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South Pacific Bureau for Economic Co-operation

South Pacific Commission

Economic & Social Commission for Asia and the Pacific

United Nations Environment Programme

South Pacific Regional Environment Programme

SPREP/Conf. Human Environment/Report
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REPORT of the CONFERENCE on the HUMAN ENVIRONMENT in the SOUTH PACIFIC

Rarotonga, Cook Islands 8-11 March 1982

including

- SOUTH PACIFIC DECLARATION ON NATURAL RESOURCES AND THE ENVIRONMENT
- ACTION PLAN FOR MANAGING THE NATURAL RESOURCES AND ENVIRONMENT OF THE SOUTH PACIFIC REGION
- THE STATE OF THE ENVIRONMENT IN THE SOUTH PACIFIC

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South Pacific Commission

South Pacific Commission
Noumea, New Caledonia

Conference on the Human Environment in the South Pacific (1982: Rarotonga, Cook Islands)

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SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

CONFERENCE ON THE HUMAN ENVIRONMENT IN THE SOUTH PACIFIC

Rarotonga, Cook Islands, 8-11 March 1982

REPORT

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Noumea, New Caledonia
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I. INTRODUCTION

1. On behalf of the Government of the Cook Islands, the Honourable I. Short, Minister for Internal Affairs and Conservation, welcomed the Conference extending the hospitality of the Government and the people, and expressing the Government's pleasure at hosting such an important meeting for the South Pacific region.

2. The Honourable Sir Thomas Davis, Prime Minister of Cook Islands, addressed the Conference. He compared the smallness of the earth in space with the smallness of an island in the Pacific Ocean. But, though the sea is so dominant in the region, relatively little attention is given to how it should be managed, harvested and protected. In the Cook Islands, there is scope for large scale fish production accompanied by marine reserves. Though the human environment in the Cooks is attractive and rapidly improving, there is still a lemming-like process in which a large proportion of young people leave the islands, mainly to New Zealand. There is insufficient understanding of the motives involved on which to base a solution - there are human factors beyond economics and the physical environment.

3. He declared the Conference open and appealed for the South Pacific Regional Environment Programme (SPREP) to be supported with finance and manpower resources. If these were forthcoming, the South Pacific could set an example for the rest of the world.

4. Mr. P.S. Thacher, Deputy Executive Director of UNEP, in his opening statement made on behalf of Dr. M. Tolba, Executive Director of UNEP, reminded the Conference that this was the tenth year of UNEP's work, and that at present special consideration was being given to assessing the effectiveness of its programmes. Management and protection of the seas and coastal areas had been one of the main and very successful activities of UNEP. At present 90 countries are served by action plans under the Regional Seas Programme, and when SPREP becomes operative about 110 countries will be working together on the protection of the sea, and on the enhancement of the people who live close to the shores. The Pacific Ocean is a common bond uniting the independent countries of the whole region. The Action Plan deserves international support because it is a good investment for the future of the planet. He recalled the special interest of the first Executive Director of UNEP, Maurice Strong, in SPREP and delivered Mr. Strong's message to the Conference.

5. Mr. K. Nakagawa, Deputy Executive Secretary of ESCAP, indicated his Commission's strong support for SPREP. It is a joint operation of the four bodies: UNEP, ESCAP, SPC, and SPEC. Development and environmental management must go hand in hand, especially in small island nations. Industrial development is only beginning and problems are still generally at a manageable level. When the environment deteriorates the poor people and womenfolk are affected first through impacts on food, fuelwood, water, shelter and fodder for livestock. A general deterioration of the socio-economic situation takes place. SPREP provides the opportunity to avoid this trend: its objective is to protect and enhance the quality of life of the people of the whole South Pacific.

6. The delegate from the Cook Islands, Honourable I. Short, was elected Chairman of the Conference, and Honourable E. Alebua, delegate from the Solomon Islands, was elected Vice-Chairman.

7. A telex was received from the Government of the United Kingdom sending its compliments to the sponsoring bodies of the Conference on the Human Environment. Through its bilateral aid programme the United Kingdom will continue to respond to requests from countries in the South Pacific for help. This telex was acknowledged with thanks. Tokelau and Niue regretted being unable to send delegations to the Conference on the Human Environment. The Tongan delegation was preventing from attending by a recent cyclone. A cable of sympathy was sent to the Tongan Government.

8. A drafting Committee was appointed consisting of the delegates from American Samoa, France, New Zealand, Northern Mariana Islands, Papua New Guinea, and Vanuatu.

9. It was agreed that the Conference would be open to the public and the media unless, for specific sections, the Conference resolved otherwise.

10. The Agenda was adopted as presented.

II. AGENDA

1. Opening of the Conference.
2. Election of Chairman, Vice-Chairman and a Drafting Committee.
3. Adoption of the Agenda.
4. Overview of the State of the Environment in the South Pacific Region.
5. Overview of development trends, their environmental consequences and the contribution of environmental management to development.
6. Country statements and discussion.
7. South Pacific Declaration on Natural Reources and the Environment.
8. Action Plan for Managing the Natural Resources and Environment of the South Pacific Region.
9. Administrative Arrangements and Financing for the next phase of the South Pacific Regional Environment Programme.
10. Work plan for the next phase of the Programme.
11. Other business.
12. Adoption of the Report.
13. Closing of the Conference.

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IV. SUMMARY OF DISCUSSIONS

The State of the Environment in the South Pacific

11. The Honourable Young Vivian, Secretary-General of the South Pacific Commission, addressed the Conference. He stressed the importance of preserving the traditional care for the environment inherent in the cultures of the Pacific, expressed in local customs and rules of conduct, while seeking to incorporate appropriate features of the cultures of the more economically developed countries. The spiritual heritage also teaches respect for the earth and its productivity, and the concept of stewardship for future generations is deeply ingrained in the culture.

12. The State of the Environment report sets out problems, pitfalls and opportunities (Appendix 1). Principles can be recognized, policies developed, and a new ethic created based on the traditional ethic common to all peoples of the Pacific - that the earth and the sea are sacred living things which man must nurture and protect.

13. The Honourable Dr. G. Gris, Director of the South Pacific Bureau for Economic Co-operation, surveyed development trends and their environmental implications. Agriculture and forestry, both dominant land uses now and in the future, present environmental hazards as well as economic opportunities. Mining and off-shore petroleum development may bring increased wealth, but will require strictly-imposed environmental safeguards. Fish harvesting from the deep sea may pose problems with land bases and processing plants.

14. These problems can be avoided through environmental management. This involves formulation of clear government policies on environmental protection and enhancement, setting up effective legislation, and applying it in decisive administrative actions. The whole process depends on adequate knowledge and understanding, and SPREP will contribute greatly to this. The Pacific Ocean unites us in a single regional environment: SPREP could become a fine example of co-operation through regionalism.

Statements from Participating Countries

15. Delegates from most countries enlarged on their country report or brought forward new topics or new emphasis which had arisen since their reports were prepared.

16. There was widespread concern expressed at proposals to dump large quantities of low level nuclear waste in the Pacific Ocean and to use Pacific Islands for high level waste storage. One delegation suggested that the declaration of waste free zones out to the 200 mile limit would considerably reduce the scope for dumping at sea. Countries were also urged to join the London Dumping Convention and to attend the February 1983 meeting to review it. A unified expression from over 20 nations in this region would carry considerable weight in world forums.

17. The Conference was reminded of the Convention on the Conservation of Nature in the South Pacific which is deposited in Western Samoa. It has been signed by three countries, but does not come into force until it is ratified by four countries. Australia plans to acceed to the Convention in 1982. It was suggested that this Convention might serve as a regional legal basis for many aspects of environmental management and control.

18. Many countries, in indicating their support for SPREP, spoke of the need for retention of cultural identity and urged that strong emphasis should be placed on the human environment. It was widely felt that though it had taken many years to bring SPREP to the stage at which the Conference on the Human Environment in the South Pacific could be held, the preparatory work had been valuable and the documentation which had been prepared was useful and highly relevant.

19. Participating countries, with expertise which would be useful to the programme, expressed willingness to assist with skilled manpower and resources. It was suggested that the programme was more than a co-operative gesture - it was an expression of regional solidarity. It was stressed that the programme must be relevant to the needs of the people of the region and that it should not become too complex nor lose its "common touch" with the people. It should not become motivated by "science for science's sake".

20. Non-governmental organizations expressed their concern about nuclear activities affecting the region. Sources of energy appropriate to the region should be developed and presented to the authorities as more favourable than many sources involving high technology. There was strong advocacy for the provision of information at grassroots level, simply presented, and widely disseminated. The key role of women in the island communities was stressed in that they were largely responsible for the education and care of the family; they were thus immediately affected by any change in the environment. It was pointed out that the churches in the islands had a wide coverage at grassroots level and could be an effective means of environmental education.

21. Other agencies of the UN system offered support to UNEP in the implementation of SPREP and stressed the need for continuing liaison to ensure that work was co-ordinated, duplication was avoided, and opportunities for co-operation used. Such co-operation could considerably increase the resources available to the Programme. It was pointed out that the widespread activity of the University of the South Pacific provides a network of professional expertise that could be used in the Programme. Courses available will place increasing emphasis on man and the environment and environmental studies degree programmes are being developed based on a combination of social science and science courses. There is also considerable interest in the area of environmental law. In-service courses on environmental assessment are beginning - the first in November 1982 funded by ESCAP as part of SPREP. It was established that the universities of the region are a substantial internal resource which should be used to the fullest extent possible. ORSTOM is another research organization in the region with expertise highly relevant to SPREP. UNESCO offered to co-operate with SPREP in the fields of coral reef and mangrove ecosystems, and IOC offered West Pac II as a co-ordinating mechanism fo regional research. WHO through its PEPAS and environmental health unit would be able to help in many SPREP activities dealing with environmental health and pollution control, especially in water quality, waste disposal, solid wastes and pesticide control.

South Pacific Declaration on Natural Resources and the Environment

22. The conference reviewed the draft Declaration proposed by the SPREP Technical Meeting as a statement of regional policy on the environment. A number of revisions and additions were considered and incorporated. Three delegations did not accept the inclusion of paragraph 10 in the Declaration. With these reservations on paragraph 10, the Declaration was adopted by the conference (Annex 1).

Action Plan for Managing the Natural Resources and Environment of the South Pacific Region

23. The Action Plan was introduced as a guide to the South Pacific Regional Environment Programme for perhaps the next five years. It provides a framework for environmentally-sound planning and management suited to the region. The major components of environmental assessment, environmental management, legal measures and institutional and financial arrangements were then considered in detail and revised.

24. Delegates noted the need for information, particularly in areas such as coral reefs, currents, flora and fauna, and nuclear testing, but considered that the collecting and processing of information should not preoccupy the programme to the exclusion of action. The need for balance was emphasized. Assessments must be cost effective and must give priority to areas where projects were planned. Management measures should be audited to determine their effectiveness. It was noted that some sections of the Action Plan were already being implemented.

25. After considerable debate about the Pacific Island peoples' fears of nuclear pollution and the appropriate actions to take concerning nuclear waste storage and dumping and the effects of nuclear testing, a resolution on the question of nuclear waste was adopted. (Resolution No.1).

26. The Action Plan as revised was adopted by the Conference, with a reservation by France concerning the added paragraph 20.11 (Annex 2).

