planners and development of training programmes — 15 - 16 — UNHCS
154.
155.
156.
157.
158. Total cost of project $150,000.
159.
160.
161.
162. *This activity cannot be completed until the inputs are received from
163. APCEP projects 20, 27, 28 and 29.

jlt561; 2 June 1980

APCEP 31 - ASSESSMENT OF THE IMPACT OF TOURISM ON THE PHYSICAL, SOCIAL AND CULTURAL ENVIRONMENT, PARTICULARLY AS THEY AFFECT COASTAL ZONES (Reference paragraph xx of the draft Action Plan)

OBJECTIVES

To develop methodologies, through the use of case studies, for the assessment of the impact of tourism on the physical, social and cultural environment.

BACKGROUND

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.

While the U.S. Gulf States and Mexico dominates the Region's 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 contributed 55 per cent of the country's gross domestic product in 1977. The figure for St. Lucia was 28 per cent, for Barbados 19 per cent, indicating the importance of tourism to these countries, but also their vulnerability to the fluctuations in the tourist market. In contrast, the contribution of tourism to the GNP of Mexico, Colombia and Panama in 1977, was 3.3 per cent, 1.1 per cent and 6.9 per cent respectively (11).

In terms of use of the already limited natural resources of the islands, in particular, several States and Territories receive a number of tourists well in excess of their indigenous population. Taking into account of the average length of time spent by each tourist, the highest population equivalent of tourists in any of the States and Territories of the Region is 10 per cent of the indigenous population (11). However, it should be borne in mind that the level of resource use (such as water and energy) by tourists is generally much higher than the indigenous population. In one country, it has been estimated that more than 50 per cent of the electricity generated is consumed directly by hotels.

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 industries often lure labourers out of menial, but essential jobs, and result in alienation of agricultural land when small farmers leave their land to work in urban tourist areas. Governments have to spend large amounts of money on infrastructure, such as power supplies, roads, and

sanitation facilities 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 often a social benefit in this category of expenditure. High import bills for construction material, food and beverages, and furniture are unfortunately endemic to the Caribbean tourist industry, and reflect the inability to create and exploit significant links with the national economy.

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 to the social structure of the indigenous population. It can, on the other hand, as evidenced in some States and Territories such as Mexico, Guatemala and Panama, be used to strengthen the indigenous culture and to preserve the national heritage (11).

The effects on coastal resources, which provide the basis for shore-based tourism, are usually on water quality (1), although mining of beach sand for the construction of tourism facilities has led to some serious beach erosion problems (6). 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 effects.

ACTIVITIES

Two or three States or Territories, preferably islands, having different intensities of tourism and different tourism development styles will be selected for in-depth study and comparative analysis.

A sociologist/anthropologist and a planner/environmentalist will be engaged to carry out the detailed case studies.

The studies will involve an in-depth analysis of the tourist traffic, a comprehensive analysis of the use of resources such as land, water, energy etc. related to the reserves and availability of these resources to the local population.

A sociological field survey using standard questionnaires will be carried out based on a random selection of the local populations.

Using historical records and through field work involving questionnaires and continual monitoring, an attempt will be made to determine the cultural effects of mass tourism on the population.

The output from this project will form the major input to project APCIP 33.

OUTPUTS

Case study and reports on the environmental, social and cultural effects of tourism as they affect coastal zones and smaller island States and Territories.

A methodology or methodologies for determining such impacts.

Material which can be used for training programmes for planners and other relevant tourist industry officials and which can be used to develop guidelines for such officials.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization (OAS?) MAB
Selection of States or Territories for study	0 - 2	
Collection and analysis of data	2 - 5	
Sociological field survey	6	
Development of guidelines for determination of the full impact of tourism development plans	7 - 9	

Cost of project $55,000.

jlt562; 2 June 1980

APCEP 32 - ASSESSMENT OF ALTERNATIVE TOURISM (INTEGRATED TOURISM) AIMED AT REDUCING NEGATIVE IMPACT ON LOCAL ENVIRONMENTS, BRINGING GREATER BENEFITS TO LOCAL PEOPLE, AND PUTTING TOURISM ON A SUSTAINABLE BASIS. (Reference paragraph xx of the Action Plan).