Administrative Arrangements and Financing for the next phase of SPREP

27. During the discussion on institutional and financial arrangements, the Conference decided that the Governments, through meetings every two years of the South Pacific Forum and South Pacific Conference, should make policy decisions concerning all substantive and financial matters related to the Action Plan.

28. The SPC, as the host organization for the SPREP Secretariat, should be responsible to the participating governments and administrations for the overall technical co-ordination and continuous supervision of the implementation of the Action Plan. This function would be carried out under the guidance of a Co-ordinating Group consisting of representatives of UNEP, ESCAP, SPC and SPEC with the representative of SPEC as Chairman.

29. The Co-ordinating Group:

a) would function much like the present group for the first phase of SPREP;
b) would rely on its secretariat to prepare proposals for its consideration in accordance with the Action Plan;
c) would normally meet twice a year to review, assess, and update the programme, and
d) would be open to governments and administrations participating in the programme who wished to attend the Group Meeting.

30. The establishment of the SPREP Secretariat should be as follows:

- Regional Co-ordinator,
- Scientific Assistant,
- Administrative Assistant,
- Secretary-typist.

31. The terms of reference for the Regional Co-ordinator should include the following functions:

a) to formulate project documents for specific activities agreed upon as part of the programme;

b) to negotiate and co-ordinate the execution of projects through international and regional organizations;

c) to collect, collate and prepare a first analysis of results achieved through the programme activities and disseminate information arising therefrom;

d) to organize expert meetings to be held in connection with the programme including the preparation of reports and other documents;

e) to keep the participating governments regularly informed of the progress achieved in carrying out the work, the results achieved and problems encountered.

32. SPREP Secretariat should:

a) serve as a referral centre providing information, identifying experts and institutions to aid participating states, and otherwise assist in solving specific environmental problems;

b) facilitate information exchange and co-operation among those experts and institutions; and,

c) use regional expertise and services where possible.

33. In order to achieve sufficient and well co-ordinated co-operation at both the national and the regional levels, a national focal point should be designated at a high level in each of the participating states to deal with all matters concerning the implementation of the Action Plan, such focal point having the following roles:

a) to act as the official channel of communication between the secretariat and the administration of the countries and territories;

b) to co-ordinate, as appropriate, the participation of national institutions and agencies in the agreed programme;

c) to consult with all relevant organizations in the national governments on the activities and progress achieved in implementing the Action Plan.

34. The Conference emphasized that national and regional institutions (such as research centres, laboratories, government services, universities) should provide the basis for carrying out the technical work of the Action Plan activities.

35. It recognized that the participation of the international organizations in the programme, in particular those belonging to the United Nations system, can greatly assist the implementation of the Action Plan, and, therefore, their technical and managerial support for specific projects should be solicited.

36. The Conference adopted a resolution (Resolution No.2) expressing appreciation for UNEP's role in supporting the development of the South Pacific Regional Environment Programme as part of its Regional Seas Programme.

37. The representative of UNEP reminded the Conference that:

a) UNEP's financial contribution to SPREP will depend on receipt of governments' contributions to the UN Environmental Fund in the 1982-1983 biennum;

b) for 1982, UNEP would be agreeable to having part of its contribution to the programme being utilized for co-ordination purposes, but, from 1983 onwards, UNEP would wish to see a substantial decrease in its contribution being utilized to meet co-ordination costs; the intention being that eventually all UNEP funds for the programme would be used to meet project costs;

c) the proposed UNEP contribution of US$ 200,000 for 1983 was subject to the approval of its Governing Council.

38. France, New Zealand and Australia expressed their willingness to give every support at the UNEP Governing Council, to SPREP as part of the Regional Seas Programme.

39. The Conference decided that, taking into account the various financial arrangements as reported above, the indicative budget of SPREP for the 1982-1983 would be as follows (in thousands of US$):

Source	1982	1983	Total
UNEP	200	200	400
SPC	71	52	123
SPEC	20	20	40
Special Government contribution	-	200	200
Total	291	472	763

Contributions to SPREP might be in cash or kind (e.g. provision of expert services).

40. A resolution summarizing the main points was adopted. (Resolution No.3).

Work Plan for the next phase of the Programme

41. The Secretariat presented the strategy it expects to follow in the development of the work plan, depending on the level of support available. A balance will be sought between assessment and management actions, and between country assistance, information, and education and training. Priorities can be drawn from the country reports, government requests and this Conference. Initial priorities selected for the next phase of the Programme will be submitted to the South Pacific Forum and South Pacific Conference this year.

42. Several governments indicated their priority areas in the Action Plan. It was emphasized that the Programme should not overextend itself by trying to undertake too many actions at once.

Closing of the Conference

43. The report of the Conference was adopted.

44. A resolution of acknowledgement to the Government of the Cook Islands was approved (Resolution No.4).

V. RESOLUTIONS

RESOLUTION NO.1

The Prevention of Storage and Disposal of Nuclear Waste

In furtherance of its declared policy on the prevention of the storage or disposal of nuclear waste in the Pacific region, the Conference resolves that the following actions should be taken:

(1) The Japanese, United States and other governments should be requested to abandon their studies of specific proposals to store or dispose of nuclear waste in the Pacific regional environment. They should be strongly urged to research alternative methods of disposal outside the region.

(2) Each country and territory of the region should be requested to accede to the London Dumping Convention. A regional meeting should be held preferably before the end of 1982 so that these countries and territories can prepare a common regional agreement. This would enable them to invoke the provisions of Article VIII of the London Dumping Convention, and thus ensure that the regulatory framework of the Convention incorporates the prohibition on storage and disposal which has been adopted as a policy of the South Pacific Regional Environment Programme (SPREP).

(3) The Co-ordinating Group should include follow up activities in the work plan including the presentation of the regional agreement to the meeting of parties to the London Dumping Convention in February 1983, and notification to all interested governments and international agencies of the common policy of SPREP participants. The Group should facilitate actions by individual countries and territories to this end.

RESOLUTION NO.2

Appreciation to UNEP

The Conference expresses appreciation for UNEP's role in supporting the development of SPREP as part of its Regional Seas Programme. This Conference also requests the Executive Director of UNEP to continue UNEP's association with SPREP through participation in the joint SPC/SPEC/ESCAP/UNEP Co-ordinating Group and by providing matching funds (US$ 200,000 for 1982 and the same amount for 1983) to those expected to be contributed by the Governments of the region for the implementation of SPREP.

RESOLUTION NO.3

Institutional and Financial Arrangements

Taking into account that a decision has already been made to entrust the South Pacific Commission with the responsibility of the Secretariat, the Conference resolves that:

(1) The Secretariat be established as an independent entity within the South Pacific Commission;

(2) Reporting to the South Pacific Forum and the South Pacific Conference be restricted to budgetary matters and to programme priorities;

(3) The Co-ordinating Group through the Secretariat be requested to circulate to Governments, well in advance, draft reports every two years to the South Pacific Conference and the South Pacific Forum for comment and amendment;

(4) Governments be requested to make additional contributions to the South Pacific Commission earmarked for the South Pacific Regional Environment Programme and assessed according to the South Pacific Commission scale current at the time of the assessment, or by some other formula to be decided upon by governments;

(5) Countries not contributing to the fund according to paragraph 4 be requested to contribute on a voluntary basis according to their ability;

(6) A target figure for the member countries contributions for 1983 be set at $ 200,000; and

(7) The Conference requests the Executive Director of United Nations Environment Programme to provide matching funds.

RESOLUTION NO.4

Acknowledgement to the Government of the Cook Islands

The Conference on the Human Environment in the South Pacific:

Having met in Rarotonga from 8th to 11th March 1982 at the generous invitation of the Government of the Cook Islands;

Having adopted the South Pacific Declaration on Natural Resources and the Action Plan for Managing the Natural Resources and Environment of the South Pacific Region;

Recognizing that the preparations made and the assistance provided by the Government of the Cook Islands contributed greatly to the smooth running of the Conference;

Appreciative of the generous hospitality extended by the Government and the people of the Cook Islands to members of the delegations, the observers, and the Secretariat attending the Conference;

Expresses its gratitude to the Government and the people of the Cook Islands.

VI. DOCUMENTS PRESENTED

Working Papers

SPREP/Conf.Human Environment/	W.P.1	The State of the Environment in the South Pacific
	W.P.2	Draft South Pacific Declaration on Natural Resources and the Environment.
	WP.2/Rev.1	South Pacific Declaration on Natural Resources and the Environment
	W.P.3	Draft Action Plan for Managing the Natural Resources and Environment of the South Pacific Region.
	WP.3/Rev.1	Action Plan for Managing the Natural Resources and Environment of the South Pacific Region
	W.P.4	Proposed Institutional and Financial Arrangements required for the Implementation of the Action Plan for the South Pacific Region.

Information Papers

SPREP/Conf.Human Environment/	Information Paper 1	Programme Proposal from the Seminar on South Pacific Women. (Papeete, Tahiti, 20-24 July 1981)
	Information Paper 2	Regional Contingency Planning Considerations (Inter-Governmental Maritime Consultative Organization - IMCO)

Information Paper 3	National Contingency Planning Guidelines (IMCO)
Information Paper 4	A World Energy Organization (Maxwell Bruce/Joseph Rotblat)
Information Paper 5	Framework for Regional Marine Oil Spill Contingency Plan (IMCO)
Information Paper 6	New Zealand Atlas of Coastal Resources (New Zealand Commission for the Environment - Wellington)
Information Paper 7	Marine Environment Protection and the London Dumping Convention 1972 (Cdr. Terence M. Hayes - IMCO)
Information Paper 8	Envisioned role of the University Of the South Pacific in the South Pacific Regional Environment Programme (SPREP) (Randy Thaman - USP)
Information Paper 9	Training Workshop on Oil Spill Response (Guam, 26-30 April 1982)
Information Paper 10	List of PEPAS-supported Inter-Regional, Regional and National Wokshops/Courses/Seminars/ Meetings (WHO-PEPAS)

Country Reports

SPREP/Country Report	1	AMERICAN SAMOA
	2	AUSTRALIA
	3	COOK ISLANDS
	4	FIJI
	5	FRENCH POLYNESIA
	6	GUAM
	7	KIRIBATI
	8	NEW CALEDONIA
	9	NIUE
	10	PAPUA NEW GUINEA

11 PITCAIRN
12 TOKELAU
13 TONGA
14 TRUST TERRITORY OF THE PACIFIC ISLANDS
15 VANUATU
16 WESTERN SAMOA
17 SOLOMON ISLANDS
18 TUVALU

Topic Reviews

SPREP/Topic Review 1 Report on the Mining Pollution in New Caledonia
(M. Benezit)

2 Parks and Reserves in the South Pacific
(P.H.C.Lucas/S.Gorio/K.Poai)

3 Urbanization and its effects on the South Pacific Environment
(John Low)

4 Making Better Use of Existing Knowledge in Managing Pacific Islands Reef and Lagoon Ecosystems
(Robert Johannes)

5 Mangrove Resources and their Management in the South Pacific
(Graham Baines)

6 Environmental Health in Rural Development- An Overview
(Eric Dunn)

7 Soils of the South Pacific - their Capabilities and Limitations
(J.D. Cowie)

8 Forestry and Environment in the South Pacific
(S.D. Richardson)

9 Oceanic Fisheries Impact on the Environment in the South Pacific
(FAO/Fisheries Resources & Environment Div.)

10 Comments on Pest and Pesticide Control (K.M. Harrow)

11 Marine Pollution in the South Pacific (Cruz A. Matos)

12 Activities of the Inter-Governmental Maritime Consultative Organization in the South Pacific relating to Marine Pollution Prevention Control and Response (Terence M. Hayes)

13 An Overview of Environmental Protection Legislations in the South Pacific countries (S.Venkatesh/S.Va'ai)

ANNEX 1

SOUTH PACIFIC DECLARATION ON NATURAL RESOURCES AND THE ENVIRONMENT

This Conference :

Having regard to the Declaration of the UN Conference on the Human Environment adopted in Stockholm in 1972 and the desirability for a regional declaration within the South Pacific framework;

Noting the World Conservation Strategy;

Recognizing that the environment of the South Pacific Region has features such as tropical rain forests and small island/lagoon/reef ecosystems which require special care in responsible management;

Taking into account the traditions and cultures of the Pacific people which incorporate wise management, born of their long history of living successfully in the region, as expressed in accepted customs and rules of conduct;

Seeking to ensure that resource development for the benefit of the people shall be in harmony with the maintenance of the unique environmental quality of the region and the evolving principles of sustained resource management, particularly in view of increasing population densities;

Building on the established processes of regional co-operation based on independence, consultation and consensus;

Declares that :

1. The resources of land, sea and air which are the basis of life and cultures for South Pacific peoples must be controlled with responsibility, and safeguarded for the benefit of present and future generations, through sustained resource management.

2. Integrated environmental, economic, social and resource planning and management is essential to ensure sustainable rational use of the land and sea resources of the region, and the greatest enhancement of human well-being.

3. An effective programme of public information, education and training is necessary to promote basic environmental understanding by the people, as well as the skills necessary for effective environmental assessment and management.

4. Appropriate and enforceable legal instruments and institutional arrangements are a necessary basis for effective integration of environmental concern with the whole development process.

5. A system of specially-designated areas such as national parks and reserves is essential for the protection of traditional use of resources, and should be included in resource use planning.

6. The economic utilization of resources, particularly forests and fisheries, should be based upon reliable information to ensure sustainable production without over-exploitation or damage to the environment and affected peoples.

7. Management of the growth and distribution of population should be encouraged to ensure adequate management of natural resources and to maintain adequate standards of human well-being.

8. The rate and nature of discharges of non-nuclear wastes shall not exceed the capacity of the environment to absorb them without harm to the environment and to the people who live from it.

9. The storage and release of nuclear wastes in the Pacific regional environment shall be prevented.

10. The testing of nuclear devices against the wishes of the majority of the people in the region will not be permitted.

11. The vulnerability of much of the region to environmental and economic damage from natural and man-made disasters requires the development of national and regional contingency plans and prevention programmes.

12. Regional co-operation should be further developed as an effective means of helping the countries and territories of the South Pacific to maintain and improve their shared environment and to enhance their capacity to provide a present and future resource base to support the needs and maintain the quality of life of the people.

13. Traditional conservation practices and technology and traditional systems of land and reef tenure adaptable for modern resource management shall be encouraged. Traditional environmental knowledge will be sought and considered when assessing the expected effects of development projects.

14. Involvement and participation of directly affected people in the management of their resources, including the decision-making process, should be encouraged.

ANNEX 2

ACTION PLAN FOR MANAGING THE NATURAL RESOURCES AND ENVIRONMENT OF THE SOUTH PACIFIC REGION

I. INTRODUCTION

1. The South Pacific Region has been designated by the Governing Council of the United Nations Environment Programme as a "concentration area" in which UNEP, in close co-operation with ESCAP and other relevant components of the UN system, working through the established co-operative regional agencies - the South Pacific Commission (SPC) and the South Pacific Bureau for Economic Co-operation (SPEC) - will fulfil its catalytic role by fostering the design and adoption of a regional Action Plan by the countries of the region.

2. The area of application of the Action Plan is that covered by the area of reponsibility of the South Pacific Commission, together with any associated national maritime resource management zones.

Countries and territories within this area are :

American Samoa
Cook Islands
Federated States of Micronesia
Fiji
French Polynesia
Guam
Kiribati
Marshall Islands
Nauru
New Caledonia
Niue
Northern Mariana Islands
Palau
Papua New Guinea
Pitcairn Island
Solomon Islands
Tokelau
Tonga
Tuvalu
Vanuatu
Wallis and Futuna
Western Samoa

II. OBJECTIVES

3. The principal objective of the Action Plan is --"to help the countries of the South Pacific to maintain and improve their shared environment and to enhance their capacity to provide a present and future resource base to support the needs and maintain the quality of life of the people."

4. The Action Plan is intended to provide a framework for environmentally sound planning and management, suited to the needs and conditions of the countries and people in the region, and to enhance their own environmental capabilities. Particular projects which should be undertaken under the Action Plan will be developed later in an operational programme document. The more specific objectives of the Action Plan are :

4.1 Further assessment of the state of the environment in the region including the impacts of man's activities on land, fresh water, lagoons, reefs and ocean, the effects of these on the quality of man's environment, and the human conditions which have led to these impacts.

4.2 The development of management methods suited to the environment of the region which will maintain or enhance environmental quality while utilizing resources on a sustainable basis.

4.3 The improvement of national legislation and the development of regional agreements to provide for responsible and effective management of the environment.

4.4 The strengthening of national and regional capabilities, institutional arrangements and financial support which will enable the Action Plan to be put into effect efficiently and economically.

III. HISTORICAL BACKGROUND

5. Regional activities providing formative guidelines for the Action Plan have been :

5.1 A regional symposium on reefs and lagoons organized by SPC in 1971.

5.2 The initiation by SPC of a Special Project on Conservation of Nature in 1974, and the appointment of a Regional Ecological Adviser.

5.3 Consultations with UNEP leading to the suggestion that a South Pacific Conference on the Human Environment should be held in the region.

5.4 The request by UNEP in 1975 to SPC to develop a comprehensive programme for environmental management for the region, including a Regional Conference on the Human Environment.

5.5 The decision of the South Pacific Forum in 1976 that SPEC should consult with SPC with a view to preparing proposals for a co-ordinated regional approach to the problem of environmental management.

5.6 The direction of the South Pacific Conference (1976) that a comprehensive environmental programme reflecting the environmental interests of all countries and territories in the region be jointly prepared by SPEC and SPC.

5.7 The reiteration of UN support for the programme at the ESCAP/UNEP Joint Programming Meeting in Bangkok in 1977.

5.8 The endorsement by the 34th Session of ESCAP held in Bangkok in March 1978 of "the idea of convening a South Pacific Conference on the Human Environment, and recommended that such a conference should be held in co-ordination with SPEC and SPC."

5.9 Successive considerations of the proposal submitted to the Forum and the South Pacific Conference leading to refinement and re-definition of the proposal by a special meeting of officials in 1978 and subsequent adoption of the South Pacific Regional Environment Programme by the South Pacific Forum and the South Pacific Conference later that year.

5.10 The preparation of "country reports" by 18 governments of countries of the region as official statements on the state of the environment, the trends and problems.

5.11 The preparation by invited specialists of "Topic Reviews" of fields identified as of wide importance to the region from analysis of the country reports.

5.12 The consideration of the country reports and the topic reviews by a Technical Meeting of representatives of participating countries.

5.13 The very substantial scientific investigations which have been carried out and reported on in the region covering geology, soils, seas, plants and animals and their inter-relationships, together with a smaller but increasing body of investigation into socio-economic factors and the relationship of man to his environment.

5.14 The contributions of institutions of higher education and research in the region, and the provision of effective platforms for regional discussion (South Pacific Forum and South Pacific Conference), and to established bodies for regional action (SPEC and SPC).

IV. NATURE OF THE ACTION PLAN

6. All components of the Action Plan are inter-dependent and provide a framework for comprehensive action which should contribute to both the protection and continued development of the region. Each activity is intended to assist governments and regional organizations to improve the quality of the information on which environmental management policies are based.

7. The Action Plan will be implemented by making the fullest possible use of government and independent institutions in countries of the region, supplemented by appropriate regional bodies (SPC and SPEC), with assistance from participating countries and international institutions. For some projects, the assistance of experts from inside and outside the region will be required.

8. Efforts should be made to co-ordinate the implementation of the Action Plan with activities being undertaken in other Regional Seas Programmes, particularly those adjacent to the region.

9. In a subsequent step, the environmental assessment and management components of the Action Plan will be developed in the form of an operational programme document, taking into account current and planned programmes of the participating countries and regional and international organizations.

V. ENVIRONMENTAL ASSESSMENT COMPONENT

10. Many of the country reports indicate that policy makers consider environmental management to be primarily concerned with pollution controls and preservation. The programme will seek to emphasize that environmental assessment should attempt to establish harmony in the use of natural resources viewed from the true well-being of people at present and of future generations.

11. An essential element of the Action Plan must be the gathering of information on the processes taking place in nature in typical environments of the region and how man is modifying these natural processes for better or for worse. Special consideration should be given to this element at the earliest stage of planning development proposals. A working information exchange at which the findings of relevant work are assembled, wherever it has been done, and made available in a readily usable form, is a basic requirement.

12. A directory of institutions and professionals in the region with expertise in fields relevant to environmental assessment and management is a basic resource that is essential to efficient use of expert manpower. The SPC has the production of such a directory under consideration. It should be given high priority as a preparatory document necessary for the implementation of the Action Plan.

13. Although the region has only limited capacity to carry out research basic to the wise management of the environment, there are some very active research centres. An extensive body of knowledge already exists. Integrating studies building on the basic data available and translating them into "process" terms on which management effects can be superposed would, if well presented, probably attract the interest and participation of research institutions of high standing and capacity. Examples are the land/lagoon/reef ecosystem and the maintenance of fertility in tropical forest soils.

14. The region is short of local expertise in disciplines basic to the understanding and monitoring of natural and human-induced processes and to the management of man-induced land use systems such as agriculture and forestry. It also lacks the skills of inter-disciplinary integration which are necessary for sound environmental assessment. A practical means of creating such expertise would be to include suitable programmes of basic study and training programmes in environmental assessment at appropriate institutions within the region. Post graduate training in inter-disciplinary integration requires special emphasis.

15. Initial areas which have been identified as requiring environmental assessment on a regional basis are :

15.1 The impact of sediments, tailings, nutrients, and metallic and organic pollutants on the river and lagoon/coral reef ecosystems.

15.2 The impact of land use, and industrial and urban development on mangrove ecosystems.

15.3 The impact of off-shore sea bed exploration and exploitation, and the processing of marine products, on the marine and adjoining ocean environment.

15.4 The impact of marine oil spills on sensitive coastal environments of the region.

15.5 The impact of tourism development on land/lagoon/reef ecosystems.

15.6 The impact of urbanization and increasing population density on representative environments of the region.

15.7 The impact of storage and utilization of pesticides on the small island environment.

15.8 The impact of subsistence and commercial activities on forests of the region, including the impact of the burgeoning demand for unprocessed logs for use outside the region.