OBJECTIVES

To develop tourism models appropriate to the natural resource base and which are socially and culturally beneficial to the society at large.

BACKGROUND

Over the short term, tourism worlwide may be severely constrained by energy shortages. Based on oil costs, price increases are certain in everything from transportation to accommodation and services. Fluctuating exchange rates may also affect destination choice. These factors may increase tourist traffic to the Caribbean (11).

In 1977, excluding the United States of America, international trips to the Wider Caribbean represented about 5 per cent of the total worlwide figures. In the long term, most authorities agree that tourism will grow and may become the world's largest industry by the year 2000 A.D. In this context, the States and Territories of the Wider Caribbean must decide, individually and/or collectively, the degree to which they wish to participate as tourism destination areas. Strategies must then be devised for managing that participation in their own best interests, to achieve desired objectives for their citizens.

The highly fragmented geographic, political, economic and ecologic patterns of the Region makes study of alternative styles of tourism or impact models extremely complex. Nevertheless, there are groups of States and Territories which are sufficiently similar in characteristics to permit the development of alternative tourism models which may be applicable, with only minor modifications, to each country in the particular group.

ACTIVITIES

Two or three States or Territories will be chosen for this project. Each one will be representative of a different regional sub-grouping of countries having common characteristics.

Based on a survey of the tourism potential of each study area, information on any existing tourism industry and a search of the international literature on the subject, alternative tourism development strategies will be drawn up. These strategies will be aimed at minimizing the negative effects of the industry and maximizing the economic, social and cultural benefits to the country and its population.

The strategies will necessarily be concerned with the means of integrating the industry with the rest of the economy and the productive sector and will be based on the carrying capacity of the country, thus putting tourism on a sustainable basis.

At least one State or Territory will be identified in which a model can be tested over a period of several years.

OUTPUTS

A model or models for environmentally, socially and culturally sound tourism development for smaller island States and Territories and coastal zones.

Materials for use in training programmes and which can be used to develop guidelines for Government officials.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Selection of States or Territories	0 - 2	
Identification and recruitment of consultants	0 - 3	
Survey of tourism potential	4 - 6	
Collection of tourism information (1)	4 - 6	
Search of international literature	4 - 6	
Analysis of all information obtained	7 - 10	
Development of alternative tourism strategies/models	11 - 12	
Testing reaction of tourism/Government officials to alternative models and modification of strategies as necessary	13 - 14	
Identification of country willing to implement new strategy for medium- to long-term assessment	15 - 16	
Preparation of final report	17 - 18	

Cost of project $75,000.

(1) In conjunction with APCEP project 31.

jlt563; 2 June 1980

APCEP 33 - DEVELOPMENT OF GUIDELINES TO MINIMIZE THE NEGATIVE IMPACT OF TOURISM ON THE PHYSICAL, SOCIAL AND CULTURAL ENVIRONMENT, PARTICULARLY AS REGARDS COASTAL ZONES. (Reference paragraph xx of the Action Plan).

OBJECTIVES

To assist the Governments of the Region to develop and plan their tourism industry in such a way as to ensure that:

- it is compatible with sound environmental management practices;

- the negative social and cultural impact is minimized;

- the economic, social and cultural benefits are maximized.

BACKGROUND

Up to the present time coastal tourism has been, and still is, promoted throughout the Region, particularly by the island States and Territories, as a major economic instrument for earning foreign exchange and providing employment.

Little or no consideration has been given to the industry's environmental effects, to practical means of integration with the rest of the economy, or to its social and cultural impact.

There are cases where not only the form of the land has been changed, but several species of wildlife and the entire ecological balance have been threatened by drainage and cultivation or subdivision of large tracts of former mangrove swamps. "Development pressures have also produced urban density in many formerly rural areas. Skyrocketing land values took vast areas out of agriculture, and along the coast, fostered extremely high densitires with little "natural" land left between developed areas" (11).

With very few exceptions, Governments have not provided the kind of assistance (mostly technical) required to enable local entrepeneurs or farmers to develop the linkages so vital to a well-integrated tourism industry (11).

Social and cultural values are often affected on a national scale, through a demonstration effect when mass tourism is developed on a small island State.

One very negative and alienating effect which results when beaches are "taken over" by foreign tourists. Even when countries have laws which preserve all beaches as public areas, the local inhabitant often feels a foreigner in his own country where he is frequently outnumbered on the beach by foreigners and often discouraged by the management of the beach resorts from using the beach.

The objective of this programme element is to prepare suitable material and to provide technical assistance to the Governments of the Region through training programmes, workshops and seminars to enable them to plan and/or modify their tourism development in such a way that they may minimize the negative aspects of the industry while, at the same time, maximizing the benefits.

ACTIVITIES

An assessment will be made of the training received by planners in the field of tourism development.

The special training needs will be identified and courses developed.

Material prepared in APCIP projects 31 and 32 will be used to formulate policy guidelines for the Governments of the region for use in the further development of the industry.

A major seminar/workshop (or several smaller ones) will be organized for those Government officials most responsible for tourism planning and development.

OUTPUTS

(a) First Phase

Report identifying training needs for tourism planners and managers.

Training programme for tourism planning officials.

(b) Second phase

Policy guidelines for tourism development

Seminar(s)/workshop(s) for tourism planning and development officials.

97. WORKPLAN AND TIMETABLE
98.
99. | Activities | Starting and ending (from month 0) | Responsible organization |
100. |---|---|---|
101. | Recruitment of a consultant to assess existing training programmes | 0 - 1 | |
102. | Assessment of existing training programmes and identification of special needs | 2 - 4 | |
103. | Development of training courses | 5 - 6 | |
104. | Formulation of policy guidelines | 7 - 8 | |
105. | *Organization and convening of seminar(s)/ workshop(s) | 9 - 12 | |
106.
107. Total cost of project $120.000.
108.
109. *This activity cannot take place until the inputs from APCEP projects 31 and 37 become available.

jlt564; 2 June 1980

Environmental Health

APCEP 34 - SURVEY OF EXISTING ENVIRONMENTAL HEALTH PROBLEMS WITH PARTICULAR REFERENCE TO:

- Availability and quality of drinking water supplies particularly in rural areas;
- waste water disposal;
- solid waste management;
- working environmental hazards;
- impact on human health of industrial waste and pesticide residues including the contamination of ground water;
- food contamination and its possible impact on the problems of human health and malnutrition;
- the health problems associated with migration to urban areas and the relocation of people as a result of development projects;
- vector control and vector-borne disease.

(Reference paragraph xx of the Action Plan)

OBJECTIVES

To identify the main environmental health problems related to the eight sectors enumerated in the title by preparing country profiles in collaboration with the national public health authorities.

BACKGROUND

Based on its extensive coverage of the Region, PAHO/WHO prepared an overview on environmental health (1) which was used as an information document for the preparation of the draft Action Plan for the Wider Caribbean Region. The paper analysed the available statistics for the following sectors: water services, sewerage and excreta disposal, rural sanitation, solid waste management, the working environment, chemical pollution and nutrition and food contamination; the status of enteric and

other parasitic diseases; the environmental health goals and resolutions of the States and Territories; a review of major national and/or institutional programmes; and the gaps and shortcomings in the environmental health sector.

The report pointed out that there are serious data deficiencies, specifically in the areas of chemical pollution, solid waste and the working environment, where the countries have not attained an infrastructural development that allows for the compilation of reliable statistics, where statistics were available, comparative analysis is difficult because of differences in interpretation and definition of various data in the countries.

"Environmental health problems in the Caribbean area vary with the level of social and economic development achieved by the respective countries. In many cases they are linked to poverty, the absence of adequate water supplies, lack of sanitation services, poor housing conditions as well as the prevalence of vectors causing high incidence of parasitic and communicable diseases. At the same time, exposure of large segments of the population to chemical and physical hazards associated with industrial and agricultural development and congestion of urban areas is a common problem.

In general, the lack of planning and inadequate management have been an important element in frustrating the efforts of the countries to deal effectively with their growing environmental problems. Among the major interrelated factors are the absence of national policies on environmental health, the fragmentation of environmental health functions among various governmental agencies that often have overlapping mandates, the inadequacy of existing legislation, the insufficiency of trained manpower, and the lack of surveillance of environmental quality.