15.9 The impact of development on the quality and quantity of available fresh water.

15.10 The impact of natural and artificial radioactivity on people and the environment including in particular the effects of nuclear testing.

15.11 The potential dangers to the region of the storage and dumping of hazardous wastes, particularly nuclear wastes, anywhere in the Pacific.

15.12 The impact of modern education systems and current development trends on traditional systems of resource management.

15.13 The impact of modern commercial agricultural production on traditional food and agricultural systems and the environment.

16. Effective environmental assessment on a regional basis requires acceptance of standards and procedures throughout the region, so that meaningful comparisons can be made. In general, this will involve adoption of compatible standards and procedures developed elsewhere but, where necessary, adapting them to Pacific conditions.

Examples are :

16.1 The adoption of standardized analytical techniques for measuring levels and trends of pollution and its effects.

16.2 The development of quality control in analytical procedures such as inter-laboratory calibration exercises both within the region and with outside reference laboratories.

16.3 The development of centres of expertise in equipment maintenance which could be available throughout the region.

16.4 The development of regionally compatible methodologies for the handling, validation, and evaluation of data basic to environmental assessment.

16.5 Though there will be variation in detail in assessment procedures according to differences in machinery of government, a standardization of terminology in the assessment process would assist in developing regional compatibility.

17. Successful regional assessment depends on the capacity of individual countries to undertake effective local assessment. Countries will be encouraged and assisted to establish mechanisms for effective environmental assessment suited to their own particular conditions, cultures, resources, and needs.

VI. ENVIRONMENTAL MANAGEMENT COMPONENT

18. Continuing socio-economic development in the region can only be achieved on a sustainable basis if environmental considerations are incorporated into the designing of developments. Improved knowledge of environmental systems may now enable some environmental errors of the past to be corrected and avoided in future.

19. The aim of the environmental management component of the Programme should be :

19.1 To ensure that environmental assessments are thoroughly and effectively carried out, and that the results are incorporated into management programmes.

19.2 To strenghen environmental education in school curricula and to support programmes to increase community awareness of environmental issues.

19.3 To ensure that adequate training is provided for all levels of environmental management, so that skilled people are available within the region.

19.4 To train managers and policy makers on how to take environmental considerations into account in management programmes.

19.5 To encourage the development and effective placement of people skilled in environmental aspects of development.

19.6 To devise ways of making wise use of natural resources (such as land, water, minerals, and forests), balancing utilization with conservation and preservation, and the needs of present people with the needs of future generations.

19.7 To adapt to changing patterns of energy availability without damaging the environment, including the use of new sources.

19.8 To ensure that national and regional environmental management systems are compatible and complement each other.

19.9 To develop the framework of laws and international agreements necessary for wise regional environmental management.

20. Certains areas which are regarded as regionally important are:

20.1 The management of the land/lagoon/reef ecosystem to maintain its health and condition.

20.2 The balanced management of mangrove ecosystems to maintain their many uses including fisheries.

20.3 The study of traditional land and marine tenure systems and their reconciliation with environmental management, especially in relation to conservation and the designation and management of reserves.

20.4 The management of forests in such a way as to safeguard their health and vigour.

20.5 The monitoring and publishing of international prices for commodities from the region and of royalties and taxes deriving from their production.

20.6 The development of national contingency plans integrated with a regional control plan to minimize the effects of major oil spills.

20.7 The management of fertilizers, pesticides, and herbicides in a small island environment to minimize their adverse effects on the environment and people.

20.8 The continued gathering of information on the populations and movements of important types of fish throughout the region.

20.9 The minimization of deleterious environmental effects of urbanization in the South Pacific.

20.10 The development of a strategy for prohibiting the storage and disposal of nuclear waste in the region.

20.11 The development of strategies to prohibit the testing of nuclear devices within the Pacific region against the wishes of the majority of the people.

20.12 The development of regional policies for the disposal of non-nuclear wastes.

20.13 The reconciliation of tourism development and protection of the environment in the South Pacific.

20.14 The development of mining methods with minimum deleterious effects on the environment.

20.15 The selection, dedication, and management of reserves, both land and marine, and their incorporation into a planned regional pattern of reserves.

20.16 The development of regional programmes for the safeguarding of regionally important endangered species of plants and animals - land and marine.

20.17 The consideration of means, appropriate to the countries of the region, of bringing the environmental factor effectively into government decision making.

20.18 The development of an effective environmental information exchange to ensure that the best available knowledge can be applied to environmental management in the region.

20.19 The development of a regional programme to control litter problems giving primary consideration to recycling and reuse and export of recoverable materials.

20.20 The development of appropriate sub-regional programmes to ensure the supply of safe domestic water.

20.21 The recording and revived use of traditional knowledge of island natural resources in order to complement scientific knowledge in the management of those resources.

20.22 The consideration of the effects on the environment and the economy of the introduction of exotic plants and animals.

20.23 The minimization of the adverse impacts of commercial agricultural development on traditional food and agricultural systems and on the environment.

20.24 The auditing of the effectiveness of previous environmental management decisions.

VII. THE LEGAL COMPONENT

21. Legal agreements generally provide the fundamental basis for regional co-operation to protect the environment. But in the South Pacific region, there is a wide diversity of approaches to environmental law and very different stages of legal development. Countries have expressed their need for assistance in developing their environmental legal controls and assessing the advantages and disadvantages of becoming parties to international conventions.

22. Most of the countries are small island states and still practise customary controls. For legislation to be effective, it must, as far as possible, be harmonized with customary practices to ensure that laws are effective and can be enforced.

23. The Convention on Conservation of Nature in the South Pacific (1976), not yet in force, could serve as a legal basis for regional co-operation on conservation in the region. A revised convention consistent with evolving principles of environmental management may need to be considered.

24. The legal component should :

24.1 Identify existing customary controls, local by-laws and national legislation relevant to the protection and conservation of the environment. This should be done by national administrations.

24.2 Examine and determine the most appropriate mechanism to harmonize the implementation of controls to ensure maximum effectiveness including examination of the need or otherwise to update, amend or pass new legislation. This can be done by national administrations with assistance from the programme.

24.3 Examine the advantages of participation by countries in international conventions on the environment with particular emphasis on conventions on pollution of the environment by any source. This should cover the International Composite Negotiating Text of the United Nations Conference on the Law of the Sea and the London Dumping Convention. Individual countries should seek advice on appropriate national legislation to give effect to international conventions.

25. Expertise to undertake studies should as far as possible be recruited from the region and have the requisite knowledge of traditional customs of the region. In that respect, the programme should keep in close contact with the Regional Advisory Services being established in the region by the Commonwealth Secretariat and other regional institutions in the South Pacific.

VIII. INSTITUTIONAL AND FINANCIAL ARRANGEMENTS

26. In formulating institutional arrangements for carrying out the Action Plan, mechanisms should be worked out which use the national capabilities available and the capabilities of existing regional organizations. Where necessary, both national and regional institutions should be strengthened so that they have the capacity to put the Action Plan into effect. The designation of national focal points - a concept which proved successful in the assembly of the country reports - should be used to facilitate communication and co-operation in the region.

27. The financing of operations under the Action Plan will be principally concerned with :

27.1 Increasing the technical capacities and breadth of coverage of national and regional institutions to put the Plan into effect.

27.2 Providing funds for personnel training inside and outside the region.

27.3 Providing the costs for regional studies and meetings to develop common approaches to and understanding of regional environmental matters.

27.4 Providing resources for special studies necessary for effective regional environmental management, but outside existing available capacities.

27.5 Providing resources to establish and operate a regional information exchange system.

27.6 Providing resources for the existing regional bodies to operate an adequate administrative base to service the implementation of the Action Plan.

28. The activities arising from this Action Plan should be principally financed by participating governments, by regional organizations, by international agencies, and by non-governmental organizations. Initially support should be provided by the United Nations system as a catalytic initiation of a new phase of regional co-operative activity.

29. To provide for the orderly evolution of an operational programme from the Action Plan, a central co-ordination mechanism is necessary involving the existing regional organizations and the major funding agencies.

30. The present Co-ordinating Group, consisting of representatives of UNEP, ESCAP, SPC and SPEC, should be retained as the central co-ordinating mechanism for the implementation of the Action Plan. The membership of this Group should be readily adjustable to reflect the emphasis of the programme and of its funding sources.

31. The Secretariat, including a Regional Co-ordinator, who could also perform the functions of the SPC Regional Ecological Adviser, should be appointed to cover the day-to-day execution of the operational programme including active communication with the co-operating organizations and the designated national focal points.

32. The ultimate aim should be to make the regional programme self-supporting, part of the normal programme of co-operative regional activities which would incorporate the SPREP objective "to help the countries of the South Pacific to maintain and improve their shared environment and to enhance their capacity to provide a present and future resource base to support the needs and maintain the quality of life of the people".

APPENDIX

THE STATE OF THE ENVIRONMENT IN THE SOUTH PACIFIC

Arthur Lyon Dahl and Ian L. Baumgart
(SPREP Secretariat)

Introduction

The South Pacific Regional Environment Programme has collected enough information through country reports and topic reviews to make a summary overview of the state of the environment in the South Pacific region. It is thus possible to examine the shared heritage of land, sea and living things that is common to all South Pacific peoples, as well as the environmental problems that are becoming widespread in the region. This overview can provide the basis for shared approaches to environmental management and problem-solving.

The environmental approach is now widely recognized and used throughout the world. The environment refers to all our surroundings, especially those affecting people or other living things. Thus, it includes the land, sea and air, the plants, animals and micro-organisms, the weather and seasons, the houses and towns that we build, and everything else made by man or nature that can have an effect on our lives. We depend on the environment for development and for our very survival. When we must look at a project and determine the value, cost and likelihood of its environmental effects or impacts, we make an environmental assessment. Man has long used and manipulated the natural world for his benefit. As we become aware of the importance of the whole environment to our well-being and our dependence on it, we must learn what actions we can take to maintain effective control of our environment and natural resources through environmental management.

Underlying the concept of the environment is the science of ecology which studies the relationships between living things and their environment. It originated as a branch of biology, but now shares many features with other sciences such as geography and anthropology. Ecology includes the study of individual organisms, of communities, and of ecosystems, which are the working ecological systems consisting of communities of living things in interaction with their physical environment.

For many people, the environment means only the conservation of nature and the prevention of pollution by harmful or offensive substances that make some part of the environment dirty or dangerous. However, the World Conservation Strategy defines conservation as "the management of human use of the biosphere (all life on the earth) so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations". The environment itself is now seen to involve all aspects of natural resource management and the human habitat, or places where we live.

The common environmental heritage of the South Pacific

All the countries and territories in the South Pacific Commission area from Papua New Guinea to Pitcairn share a common environmental heritage as islands originating through certain common processes. Some islands in the western part of the region are based on fragments of continental rock that have broken off from larger land masses, while the remainder have volcanoes rising from the sea floor as their foundations. Limestone deposits from coral reef growth may occur on either base.

Changes in the relative sea level in past ages from the rising and falling of both the sea bottom and the ocean surface have produced the four island types characteristic of the region. The larger continental islands have complex geology and landforms. The volcanic islands built of lava and volcanic ash vary principally according to their age and the amount of weathering. Elevated reef islands are atolls or reefs raised above the sea surface, with or without overlying soil deposits from volcanic ash or other non-reef origin. Atolls and other low islands are made of sand and coral rubble accumulated on reef platforms at or near sea level. The different island types occur in many combinations throughout the region, and are often mixed on the same island.