The institutional framework for integrating environmental services in the national development plans and providing for a co-ordinated multi-agency approach to programme planning and execution is not fully developed in most countries." (1)

This project attempts to fill in the data gaps in close co-ordination with other regional, subregional and national ongoing activities that have similar objectives.

ACTIVITIES

1. <u>Availability and quality of drinking water supplies</u>

In consultation with the Governments and national institutions in the Region, and in conjunction with APCEP project 10, a country-by-country survey of the availability and quality of drinking water supplies particularly in rural areas will be made. During the course of the

survey, emphasis will be placed on data collection procedures and training of local personnel

2. Waste water disposal

This aspect of the project will be covered by APCEP projects 10 and 13/2.

3. Solid waste management

Based on information produced by APCEP projects 10 and 13/2, waste management guidelines will be developed. These will include data collection disposal sites and possibilities for recycling and energy generation. The latter will form an important input for APCEP project 26.

4. Working environmental hazards

In conjunction with APCEP project 10, those industries which are generally known to affect the health of workers will be identified. Monitoring systems will be established where none exist and checks will be made on the employees' health. The results of the assessment will be used to develop regionally applicable criteria for monitoring and controlling occupational exposure to hazardous substances.

5. Impact on human health of industrial waste and pesticide residues

This aspect of the project will be covered by APCEP projects 10 and 13/2.

6. Food contamination

Using existing national and sub-regional institutions, a co-ordinated monitoring programme for the analysis of foodstuffs for contaminants. The main contaminants to be assessed will be pesticide residues, microbiological agents and toxic metals.

Where necessary, training will be provided in sampling and analytical techniques.

Guidelines for permanent monitoring techniques will be developed.

7. Health problems associated with urbanization and migration

In conjunction with APCEP projects 27 and 28, an investigation into the sanitary conditions prevailing in the urban areas of a selected number of States and Territories with a view to determining to what extent the adverse conditions result from migration or relocation.

Guidelines for preventing or minimizing environmental health problems resulting from urbanization will be developed.

8. Vector control

A country-by-country survey of vector control methods and vector-borne disease problems will be made.

Where found to be unsatisfactory, management and training programmes will be developed.

OUTPUTS

1. Country profiles on eight environmental health problems of the Region.

2. Training programmes in data collection and analysis.

3. Guidelines for solid waste management in the Region.

4. Criteria for monitoring and controlling occupational exposure to hazardous substances.

5. Guidelines for monitoring contaminants in foodstuffs.

6. Management and training programmes for the prevention and control of vectors and vector-borne diseases.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization (tentative)
Survey of availability and quality of drinking water supplies (in conjunction with APCEP 10)	0 - 8	PAHO/WHO
Waste water disposal survey (APCEP projects 10 and 13/2)	0 - 8	PAHO/WHO
Survey of working environment hazards	0 - 8	PAHO/WHO
Impact on human health of industrial waste and pesticides (APCEP projects 10 and 13/2)	0 - 12	PAHO/WHO/UNIDO
Guidelines for solid waste management	9 - 12	PAHO/WHO
Assessment of food contamination in the Region	4 - 12	PAHO/WHO
Health problems associated with urbanization	6 - 12	PAHO/WHO
Survey of vector control problems	6 - 12	PAHO/WHO
Guidelines for occupational health monitoring	9 - 12	PAHO/WHO

Cost of project $175,000.

jlt565; 16 May 1980

APCEP 35 - DEVELOPMENT AND STRENGTHENING OF NATIONAL INSTITUTIONAL CAPABILITY FOR IMPROVING ENVIRONMENTAL HEALTH SERVICES INCLUDING WATER SUPPLIES IN URBAN AND RURAL AREAS, WATER QUALITY CONTROL, WATER RESOURCES, SANITARY WASTE DISPOSAL, WATER POLLUTION CONTROL AND VECTOR CONTROL. (Reference paragraph xx of the Action Plan).

OBJECTIVES

To improve the environmental health situation of the population in the Region through region-wide co-operative efforts involving public heaath services.

To strengthen linkages with ongoing international public health programmes such as communicable disease prevention.

To review the manpower situation in the public health sector of all countries in the Region and, as appropriate, design programmes for sanitation and public health inspectors, provide technical assistance in the reduction or elimination of communicable diseases resulting from inadequate sanitation, conduct on-the-job training programmes for sanitation and public health inspectors.

To develop regional collaboration in sanitation programmes where transboundary interests are involved.

BACKGROUND

The Wider Caribbean Region already has a regional body which responds to its individual environmental health problems. The Pan American Health Organization of the United Nations World Health Organization maintains a national office in each of the countries of the region. In the document entitled "Overview on Environmental Health in the Wider Caribbean Region" (1), the recommendations for environmental health improvements for policy and institutional mechanisms stated that:

> "In order to improve environmental health conditions in the regions and meet the goals established for various aspects of the sector it is recommended that more interaction and better co-ordination take place at subregional and regional levels on matter related to Environmental Health. Certain mechanisms have been suggested that could fulfil these functions to various extent:

1. The establishment or strengthening of subregional centres or institutions as focal points for the concentration of information and technical resources for planning and developing environmental health projects and provide technical assistance for management and operations of facilities.

2. The complementation of country human resources through technical co-operation between countries in a co-ordinated fashion as examplified in the Caribbean Basin Water Management Project. This may be coupled with the development of subregional training programmes for environmental health.

3. The development of a network of collaborating centres which will complement country resources by developing specialization in specific areas and providing services in environmental health.

4. The development of subregional strategies should be encouraged as the Caribbean Environmental Health Strategy for CARICOM countries which, inter alia, recommended the establishment of a Co-ordinating Working Group in Environmental Health to improve environmental health management.

It is, therefore, recommended that programmes be established at subregional and regional levels to explore the full potential of the above mechanisms."

In furtherance of the above recommendations and of the goals of the Action Plan, this project is proposed.

ACTIVITIES

1. Community Water Supply and Wastes Disposal

Countries will be assisted in establishing surveillance services for drinking water quality and in conducting national surveys using common methodologies. The advancement and transfer of knowledge and methods for the provision of community water supply and basic sanitation facilities will be encouraged by demonstration projects and by disseminating information. In addition, procedures for collecting the data needed for planning purposes will be strengthened.

2. Environmental Sanitation

Environmental sanitation practices that contribute to the prevention of communicable diseases in urban and rural areas will be promoted by collaboration with national agencies.

Training courses will be given to sanitation personnel working in primary health care programmes in small communities.

3. Food Hygiene and Safety

Food hygiene and safety policies and programmes, including the hygienic handling and processing of food will be augmented. Particular attention will be given to quality control of imported and exported food products. Seafood contamination and its sanitary quality in general will be the subject of a special study. This will include shellfish-growing, harvesting, processing and marketing.

The project will be implemented through three main steps:

(a) Comprehensive country profiles prepared in project APCEP 34.

(b) Technical co-operation programmes with the countries will be initiated to provide guidance for public health policies and activities. These will include expert advice to national and local authorities, provision of laboratory equipment and manpower development. Particular attention will be given to training of sanitary and public health inspectors.

(c) Co-ordination mechanisms between national public health authorities will be recommended for sanitation problems of regional significance. This will include problems of food export and import, intra-regional transmission of communicable diseases, and establishment of sanitary regulations for international installations.

OUTPUTS

(a) First Phase

1. Proposal for a co-ordination mechanism between the national public health authorities and international health programmes.

2. Report on manpower needs and training requirements in collaboration with APCEP project 34.

3. Proposal for a programme of regionally co-ordinated surveillance of food exports and imports for hygienic quality.

(b) Second Phase

1. Proposal for an intra-regional inspection programme of port sanitation in accordance with standard procedures.

2. Proposed mechanism for monitoring of water-borne vectors and of rodent and ectoparasite populations analysing their significance as carriers of microbiological agents.