Each island type has its particular environmental problems and susceptibilities which tend to be common to areas of that type, a fact which can facilitate the regional exchange of experience and information.

All of the region is within the area of coral reef growth, and the presence of coral reefs is one of the principal characteristics of the South Pacific marine environment. Coral reefs are one of the most ancient and highly-evolved ecosystems on earth, and as such they are complex, dynamic, and fragile if pushed beyond their limits. The Indo-Malaysian area is the centre of coral reef evolution and diversity, so that the reefs are richest to the west of the South Pacific region, and the number of species present gets smaller to the east. The coral reef ecosystem is still not well understood. For instance, recent studies have shown that corals and reef communities can change greatly in even a very short time. It will be possible to develop principles for managing the coral reef environment only by sharing information and experience from all reef areas.

The land plants and animals of islands are subject to special evolutionary pressures that make island flora and fauna unique in the world. The ocean isolates island populations from the major continents. Some continental islands have kept communities that are relics from the time when they were part of a continent in the distant past. Most islands were colonized by immigrant species that managed to cross the sea, often through a rare accident. Because islands are small and their populations restricted, a natural disaster can easily make a local species extinct. The balance of immigration and extinction depends on the size of the island and its distance from other islands and continents and determines how many kinds of plants and animals an island will have.

Because islands are small and isolated, the species that colonize them face different conditions and have less competition than in larger land areas. This leads to rapid evolution into new species with special features adapted just to that island and found nowhere else in the world. Most high islands in the Pacific have at least some such species, and some have very high levels of species found only on that island group (80% or more). These species are an important part of both the island system and the world biological heritage, and as such their preservation is of great importance. While in most instances species conservation will be a national responsibility, the experience gained in managing one species will be valuable to other countries facing similar problems.

Island species do not live in complete isolation. They make up communities and ecosystems such as a mountain forest, swamp or barrier reef in which each species depends on others for its food, its shelter, its reproduction and often its very survival. Conservation and environmental management must thus focus largely at the ecosystem level.

The Regional Ecosystems Survey of the South Pacific Area (SPC Technical Paper No. 179) estimates that there are roughly 2,000 kinds of ecosystems in the South Pacific area. Some of these occur in every country of the region, and others may be highly localized in a single valley, lake or lagoon. Many of these ecosystems are critical habitats where commercially important species live or breed, and others are essential to island resources upon which local people depend. Their conservation is necessary for the physical and economic well-being of the inhabitants.

Even where ecosystems differ from country to country, they share many common features based on ecosystem and island type which allow the development of regional approaches to their management.

While the Pacific Ocean divides the South Pacific countries, it also unites them in a single environmental system. The waves, currents and weather do not respect national boundaries, and any major alteration or contamination could have widespread effects. The resources of this regional ecosystem are shared by all the countries. Migratory species such as the tunas, sea turtles and many birds pass in and out of many countries' jurisdictions. One country may bear the responsibility of protecting a breeding area, while another benefits from the harvest. Very little is known about the ocean transport of juvenile marine life. The population balance of marine life on an island may depend on a supply of spores or larvae from other islands up the current. The more the regional ocean system is studied, the more interactions are certain to be discovered. Co-ordinated approaches to ocean resource management are therefore essential.

Environmental management is not a new concept for Pacific peoples. Wherever natural resource management was needed, the traditional cultures of the region developed practices which protected their essential interests. These included land and reef tenure systems, permanent and temporary taboos on species or places, refined and selective fishing techniques, agroforestry, terracing and irrigation, windbrakes, bush fallow, and other agricultural and soil management practices, etc. The cultural heritage of the Pacific is full of examples of sound environmental management equivalent or superior to modern methods. One of the great tragedies of the region is that this heritage is rapidly being lost just as the need for it is increasingly apparent.

The State of the Environment

The South Pacific has too often been viewed from outside as an unspoiled tropical paradise. It is true that life in the Pacific Islands is not as difficult as that in many other parts of the world, and that the climate and available resources permitted a quality of life that was traditionally higher than many other subsistence societies. However, even traditional island communities were limited by their environmental resources, and change and development have led to an increasing number of environmental problems.

The country reports and topic reviews prepared for the South Pacific Regional Environment Programme(*) indicate the priority problem areas that affect the state of the environment in the South Pacific region.

SOILS. Soil is the essential basis of agriculture and forestry, and in the islands it often limits both development and self-sufficiency. Under the bush fallow system of subsistence farming, soil fertility was largely maintained, but more intensive agriculture and the pressures to clear and use land with marginal or unsuitable soils have led to serious soil problems in some parts of nearly all countries of the region.

Over 60% of the countries report soil erosion problems, generally associated with agriculture or pasture creation on steep slopes, timber extraction in forest areas, or other land clearing and construction activities. The loss of soil fertility and organic matter and the deterioration of soil structure, both in cleared tropical forest soils and the very porous and poor soils derived from coral, are evident in the majority of countries. Since the vulnerable island soils are an essential natural resource that cannot easily be replaced, these losses represent an important permanent reduction in island productive capacity. Careful soil management is therefore necessary where the natural vegetation and soil cycle are modified. The soils are generally well characterized and mapped throughout the region (although not to a common soils classification), but the available knowledge in managing similar soils has not been well applied locally.

MINERALS. The most commonly used minerals in the islands are sand and aggregate used for construction. Supplies of these materials are often limited in the smaller islands, and more than half the countries report environmental problems associated with their extraction. Quarrying leaves pits and cuts that are difficult to restore. Sand removal from beaches leads to beach loss and coastal erosion. Dredging of sand and coral from the reef or lagoon bottom destroys productive fisheries resources and produces pollution.

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*: SPREP country reports : (1) American Samoa, (2) Australia, (3) Cook Islands, (4) Fiji, (5) French Polynesia, (6) Guam, (7) Kiribati, (8) New Caledonia, (9) Niue, (10) Papua New Guinea, (11) Pitcairn, (12) Tokelau, (13) Tonga, (14) TTPI, (15) Vanuatu, (16) Western Samoa, (17) Solomon Islands, (18) Tuvalu. SPREP Topic Reviews : (1) Mining Pollution, (2) Parks and Reserves, (3) Urbanization, (4) Managing Island Reef and Lagoon Ecosystems, (5) Mangrove resources and Management, (6) Environmental Health in Rural Development, (7) Soils, (8) Forestry, (9) Oceanic Fisheries Impact, (10) Pest and Pesticide Control, (11) Marine Pollution, (12) Activities of the IMCO relating to Marine Pollution, (13) Environmental Protection Legislations.

The need to obtain construction materials without serious environmental costs has become a major preoccupation in several South Pacific countries. Other minerals are economically important for some countries which have major mining projects for copper, nickel, phosphates, gold and other metals. Most of these projects were started at a time of little environmental concern, and have led to major problems of land degradation, mine waste and tailings disposal, and erosion. 30% of the countries in the region report problems of this sort.

WATER. Water is, of course, essential for life, and it is often one of the most limited island resources. More than 60% of the countries report some problem of water shortage. The problem has become worse as many water resources have been poorly managed in the past. Rivers and lakes have been polluted and their water quality degraded. Water catchments have been poorly managed and often cleared of vegetation. Those areas dependent on catching rain water find the supply inadequate during droughts and that catchment systems have maintenance and pollution problems. Some islands are dependent on groundwater and others are increasingly turning to their groundwater resources, requiring expensive wells and pumping. There are an increasing number of problems in the islands of groundwater pollution , and of over-use leading to contamination with seawater. Changes in land use have interfered with the recharge of groundwater reserves, and increased the risk of contamination accidents. Since water is essential for most kinds of development, increasing care will be needed to manage existing island water supplies wisely.

FORESTS. Most South Pacific islands were originally covered by tropical forest. It is the forest that maintains soil fertility, stabilizes the water supply, and provides wood and other materials for the local population. With development of the islands, most coastal and lowland forests have been converted to other uses, and there is increasing forest clearance in higher areas. Forest loss is cited as a significant problem in 70% of the country reports. The forest is cut both to clear land for agriculture and other uses, and for commercial logging. Some is also lost through fire and storm damage. With the destruction of the forest cover come problems of erosion, loss of soil fertility, soil compaction by heavy equipment, lack of adequate forest regeneration, and the expense and difficulty of reafforestation. In many countries, the forest harvest is inadequate to meet even local demand. Others export considerable volumes of unprocessed logs. There is some controversy over the economic benefits to the islands of large scale logging, with its major local impacts on land resources and coastal areas. Smaller-scale projects may be more appropriate both for island economies and cultures, and for the island environment. Several countries report problems of frequent grassland and forest fires which degrade the land and destroy forest resources. The tropical forest can either be treated as a non-renewable resource and "mined" for its immediate economic value, or managed as a sustainable resource from which the economic and environmental returns can continue indefinitely.

CONSERVATION of FAUNA and FLORA. The unique island natural heritage of plants and animals has been discussed in the first part of this report. Considerable progress has been made over the last decade to conserve some of this heritage, and over 100 parks and reserves have been created in some 15 countries of the region. However, these protected areas still include only a small proportion of the fauna, flora, unique sites, and ecosystems of the South Pacific region. Furthermore, enforcement of existing conservation laws and protected areas is often difficult. Many extinctions of unique plant, animal and bird species have already been caused by man in the islands, and more species are endangered by extinction now. Two-thirds of the countries report problems with endangered species. A much greater effort is therefore needed to ensure the survival of this unique natural heritage of world significance. Such conservation projects are important not only for resource management, but also for tourism and education. The Convention on Conservation of Nature in the South Pacific will assist regional co-operation in conservation once it comes into force.

CROPS and LIVESTOCK. While agriculture is of great subsistence and commercial importance to all the South Pacific, and soil and water problems are very important, there seem to be few environmental problems associated with the small number of kinds of crops and livestock that are commonly raised in the region. The small population of many introduced species means that they have a weak genetic base through in-breeding, requiring importation of breeding stocks from outside. On the other hand, some traditional crops have an existing diversity and adaptability to local conditions, which could be lost with agricultural modernization. Because of the great environmental problems created by certain past introductions, the countries of the region have established strict quarantine procedures to protect their vulnerable agricultural base. Introduced plants, birds and predators have raised havoc among the local flora and fauna, and require continuing expensive control efforts. On some islands, feral animals descended from escaped domestic stock have destroyed much of the vegetation and caused serious erosion problems. Some islands also report problems in controlling dogs. It has proven much easier to destroy natural ecosystems than to create new balanced systems of species useful to man.

LAND USE and LAND TENURE. Land is the most important island resource; without it a country will cease to exist. Throughout the region the peoples' attachment to their land is very strong as reflected in traditional land tenure systems. These systems tended to encourage efficient use of land resources in the past, but now have difficulty in adapting to population growth and modern development requirements. Over half the island countries report environmental problems associated with land use and land tenure. These include problems from unplanned development, such as incompatible adjacent developments and inefficient use of limited land areas.

There has been a loss of essential land resources, such as from urban expansion on good agricultural land. In some places, areas of good land are left undeveloped, while in others, fragmented land holdings make agricultural modernization difficult. The European freehold system has not adapted well to island cultures and conditions, and new approaches to land tenure and land use may be needed to achieve the best management and use of this limited resource.

COASTAL ZONE. The area between land and sea is one of the most environmentally sensitive areas in all countries. This coastal zone includes both the land along the shore within sight of the sea and the shallow coastal waters within the range of terrestrial influences. Human activities tend to concentrate in the coastal zone, and most major cities are located there. In the Pacific, all except the largest islands consist entirely of coastal zones. These areas are subject to significant conflicts in uses with development, and about half the countries report coastal zone management problems. For instance, runoff from agriculture areas can hurt coastal fisheries. Nearly one-third of the countries report problems associated with the reclamation of coastal areas. Coastal erosion is also a significant problem, particularly for the atolls that occur in one-third of the countries of the region. A major problem for governments in managing the coastal zone is in co-ordinating the many different government departments and ministries that have some jurisdiction there. Some countries have established coastal zone management bodies to resolve this problem.

MANGROVES. Mangroves have been shown to be areas of high coastal productivity with great importance to coastal fisheries. They have long been important for subsistence fishing, firewood collection, and other uses. They are important in controlling coastal erosion, and in protecting islands against storm damage. While mangroves are sensitive to pollution, particularly from oil and chemicals, work in the region has shown that they can be useful in treating urban wastes under controlled conditions. For too long mangroves have been thought of as nasty swamps, and have therefore often been the first areas to be reclaimed or lost with development. As a result, some mangrove areas have been totally destroyed or have shrunk to the point where the remainder is critically important to the coastal zone. More than half the countries report problems in managing their mangrove resources.

REEFS and LAGOONS. The coral reefs and associated lagoons that are one of the characteristics of the South Pacific islands are a major resource now subject to serious environmental pressures. The coral reef ecosystem is highly productive, fragile and easily disturbed when pushed beyond its limits. The reports suggest that there is extensive degradation of reef and lagoon resources in the Pacific: nearly half the countries report reef damage from illegal dynamiting and poisoning for fish; three-quarters report problems of reef pollution, although scientifically the impacts of pollution on reefs are still largely unknown. Siltation and smothering of corals by land erosion and dredging are reported by one-third of the countries, and construction activities on reefs have destroyed further areas. Many reefs have been damaged over the last twenty years by the crown-of-thorns starfish, Acanthaster, and while this may largely have been a natural phenomenon, the present human disturbances of reefs may slow down or prevent their recovery. While much is still not known about reef and lagoon ecosystems, there is also considerable existing knowledge that is not well applied to managing reef and lagoon resources.

FISHERIES. Fishing is an important subsistence and commercial activity throughout the region. While many traditional fisheries were based on a deep knowledge of the resource and effective management procedures, these have largely lost their effectiveness and are disappearing as fisheries are modernized. However, there is inadequate scientific knowledge to manage most tropical coastal fisheries. The improvement in boats and modernization of fishing techniques is leading to extensive over-fishing in more than half the island countries, with the resulting subsistence and economic problems for local fishermen. Ciguatera fish poisoning continues to be a problem in many parts of the region, but with recent research progress on the causes, it may eventually be possible to improve this situation. The Pacific oceanic fisheries are subject to major commercial pressures of world economic importance. While some tunas may be near the maximum catch that they can sustain, there still seem to be considerable potential for the expansion of the skipjack fisheries. Unfortunately, here too, the wide ranging fish species are far from understood scientifically, and the limits of the resources are therefore not clear.

OCEAN. The open ocean between the Pacific islands is fortunately very large with considerable pollution absorption and purification capacity. There is no present evidence of major pollution problems, although some contamination by man-made persistent chemicals has occurred, and floating plastic may be a problem locally. Given the very limited waste disposal capacity on the islands, the ability of the ocean to absorb and neutralize wastes is a useful resource that should be developed with care.

HUMAN HABITATS. More than half the countries report environmental problems associated with the places people live, whether in cities or villages. The Pacific region has been fortunate that the basic traditional quality of life has been reasonably good. However, the rural to urban migration, the increasing expectations and desire for modernization, and the deterioration of resources with over-use, have produced localized but increasing difficulties. The country reports refer to increasing water supply, sanitation and pollution problems, to some sub-standard insanitary housing, to urban development in unsuitable areas with a high risk of damage in natural disasters, to the destruction of the coastal environment near urban centres, and to other problems of the human environment. About half the countries report problems in planning their human settlements, and the few planning controls that exist are generally inadequate and difficult to enforce. Fortunately, the small size of most island communities has kept the problems within limits.

ENERGY. Many countries are concerned that their economic development has led to an increasing dependence on expensive imported energy. However, the presently available technologies for utilizing local renewable energy resources such as the sun and wind are still expensive and limited in their application. Wood and other local fuels for cooking are becoming limited in some islands with the over-exploitation of local resources.

WASTE DISPOSAL. The most important environmental problem in the region in terms of the number of countries affected is the disposal of the wastes resulting from both population concentration and imported materials. Over 60% of the countries report problems in disposing of solid wastes, particularly cars, appliances, cans, bottles, etc. Disposal sites for these non-degradable materials are limited, and are often poorly managed. The disposal of liquid wastes, particularly human wastes, is a problem in 90% of the countries. Systems for the collection and treatment of these wastes are costly and difficult to maintain. Presently used systems such as septic tanks are often inadequate due to poor design and lack of maintenance. In spite of great efforts at rural sanitation, facilities are still rudimentary or entirely lacking in many rural areas. Most Pacific urban areas have local pollution problems with their attendent health risks. There are some serious but localized industrial waste disposal problems.

TOXIC CHEMICALS. With the worldwide concern about toxic chemicals such as pesticides, herbicides, and insecticides, it is normal that this problem is raised frequently in the region. The smaller the island, the greater the risk to its essential environmental resources from a toxic chemical accident. Many small accidents have already occurred in the region, but since there is little or no monitoring of toxic chemicals, their effects have gone largely unrecognized. Drums have rusted and leaked into soil and groundwater, cyclones have destroyed and spilled agricultural stores, and chemicals have intentionally been poured into streams and lagoons to kill fish. Some countries have unwanted chemicals that they cannot safely dispose of. There have been poisonings from inadequate packaging and labelling. As toxic chemicals are used in increasing quantities in agriculture and to control disease-carrying insects, there are increasing risks of pollution and of residues in food crops. More than half the countries report environmental problems associated with toxic chemical use. It is evident that such dangerous materials must be selected, stored, and used with wisdom, with a much greater knowledge of local conditions than often exists at present.

OIL POLLUTION. While the South Pacific region is not on major tanker routes, about one quarter of the countries report existing oil pollution problems. There are small oil spills from port accidents, leaks in pipelines or storage depots, and shipwrecks. These spills have fortunately only affected small areas, extending to a few kilometres of coastline at most. Since tankers of some size do deliver oil supplies to the region, the risk of a large spill is small but present. There is little capacity in the region to control oil spills or to respond quickly in the event of a major accident. Over 80% of the countries are concerned about the effects on their resources of such a major spill, and there is therefore great interest in contingency planning for oil pollution control.

RADIOACTIVITY. The problems of radioactive pollution in the region have long been a subject of political discussion and concern. There is natural radioactivity on Niue, and residual contamination on some islands from earlier nuclear weapons testing programmes. While there is great concern about current and potential sources of contamination, especially the proposed dumping or storage of nuclear wastes near or in the region, there is little real information available to island countries about the risks of radioactive pollution. Since the greatest fear is fear of the unknown, further studies and public education would help to provide a regional basis for action.

AIR POLLUTION. The scale of human activities is very small relative to the size of the South Pacific, and therefore there is no regional air pollution problem. However, half the countries report localized air pollution, mostly in urban areas or associated with particular industries.

POPULATION. It is not possible to generalize about the human population situation in the South Pacific region. Some islands have an increasing population; others a stable or even decreasing population as a result of emigration. Within a country, the movement of people to the capital or urban centres may be depopulating the rural areas or outer islands. Nevertheless, islands, because of their small size, are limited in the number of people they can support, and over 60% of the countries report some concern about their population growth or the carrying capacity of their islands. Fortunately, actual cases of serious overcrowding are rare and localized in the Pacific region at the moment.

Development trends and their environmental consequences

As development continues in the Pacific islands, it will be important to look not only at the direct environmental effects of particular projects, but also at the interaction between different projects that may affect the same resources or the overall system. The SPREP country reports give a summary of development trends and thus give an idea of possible environmental problems to come.

AGRICULTURE. The limited land area of many islands and the distance from potential markets mean that most agricultural development is directed towards import substitution and only small-scale expansion of existing export crops. There should therefore be a slow advance in conventional agriculture for meat and food crops, with some further development of food processing industries near to the production sites. On those islands where large land resources are available for agricultural development, there is some unease that mistakes made elsewhere in developing unsuitable land or in establishing unsuitable types of agriculture should not be repeated on the Pacific's vulnerable soils. There is interest in the potential of perennial crops in the region, minimizing the need for cultivation, exposed soil surfaces, and radical changes to the soil organic cycles. The matching of crop to soil conditions will be a basic requirement for the maintenance of soil nutrients, structure and productivity. The use of agricultural chemicals such as fertilizers and pesticides is increasing, and there is concern about their effects on the small island and lagoon systems. There will probably be an increasing number of accidents with such chemicals, leading to increasing controls on their use.

FORESTRY. In those countries with significant timber resources, forests are coming under increasing pressure from external interests seeking wood as timber and as a raw material. Because of the importance of forest to conservation and to soil and water management, forest exploitation projects will need to be looked at with great care.

Bad experiences with large-scale forestry projects may lead to smaller-scale operations more suited to the island situation. The establishment of means of ensuring the balanced management of the forest resource to provide for sustainability while taking an economic crop is an urgent and critical need in the region. The control of forest clearing and reafforestation are both made complicated by land tenure systems which leave customary owners complete freedom of land use. In those countries where land is available, timber production and processing will be developed with increasing emphasis on plantation forest, often of exotic species, managed for sustained yield. There will be increasing problems of balancing land uses for forestry and for agriculture and other purposes. The responsible management of the forest resource is probably the most urgent environmental issue facing many Pacific countries at the present time.

MINING. Mining will continue to be a very important form of resource use in several countries, and some which have not previously exploited mineral resources consider that mining development is likely. Off-shore petroleum exploration can be expected to increase. While mining has brought great economic prosperity to some countries, it has had substantial and devastating local environmental effects. With increasing international interest in minerals, several countries stress the need to establish more effective means of ensuring that in future mining proposals are assessed for environmental impact and that environmental safeguards are included in development approvals. It is important that governments throughout the region should realize that the international mining industry now expects to live with stringent environmental protection requirements.

FISHING. Fishing, traditionally in-shore in the lagoons and on the reefs, is now moving into deeper water, increasing the available fish resource. Though the open ocean fishery itself probably has little environmental impact in the region, the increasing on-shore processing of off-shore catches and the in-shore catching of live bait introduce environmental issues. The management of coastal fisheries will become an increasing concern as overfishing and coastal development impacts deplete the resource. Aquaculture has so far shown little commercial promise in the region and will probably develop only slowly. There will be difficult choices involved in developing coastal areas for aquaculture or for for other uses.