3. Teaching aid packages for training sanitation and public health inspectors.

4. Proposed regional regulations regarding sanitation practices for sea traffic.

WORKPLAN AND TIMETABLE

Activities	Starting and ending (from month 0)	Responsible organization
Preparation of teaching aid packages for sanitation and public health inspectors	0 - 9	PAHO/WHO
Establishment of a regional food surveillance programme in collaboration with Governments	10 - 18	PAHO/WHO
Establishment of a regional port sanitation programme in collaboration with Governments	10 - 18	PAHO/WHO
Studies of microbiological agents in collaboration with national institutions	10 - 18	PAHO/WHO
Seminars for sanitation and public health inspectors	10 - 19	PAHO/WHO
Preparation of regulations concerning sea traffic sanitation in collaboration with national public health authorities	10 - 18	PAHO/WHO
Government expert meeting to review regional situation in public and environmental health	19	PAHO/WHO
Finalization of reports on all activities related to this project	20 - 21	PAHO/WHO

Cost of project $130,000.

jlt566; 2 June 1980

4. INSTITUTIONAL FRAMEWORK

General

The institutional arrangements relevant to the projects described in this document are based upon the recommendations of the Expert Meeting in Caracas and on standards practised by UNEP in co-ordinating the implementation of large-scale regional programmes, taking into account the specific priorities, needs and capabilities of the Region.

To the greatest extent possible, it is envisaged to use the national capabilities available in the Region and the capabilities of existing sub-regional and regional organizations, international organizations and co-rdinating bodies, and which will deal with national institutions through the appropriate national authorities of the States concerned.

The efficient implementation of the proposed projects and their results will depend on action at regional, subregional and national levels. It is, therefore, very important to identify the lines of authority and communication on policy and working levels and to develop appropriate institutional capabilities and co-operative mechanisms at each of these levels.

Overall authority

The overall authority to determine the contents of the proposed projects, to review their progress and to direct their course, including the financial implications, are the Governments deciding to participate in the projects in consultation with the organizations and structures supporting the projects' implementation.

Co-ordination

Assuming that the Governments will adopt the recommendation of the Meeting of Experts in Caracas, UNEP will have the responsibility for the overall co-ordination of the approved projects, in particular for their co-ordination with the other components of the Caribbean Action Plan.

For all practical purposes UNEP will discharge this responsibility through a Regional Co-orddneting Unit (RCU), operating under UNEP's authority and physically located in the Wider Caribbean Region.

In order to attain the highest possible degree of co-ordination between the projects, the best utilization of financial resources and to avoid unnecessary duplication of work, projects described in chapter 3 will be grouped and managed on the basis of their thematic similarity or methodological requirements.

The envisaged groupings of projects and the organizations which may become responsible for their day-to-day co-ordination are:

GROUP 1 - General

UNEP (Regional Co-ordination Unit)
APCEP projects: 1/1, 1/2, 1/3, 3, 4, 8/1, 13/1

GROUP 2 - Coastal Processes and Ecosystems

IOC/UNESCO/FAO/IUCN/UN(DIESA)
APCEP projects: 2, 5, 6, 7, 8/3, 8/4, 13/3, 13/5, 15, 16, 17.

GROUP 3 - Pollution Control and Monitoring

UNESCO/IMCO/PAHO/WHO/UNIDO
APCEP projects: 8/2, 8/3, 9/1, 9/2, 9/3, 9/4, 9/5, 9/6, 9/7, 11, 12, 13/2, 13/4, 13/6, 14