RURAL DEVELOPMENT. Development in the rural areas is a widespread priority in the region. As it proceeds, there will be increasing conflicts between different land uses for agriculture, forestry, water catchment, conservation, etc. There will be an increasing need to achieve a greater degree of compatibility between the traditional land tenure systems and more effective land and resource planning. The control of forestry and mining operations, watershed management, conservation of fauna and flora, and soil conservation must be on a legal basis totally different from a country using a freehold land title system.

The alternative will be continued deterioration of essential island resources. Governments will need to develop comprehensive planning including physical plans based on inventories of critical resources. The major environmental health problems in villages will be overcome through a considerable investment in rural infrastructure.

URBANIZATION. Urban development through the movement of people from the rural areas to government and commercial centres is a major trend cited in the country reports. With continuing urbanization, there will be an increase in conditions of overcrowding, poor housing, waste disposal difficulties, and a generally poor human environment, where growth outstrips the capacity of countries to provide housing and support services. Urbanization also increases expensive energy consumption. The need to provide employment for urban dwellers leads to a concentration of industrial development and its associated pollution. The increasing population pressures in the region will largely be reflected in towns and cities. Some countries are concerned about the possible return of large numbers of overseas emigrants, and these too would tend to settle in urban centres. The continued development of infrastructure projects such as roads, ports, and airports, will have some environmental impact.

INDUSTRY. There will be further major industrial projects associated with the processing of minerals, fish, and agricultural products. Smaller-scale industries may develop for import substitution in some countries. Processing industries will have to be required to incorporate the best anti-pollution technologies available into their design, as they are required to do in many other parts of the world. OECD work has shown that such technologies are not crippling financially, especially when incorporated into the initial design and not added as an after-design requirement.

TOURISM. Tourism, with its associated accommodation, transport, and support services, is considered likely to be highly important in many parts of the region, though several countries have stipulated that such development will be cautious, gradual and carefully planned. Emphasis is placed on attracting Japanese tourists in the northwest part of the region, the Americans in the central and northeast, and the Australian and New Zealand tourists in the south. A mixing of all sources plus tourists from Europe and Southeast Asia is envisaged for the whole region. The development of tourism will require the development and protection of island amenities and tourist sites so that the industry does not destroy the very qualities that attract tourists to the region. As the competition for tourists increases, there will be an emphasis on appropriate types of tourism development, and on better planning of tourist infrastructure such as beaches and parks.

ENERGY. The high price of fossil energy is forcing attention on other forms of renewable energy, and hydro-electric development is being planned in many areas. Such projects will require careful consideration to minimize environmental costs. Energy farming based on exotic tree crops, cassava, or sugar cane for alcohol fuels is being considered seriously and could bring a new surge of development to tropical agriculture and tree cropping. Tree planting for fuel wood is also possible. Skilled and well-informed management of the land will be necessary if this is to avoid soil erosion and other deterioration. Competition with other essential land uses will also be a problem. Some smaller islands may divert copra production into coconut oil based fuels. The cutting of the existing native forests for energy is being proposed, but both the sustainability of this resource and the impact on native species should be carefully examined. There will be an increased use of solar energy where the considerable investment makes this practical. The wider use of wind, wave and ocean thermal energy must await the development of economic technologies at an appropriate scale for the region.

OCEAN POLLUTION. There are increasing pressures for the dumping in the Pacific Ocean of nuclear and other toxic wastes originating in the industrialized countries. Such dumping will create a risk of contamination, particularly through oceanic food chains. With increased oil exploration and transportation, the risk of major oil spills is also growing. A spill in the wrong place could be disastrous for an island country's marine resources. There will be potential pollution dangers from the mining of sea bottom minerals, and disruption to marine ecology from the exploitation of ocean thermal energy differences. Careful consideration will need to be given to regional ocean dumping and pollution regulations, to permit ocean disposal by island countries of non-toxic wastes they cannot dispose of on their limited land areas, while prohibiting the kinds of dumping that threaten the regional environment.

THE ISLAND SYSTEM. The greatest environmental problem facing the countries of the region will be to balance the different requirements of their island system. More than 60% of the countries are already concerned that they are approaching their carrying capacity. It is therefore essential to determine what will be the most limited resources, and to plan carefully to ensure that all the peoples' needs can be met on a sustainable basis. The coastal zone will need to be a particular focus of attention, with new legal controls and co-ordinated government action to plan and manage this vital sector of the environment. It will be necessary for governments to choose appropriate kinds of development and to be conscious that some developments may be impossible in their island situation.

The contribution of environmental management to development

The SPREP country reports indicate that environmental management is becoming increasingly integrated into governmental concerns and development plans, although the means to implement government desires in this area are far from adequate. The following section summarizes the state of the environmental management capacity of countries of the region.

An effective national programme of environmental management should include the formulation of government policy and the adoption of appropriate legislative modifications and administrative procedures to implement that policy. The government needs to know the present state of its resources and environment and what is happening to them, requiring assessment, scientific information, research and monitoring. On the basis of the available information, plans need to be adopted or modified and the planning process itself developed, and actions need to be undertaken through development, control and conservation projects. The whole process requires education of the general public, the training of personnel and/or the use of outside experts, and the development of facilities and equipment.

POLICY. The country reports reflect a high degree of policy commitment to environmental protection and enhancement, but a good deal of concern about how such policies can be implemented. Most countries are mindful of the relevance of environmental issues in development planning, but have real difficulty in expressing environmental policy in terms of economic development plans. As in most other countries, the reconciliation of sustainable economic advancement with social compatibility and environmental protection and enhancement is a critical process which is difficult to attain - perhaps this is especially so in many Pacific countries because anticipatory policies are needed more than curative policies.

There is a traditional feeling for wise environmental management among most Pacific peoples. Because islands are small-scale fragile ecosystems, many village customs and unwritten rules of behaviour have been based on inbuilt concern for environmental protection. These traditions can be readily incorporated in government policies, but the balancing of these against the new values of economic development and the values of other cultures is an extremely difficult political process.

Specific references in the country reports indicate a surprisingly widespread application of policy through formal planning processes. There are many references to economic development plans, to outdoor recreation plans, to coastal zone planning, and to energy planning. Some country reports indicate that these planning processes are longstanding - referring to the fourth five-year plan - and the later versions of these plans all seem to recognize environmental protection and enhancement as one of the national objectives that must be secured within the prime objective of economic development.

There is frequent reference to the relative ease of developing single objective policies, but the great difficulty is achieving the co-ordination at both formulation and implementation stages which is necessary to establish and achieve truly multi-objective policies.

The experience of Banaba has made a deep impression on some countries providing an object lesson on the ultimate effects of policies weighted substantially to economic objectives. Cultural values and traditions have been prominent in most country statements on policies which generally can be summed up as "seeking the development of natural resources with sensitivity to cultural traditions and values, and with compatibility to the protection and enhancement of the physical and social environment".

LEGISLATION. There is a great deal of environmental legislation in Pacific countries, reflecting the care which has traditionally been required to maintain environmental quality in small isolated ecosystems. Water management, especially the protection of water supply catchments and aquafers from pollution and excessive draw-off, the control of animal and plant introductions, wildlife conservation often in relation to hunting, forest protection, and park and reserve establishment - these issues are covered by legislation in many countries. Legislation for the environmental assessment of development projects and the control of pollution and toxic chemicals is less common. Some reports stated that the legislative base is adequate, if the will and ability to apply the law were stronger - and this might well generally apply to the region as a whole. For regulating environmental management in relation to pressures from within the region, existing laws complemented by traditional customs and unwritten rules of conduct may well be adequate if their application and enforcement can be improved. But there is real concern that in dealing wisely with outside pressures for the use of resources such as minerals and timber a much firmer legal base may be necessary in many countries. No country appears to have an environmental statute which completely meets its needs, probably because many have been modelled on examples only marginally relevant to their circumstances. Emphasis often lies on the aesthetics of environmental protection rather than the imperative of resource conservation.

The reports reflect a keenness to work together on legislation for environmental protection both in the field of international conventions and in the design of national laws. The effective implementation of the Regional Plant Protection Convention illustrates the value of a regional approach, and several reports have suggested that advice and assistance would be welcome in clarifying the responsibilities, advantages and disadvantages, of adherence to a range of international environmental conventions.

There is concern that legislation to control the exploitation of biological resources on land and in coastal waters is difficult to design because of inadequate knowledge of the biological processes involved, and is difficult to implement because of traditional freedoms and to police because of the large areas involved.

ADMINISTRATION. The administrative arrangements necessary to implement national environmental policies differ considerably among countries. Some countries have a council or a committee or a secretary to develop policy, and its implementation is in the hands of the operating agencies. Some regard the policy development body as "the environmental watchdog" also. Other countries have an environmental protection board which has direct control of environmental matters by regulation, permit, and classification. In some countries "conservation" is set aside as the specific responsibility of one department, with other aspects of environmental management spread throughout the government system. At this stage, the policy development activity seems to be more effective than the system for incorporating that policy into planning.

There is widespread concern about lack of effective co-ordination and almost all countries are seeking advice or guidelines in this area. Both at policy level and at the individual project level the incorporation of environmental values and the results of environmental assessments present real difficulties. The process is a complex piece of machinery of government in all countries, but it is made more difficult in Pacific countries because of the shortage of skills in environmental assessment, very limited experience in multi-objective planning, and some problems in modifying the administrative systems to receive a new input. There is also concern that a substantial additional bureaucracy might arise in incorporating environmental factors into national programmes. It should be possible to avoid this if the principles are clearly delineated and functions are clearly established and understood.

ASSESSMENT. Assessment means deciding on the value or worth of a project or activity, and must include not only economic, but also environmental and social costs and benefits. Adequate assessment is essential for sound government decision-making. Judgments of value must be made by skilled people based on information about the environment, resources and processes to be affected. Some of the necessary information is in the scientific and technical literature, but it is generally unavailable and in forms that cannot be used in the region without interpretation. Other information exists locally, but it is difficult to keep up to date. Much is simply not known at all, and will require further surveys and research. Bringing together and evaluating this information is one of the major challenges of environmental assessment.

There seems to be a general concern that there is very little expertise available in the region in environmental impact assessment or in translating environmental information into the planning process. This is to be expected, for it is a "second generation integrative function", and most of the countries of the region are still at a very early stage in developing their teams in the primary scientific disciplines. Several countries have requested guidelines for environmental assessment procedures and their incorporation into planning activities. There may be dangers in assuming that environmental impact assessments take care of environmental issues. In fact they only provide additional information for the decision-maker to take into account.

There is considerable uncertainty about the role of environmental assessment and its application to the decision-making process, because of the shortage of real expertise in both assessment and application processess. This is a "chicken and egg" situation in which recognition of assessment depends on high calibre expertise, and the availability of high calibre experts depends on recognition of the importance of their role.

In fields in which country reports indicate that assessment skills are likely to be needed in the near future, high priority is given to the effects of sedimentation and organic pollution on lagoons and reefs - an area in which the lack of basic knowledge of processes is limiting understanding. Soil deterioration consequent on unsuitable agricultural development has alerted some countries to inadequate assessment in this area, and the need for more skilful assessments in the future. The management of pesticides so that they are fully effective on their target without entering non-target areas of the environment necessarily involving development of integrated pest control techniques, is a matter of real concern in many countries. So is management of mangroves so that sufficient areas are retained in good condition to fulfill their key role in estuarine/lagoon/open sea biological systems. The control of coastal sediment movement to avoid coastal erosion also receives emphasis.

In human settlements, sewage disposal in unserviced areas, the effective disposal of non-biodegradable wastes and the avoidance of juxtaposition of incompatible land uses require assessment skills. The incorporation of tourism into island environments with the least practicable disturbance, and the minimizing and containing of the effects of mining and hydro-electric development will be major projects to be assessed in the near future.

Oil spillage from land-based installations, from off-shore exploration, and from ship and tanker accidents, is particularly serious in a coral reef/lagoon situation, and many countries have stressed the urgency of assessment and control measures. Major spills or leaks at sea would convert the open sea from a pollution-receiving sink of high capacity to a source of danger to the coastal zone on which people are so dependent. There is similar concern about the dumping of toxic materials (including nuclear wastes) in an ocean at present virtually unpolluted, and assessment skills of the highest order will be necessary if people are to have confidence in the evaluation of potential effects.

Overall, assessment of environmental impact of policies and projects in the Pacific region is well behind the basic data available, and the development of assessment skills relevant to these environments is urgent if future development is to be environmentally sound.

In those areas where knowledge is inadequate to make sound assessments, further research will need to be encouraged. Although the regional capacity for research fundamental to wise environmental management is limited, there are centres with active research programmes which provide the opportunity for co-operative work with many institutions and research workers from outside the region. The University of the South Pacific at Suva with the South Pacific Regional College of Agriculture at Alafua in Western Samoa, the University of Papua New Guinea at Port Moresby, the PNG University of Technology at Lae, and the University of Guam, all have research programmes operating in disciplines of environmental significance. Of particular relevance are the Marine Laboratory of the University of Guam, and the Atoll Research Unit of the University of the South Pacific in Kiribati.

The SPC's own research programme, ORSTOM and the Pasteur Institute in New Caledonia, and the local research programmes of government agencies add to a substantial research effort within the region. From countries peripheral to the region, universities and government agencies in Hawaii, Australia and New Zealand have many co-operative programmes, and the East-West Centre at Hawaii has a number of projects involving the region. There are some large internationally sponsored programmes operating in the area such as the SPC Tuna and Billfish Assessment Programme. There is a substantial body of information available on geology, soils, and vegetation, from surveys made over many years.

Overall, the picture is of quite extensive research activity, commanding a considerable measure of world interest and support, but based on unco-ordinated initiatives from a large number of institutions. At this stage, there seems to be a need for a reappraisal of research emphasis. For example, soil research should probably move from basic characterization towards interpretation according to the capacities and limitations of Pacific island soils, and thence to their suitability for various forms of agriculture and forestry use. On the other hand, reef and lagoon management lacks a well-documented understanding of the ecological processes taking place in this ecosystem, and if real progress is to be made, a concerted and co-ordinated effort in basic research is necessary. A well-presented programme would probably attract participation by research institutions of high standing and capacity.

The gradual extension of resource utilization into deep water fisheries is opening up new areas for research which can only practicably be carried out on a regional or international basis. The SPC Skipjack and Tuna Programmes illustrate how substantial progress can be made by a well-designed project and this could establish a pattern for future off-shore studies applied to other elements of marine resources.

A major lack is of information about the changes in the status of local resources and levels of pollution over time, as this knowledge is essential to determine the need and urgency for local corrective action. Simple monitoring programmes are needed to provide this information, particularly for forest and mangrove areas, land use, freshwater and coastal pollution, pesticide residues, endangered species, reef health and fisheries resources. Monitoring of water supplies is already carried out in most countries - mostly by public health authorities. The techniques and resources for such monitoring could perhaps be most economically co-ordinated on a regional basis.

MANAGEMENT APPROACHES. Once environmental assessments have been reviewed, decisions must be taken and implemented through a series of management actions. One of the most important areas for government action in environmental management is through comprehensive planning.

Most of the countries report on development plans which are an established element in their administration or are shortly to become so established. It is a sign of the rapid broadening of view that, though the earlier plans were solely economic, almost all of the later ones include environmental considerations, some with only a minor role, but some as a very important element of the overall plan.

As in most countries, single objective planning follows readily along established procedures, but the necessary co-ordination among government departments and other agencies is hard to achieve for multi-objective planning, such as for environmental protection and enhancement.

The standard of physical base data available to planning authorities is generally very adequate. There is good information on soils and geology, and in most areas aerial photographic cover is of a high standard. Biological data is much less available, and much less readily translated into planning terms. More work is required to develop useful planning tools such as map overlays that can help to synthesize data for planning purposes.

Though many countries have planning processes which include environmental impact procedures, in fact these are often not enforced or taken into account. The lack of local skilled and knowledgeable people, both to make assessments and to apply the information in making decisions, is a major handicap. In addition, procedures developed elsewhere are not easily scaled down to the small size of many island governments. This whole area seems to require considerable thought, consultation, and exploration, and could be suitable for regional collaboration in developing appropriate guidelines.

Action may also call for the modification of development projects, or their monitoring to ensure that decisions are respected and corrective actions taken if necessary. Where essential resources are threatened, protective measures may be in order. While some environmental measures may increae costs, it has been found that effective environmental management based on careful assessment and planning early in the conceptual stage of projects can often be more economical than unregulated development.

Reports indicate that in many places policy-makers consider environmental management to be concerned only with pollution controls and conservation measures rather than the balanced and efficient use of all natural resources. This misconception leads to a reluctance to incorporate environmental factors in management decision-making. In fact the ultimate goals of environmental management and development are the same : the improved welfare of the people on a sustainable basis.

There appears to be quite widespread doubt that present environmental procedures may be strong enough to withstand increasing pressure for rapid and sometimes unwise developments in the near future. The development of an environmental assessment process appropriate to Pacific island conditions is therefore urgent. In some countries, more rigorous planning is likely to be used - a difficult operation within the customary land tenure system. Coastal management plans, town plans, and even rural land use plans are contemplated. Disaster contingency plans are being worked on with widespread attention to plans for the control of oil spills. Regional oil spill contingency plans are advocated by many countries.

All except the largest islands are single integrated environmental systems, in which a change in forest cover or river flow, for instance, might damage a coastal fishery on the other side of the island. Government resource management approaches and planning must therefore be developed to cover the whole island system in an integrated fashion. Strengthening governments' capacity to do this will be a major priority in the years to come as resource use conflicts increase.

IMPLEMENTATION. Actions can only be carried out if there are people to do the work, and if the necessary equipment and facilities are available. Since much environmental management depends on the individual actions of many people in such things as caring for their land and disposing of their wastes properly, environmental education is important in the schools and for the general public. People skilled in monitoring, assessment, planning and decision-making are essential, either within the government, or available as outside experts when needed. The country reports have indicated the major requirements in these areas.

EDUCATION. Throughout the education system, through primary, secondary, and tertiary institutions and in the various media for public information and education, there is need for the provision of relevant basic material such as teaching aids. There is widespread concern expressed that much of the present teaching material is irrelevant to the island environment : where special material has been prepared by the SPC, it has been much appreciated, but even this does not apply to all different island situations.

It is not in fact practicable to provide individually tailored material for each country; the only solution is to improve teacher training so that this application stage can be handled more adequately.

The presence of active tertiary institutions within the region, all showing real interest in environmental questions and introducing environmental concepts in science teaching, will eventually lead to a re-focussing of teaching at all levels. But it will take time. In the interim, the supply of teaching materials, and well-presented information for radio and press seem the most effective measures to take. SPREP in itself will be a test of the effectiveness of public information and education methods in the region.

PERSONNEL. The country reports give a picture of development and change which is taking place at too fast a rate for the number of trained people available and their level of experience. There is a shortage of graduates in the area, and it seems especially difficult to retain them in the environment field.

Research, planning, assessment and management are all short of the type of people necessary to make the decisions which are now being forced on the region.

Two areas of special concern which arise from country reports are the lack of skills in environmental assessment, and a lack of comprehensive experience in environmental legislation. Both these areas are critical to orderly development planning for the region, and both merit special consideration within the SPREP framework.

OUTSIDE EXPERTS. Most countries report that they have fairly ready access to outside experts either through bilateral arrangements (government to government, or institution to institution) or through the SPC or other international agencies. Long-term bilateral arrangements have been particularly productive : shorter-term consultancies have been productive when they have been concerned with a specific problem, which has been clearly defined. The ability to recognize the problem and define it clearly is a skill which must be developed within the countries if outside expert assistance is to be used effectively and efficiently.

Some interchange of experts within the region is developing, particularly fostered by SPC. This will lead to strengthening the regional concept, a comparison and pooling of knowledge, and a stimulation of experts who might otherwise become highly localized.

FACILITIES and EQUIPMENT. Though there are some centres in the region which have a reasonable range of basic equipment and adequate operating facilities (e.g. the universities, some government departments, and the SPC), it is inevitable that small independent countries should be very restricted in what they can afford to maintain or have the staff to operate. Most of the smaller countries have equipment for basic monitoring of essential aspects of the environment (usually public health) and many have arrangements with larger neighbouring countries, sometimes facilitated by SPC, for more sophisticated monitoring when it appears necessary.

Isolation from maintenance services also limits the degree of sophistication of equipment which is possible in many countries. The expense of special visits by service men, or long down-times waiting for regular maintenance calls make much useful equipment quite uneconomic in the Pacific.

Several country reports, however, suggest that the effective usefulness of existing equipment could be increased by better co-ordination of its use within the individual countries. Acceptable ways of ensuring that equipment is available on an inter-agency basis, rather than being held for its own use by only one agency, would be one low-cost means of improving effective equipment availability.

Equipment and personnel must be matched. Additional qualified technical people will inevitably require additional equipment - without it they will be ineffective and frustrated. Sophisticated equipment without the expert to plan its use and to operate it is wasted. It is important that countries recognize the costs involved in maintaining this essential balance.

Conclusions

This brief review of the state of the environment in the South Pacific based on reports from nearly all countries of the region demonstrates the importance of regional co-operation in environmental matters through activities such as the South Pacific Regional Environment Programme. All the countries share a common natural heritage, especially of similar island types, which provides the basis for shared experience. While the environmental situation in general is far from serious, there is no room for complacency. A series of increasingly widespread problems is reducing the productive capacity of island natural resources, endangering the health and well-being of the people, and increasing the risk of accidents. It is clear that some islands at least are getting closer to the limits of certain resources and thus to their capacity to support their inhabitants. It is also apparent that some problems and risks concern the whole region. It has long been accepted that "no man is an island", but today, no island is an island either.

The governments of the South Pacific region are concerned about these problems, as illustrated by the widespread support for SPREP. They are responding within the limits of their resources, but the Pacific is vast and complex relative to the small size of its human population. Most countries lack the knowledge, personnel and material means to implement what they see as necessary and desirable. It is not possible simply to transplant the elaborate environmental procedures developed elsewhere. More appropriate alternatives are required, perhaps combining national and regional elements. The Action Plan for SPREP will help to define the next steps to take to maintain and improve the South Pacific environment for the benefit of its people.

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