GROUP 4 - Environmental Health

PAHO/WHO
APCEP projects: 10, 26, 28, 29, 34, 35

GROUP 5 - Human Settlements and Natural Disasters

UNDRO/WMO/UNCHS/PAHO/WHO/UN(ECLA)/UNIDO
APCEP projects: 18, 19, 20, 21, 22, 27, 30, 31, 32, 33

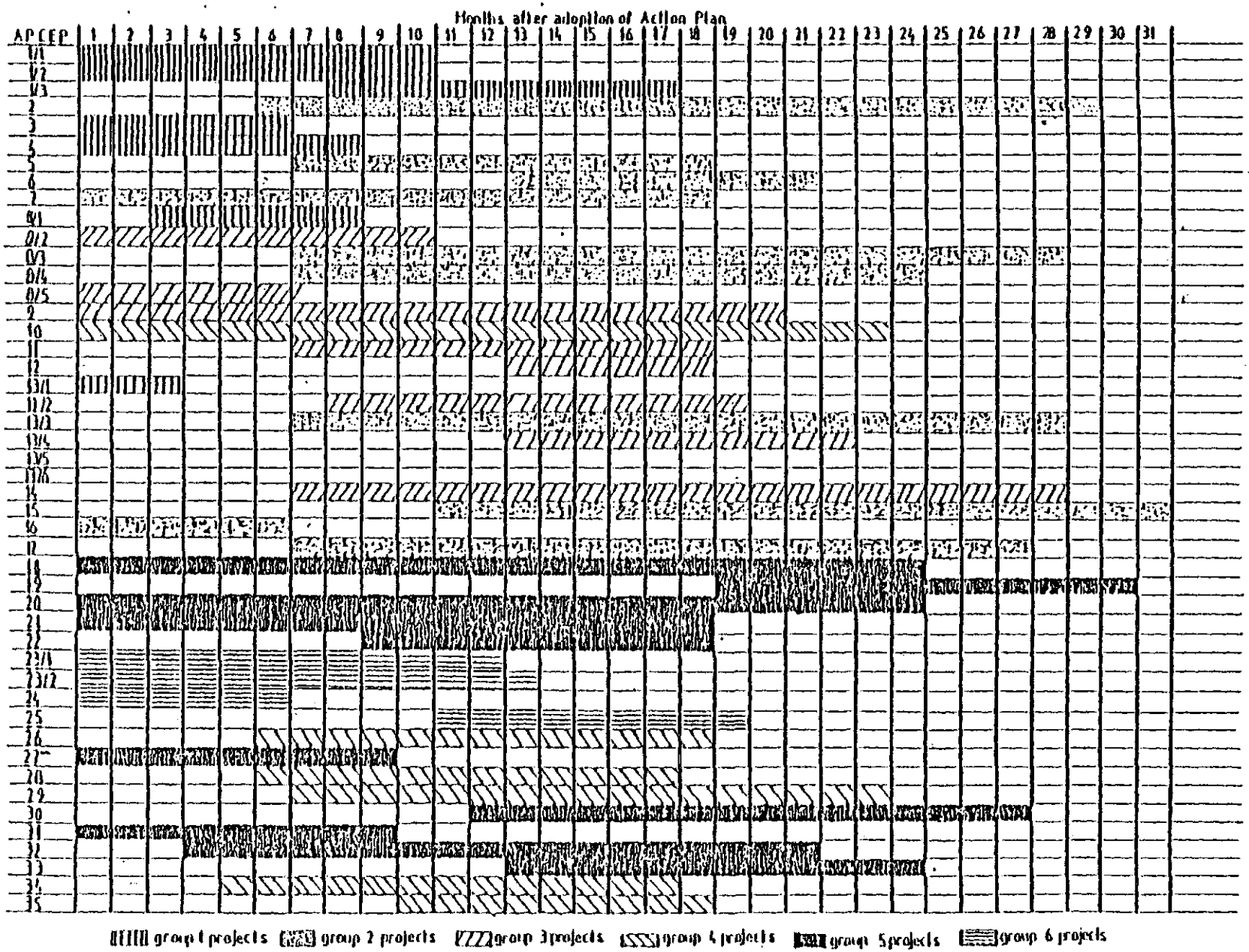
GROUP 6 - Energy

UN(CNRET)/UNIDO
APCEP projects: 23, 24, 25

Co-ordination within a group of projects may include the organization of joint surveys by experts, oceanographic cruises of interest to several projects, preparation of reports, etc. In some cases, especially in groups 2, 3 and 6, project managers may be appointed to co-ordinate the work. These managers, in co-operation with the Regional Co-ordinating Unit, would be responsible for the day-to-day implementation of individual projects, or groups or projects, and would ensure that they are accomplished in a timely fashion. In addition to their managerial responsibilities they would work as experts on specific projects.

Figure 1 illustrates diagramonatically the expected duration, the earliest month for commencement and completion of each project. Constraints on the commencement of the majority of the projects are imposed by the requirement for inputs from other projects.

Figure 1. Schematic for Implementation of Projects for Caribbean Action Plan



Execution of the projects

The projects will be executed primarily by the national institutions (research laboratories, universities, Government departments, consulting firms, etc.) designated by their Governments to participate in the projects.

Designation of national institutions by their relevant national authorities should take into account:

- expertise in subjects pertinent to the programme;
- availability of resources (laboratory space, equipment, etc.);
- availability of manpower (scientists, technicians, support staff, etc.);
- experience with projects of similar nature (whenever possible);
- knowledge of the study area; and
- potential for the pooling of resources.

In order to enable the fullest participation of the designated institutions and to promote their operational self-reliance, project tasks should, as far as possible, be assigned to these national institutions for direct implementation. Assistance will be provided to them in the execution of these tasks through the Action Plan. This assistance primarily consists of the training of personnel (scientists, managers, technicans), preferably within the Region, such as:

(i) individual training at existing national, sub-regional, regional or international institutions ready to offer their facilities;

(ii) opportunities for on-job training and local manpower development;

(iii) group training courses for specific technical subjects, such as analytical techniques;

(iv) workshops and seminars for exchange of experiences; and

(v) meetings of regional experts to review, periodically, the programme and the results obtained.

At the request of national institutions participating in the Action Plan, experts from outside the Region would be made available to work with them.

The day-to-day supervision and co-ordination of the projects' execution will be, most frequently, assigned to a specialized organization of the United Nations system or to a competent regional or subregional (Caribbean) organization in co-operation with and under the overall co-ordination and guidance of UNEP. UNEP's relationship with these organizations would be based on contracts specifying the responsibilities of each party, including their financial obligations. The organizations which may be considered as responsible for the various activities called for by the projects are indicated in the workplan for each programme as outlined in chapter 3 of this document.

National experts from the Region will be assigned to the implementation of the regional projects and, as far as possible, directly involved in the management and execution of projects. Thus continuity of the programme at the operational level will be ensured. For the same purpose, experts from outside the Region assisting in project implementation will be brought into close working contact with national counterparts.

Institutions or organizations from outside the Region would be involved in the implementation of those projects for which the network of designated national, subregional and regional institutions could not provide the necessary institutional infrastructure, or where priority needs are such that an early start to a particular project would be severely jeopardized. However, after the initiation of the particular project, the necessary networks of institutions from within the Region would be developed so that they may assume responsibility for the project's implementation.

The selection of the institutions or organizations from outside the Region would be made by the Regional Co-ordination Unit (RCU), in consultation with the focal points of the Governments of the Region and the United Nations organizations charged with the supervision of the projects involved.

jlt567; 3 June 1980

5. FINANCIAL IMPLICATIONS

The tentative budget for projects envisaged by the Action Plan is presented in table 1. These figures will be finalized in conjunction with the relevent agencies during the preparation of formal project documents.

Financial support for the projects which may be agreed as part of the Action Plan may come from several sources:

(a) voluntary contributions from States and Territories participating in the Action Plan;

(b) voluntary contributions from States supporting the Action Plan but not participating in it;

(c) support from the United Nations organizations on a project-funding basis;

(d) support from the regional and international organizations which are not part of the United Nations system, in most cases on a project-funding basis.

All these contributions could be in cash or in kind (staff time, experts, training, facilities, services, etc.). Although contributions in kind could be of great importance, contributions in cash are essential for the smooth implementation of the projects.

The timing of the implementation of the projects will have to reflect the available financial resources.

These resources will be used either directly by UNEP, through the Regional Co-ordinating Unit, or indirectly, through project documents established with the co-operating organizations as indicated in chapters 3 and 4.

Table 1. Estimates of the financial resources needed for the implementation of the projects outlined in this document (in thousands of U.S. $)

APCEP Project Number	Cost	APCEP Project Number	Cost
1/1 to 1/3	15*	13/4	20
2	235	13/5	40
3	20*	13/6	
4	5*	14	350
5	200	15	150
6	80	16	10
7	200	17	200
8/1	25*	18	100
8/1/1	150	19	75
8/2	40	20	550
8/3	400	21	408
8/4	690	22	50
8/4/1	200	23/1	50
8/5	20	23/2	200
9/1	Underway	24	50
9/2	220	25	75
9/3	200	26	75
9/4	20	27	40
9/5	100	28	150
9/6	35	29	225
9/7	25	30	150
10	200	31	55
11	150	32	75
12	50	33	120
13/1	50*	34	175
13/2	200	35	150
13/3	200		

TOTAL FOR ALL APCEP PROJECTS US $ 7,273,000.

*Cost to be met from RCU budget